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THE

FLORA OF THE PRESIDENCY OF BOMBAY.

BY

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FORMERLY PRINCIPAL OF THE COLLEGE OF SCIENCE AT POONA AND DIRECTOR OF THE BOTANICAL SURVEY OF WESTERN INDIA.

VOL II.

CORNACEÆ TO CHENOPODIACEÆ

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PREFACE TO REPRINTED EDITION.

When the Botanical Survey of India was reorganised in 1954 the Government of India decided on the advice of the eminent Botanists of the country that the important 'Floras' of the country which had gone out of print should be reprinted in order to provide immediate facilities of work on Systematic Botany of Phanerogams by students and Botanists of the country. The reprints are now being issued accordingly.

One particular point needs a special mention here. The Government of India, while recognising fully the need for bringing the 'Floras' of the country upto date after a thorough revision, cannot overlook the fact that such work is possible only on an extensive and thorough exploration of both regions already explored and those hitherto unexplored and a proper rating of the information thus obtained with the materials in the already published 'Floras'. For this reason alone, there is ample justification for a reprint of the old 'Floras' ; the present effort is therefore the starting point in the greater project of the review of the 'Floras' of our country. It is hoped that these publications would thus meet the long-felt requirement of the Botanists of the country.

Owing to the necessity to conform to certain printing stipulations and using the same size of paper for all the reprinted 'Floras', the paginations in the reprinted volumes differ from the original. But the index, which is correspondingly corrected, would, it is hoped, enable reference without inconvenience. Some of the printing mistakes in the original flora have been corrected in this publication. It was also found that some of the vernacular names as well as names of genera and species had not been included in the indices of the original edition. These have been added in the present edition.

The original work was published in two unequal volumes each with separate indices. In the present reprint they are being published in three more or less equal volumes, volumes I and II with separate indices and volume III with a consolidated general index at the end, for convenience in handling.

J. C. SEN GUPTA,
Chief Botanist,
Botanical Survey of India.

Calcutta, 1958.

FLORA OF BOMBAY

ORDER LXIX. CORNACEÆ.

Shrubs or trees. Leaves opposite or alternate, usually petiolate, generally quite entire, often unequal at the base ; stipules 0. Flowers 1-sexual or hermaphrodite, regular, in terminal or axillary cymes, panicles or heads. Calyx-tube adnate to the ovary ; limb 0, or truncate, or 4-10-toothed or lobed, persistent, valvate or open in æstivation. Petals 0 or 4—5 (rarely ∞), imbricate or valvate. Stamens inserted with the petals at the base of an epigynous disk, usually equal in number to the petals, rarely 2—4 times as many. Ovary inferior, 1—4-celled ; ovules usually solitary (rarely 2), pendulous from the apex of the cell, anatropous. Fruit usually drupaceous ; putamen 1—4-celled, less commonly with 2 bony or crustaceous pyrenes. Seed oblong, pendulous ; embryo in the axis of copious usually fleshy albumen ; cotyledons usually thinly foliaceous ; radicle terete.—DISTRIB. Scattered throughout the world, but chiefly in the northern hemisphere ; species 75.

Flowers fascicled ; petals very long ; stamens 15 or more	1. ALANGIUM.
Flowers panicled ; petals short ; stamens 4—5	2. MASTIXIA.

1. ALANGIUM, Lamk.

Shrubs or small trees, armed or not. Leaves alternate, petiolate, oblong, quite entire, 3-nerved from the base, persistent. Flowers white, subsilky, hermaphrodite, in axillary fascicles, ebracteate, shortly pedicelled, articulated with the pedicel. Calyx-tube turbinate, often sulcate ; limb large, 5—10-toothed or truncate. Petals 5—10, linear-oblong, at length reflexed or revolute, valvate. Stamens usually 2—4 times as many as the petals ; filaments filiform or flattened, more or less villous ; anthers long. Disk cushion-shaped, depressed in the centre, lobed or crenulate. Ovary 1-celled ; ovule solitary in each cell, pendulous ; style narrowly clavate or filiform ; stigma clavate or capitate, 4-many-fid or many-lobed, the lobes conduplicate. Berry crowned with the calyx-limb. Seed oblong ; testa thin ; albumen usually fleshy ; cotyledons foliaceous ; radicle elongate, cylindric, thick.—DISTRIB. Asia and Tropical Africa ; species 8—10.

1. **Alangium Lamarckii,** *Thw. Enum.* (1859) p. 133. A small tree with more or less spinescent branches ; bark light-colored ; young parts pubescent. Leaves variable, 3—5 by 1—2¼ in., narrowly oblong or ovate-lanceolate, more or less acuminate, subobtuse, entire, glabrous above, pubescent on the nerves and prominently reticulately veined beneath, base rounded or acute ; petioles ¼—½ in. long, densely

pubescent. Flowers few, in axillary fascicles ; pedicels ⅛—¼ in. long, densely pubescent, jointed at the top. Calyx turbinate, ⅛ in. long, densely silky-pubescent ; teeth triangular, $\frac{1}{16}$ in. long. Petals 5—10 (usually 6), densely pubescent outside, ½—¾ in. long and about $\frac{3}{16}$ in. wide, narrowly linear, reflexed. Stamens numerous (usually more than 20), nearly as long as the petals ; filaments hairy at the base. Style as long as the stamens ; stigma very large. Fruit when young ovoid or ellipsoid, becoming nearly globular when ripe, ½—¾ in. in diam., crowned by the persistent calyx-limb, finely pubescent, not or obscurely ribbed, purplish-red ; endocarp bony ; albumen fleshy outside, friable inside, not at all ruminate ; cotyledons foliaceous, flat, not crumpled. Fl. B. I. v. 2, p. 741 ; Dalz. & Gibs. p. 109 ; Trim. Fl. Ceyl. v. 2, p. 285 ; Talb. Trees, Bomb. ed. 2, p. 181 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644 ; Watt, Dict. Econ. Prod. v. 1, p. 153. *Alangium decapetalum*, Lamk. Encyc. Méthod. v. 1, p. 174 ; Grah. Cat. p. 72 ; Wight, Icon. t. 194.—Flowers : Feb.—Apr. VERN. *A'nkul* ; *Ansaroli*.

KONKAN : *Stocks* !, *Dalzell & Gibson* ; Elephanta, *Graham*. DECCAN : *Dalzell & Gibson* ; Poona, *Woodrow* ! GUJARAT : Dangs, *Bhica* ! ; Bodeli, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 1070 ! KANARA : Godhuli, *Talbot*, 521 !—DISTRIB. Throughout India ; Ceylon, S. China, Malaya, Philippines.

The fruit though astringent and acid is eaten. The wood is hard, tough, and close-grained, and is valuable as fuel.

2. MASTIXIA, Blume.

Trees with terete branches. Leaves alternate, subopposite, and opposite, oblong, quite entire, drying black. Flowers small, hermaphrodite, in terminal panicles, articulated with a 2-bracteolate pedicel. Calyx-tube campanulate ; limb dilated, 4—5-toothed. Petals 4—5, ovate, leathery, valvate. Stamens 4—5 ; filaments short ; anthers cordate. Disk fleshy. Ovary 1-celled ; ovule 1, pendulous from one side of the cell near its summit. Drupe ovoid or ellipsoid, usually areolate at the apex ; putamen woody, grooved down one face. Seed conform to the cell ; testa membranous ; albumen copious, fleshy ; embryo small ; cotyledons foliaceous, thin ; radicle subelongate, cylindric.—DISTRIB. Indian Peninsula, Ceylon, Java ; species about 8.

1. **Mastixia pentandra** *Blume, Bijdr.* (1825) p. 654. A moderate-sized tree ; bark smooth. Leaves 4—6 by 1¾—2½ in., elliptic-oblong, often obtusely acuminate, green and glabrous above, paler, reticulately veined, and, when young, puberulous beneath, base usually unequal-sided ; main nerves 6—8 pairs ; petioles ¾—1 in. long, glabrous. Flowers numerous, in terminal densely pubescent panicles ; buds silky-pubescent ; lower bracts foliaceous, sometimes nearly 1 in. long, the upper narrowly linear ¼ in. long ; bracteoles $\frac{1}{12}$ in. long, acute, pubescent. Calyx ⅛ in. long, pubescent outside ; tube narrowly campanulate ; teeth 5, ovate, subacute, $\frac{1}{12}$ in. long. Petals 5, ovate, very acute, leathery, a little longer than the calyx. Stamens 5. Style very short. Fruit 1¼ by ¾ in., ellipsoid. Fl. B. I. v. 2, p. 746 ; Talb. Trees, Bomb. ed. 2, p. 182 ; Woodr. in Journ. Bomb. Nat.

v. 11 (1898) p. 644. *Bursino-petalum arboreum*, Dalz. & Gibs. p. 28 (*not* of Wight).—Flowers: Jan.—May.

KONKAN: *Stocks*!, *Dalzell*!, *Law*!; Western Ghâts from Bombay southwards, *Talbot*. S M COUNTRY: Dharwar, *Woodrow*; Párva Ghât, *Dalzell & Gibson*. KANARA: in evergreen forests and along nálas in N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula).

ORDER LXX. RUBIACEÆ.

Trees, shrubs or herbs, erect, prostrate, or scandent. Leaves opposite or whorled, simple, entire, stipulate (except in *Rubia*); stipules various inter- or intra-petiolar, persistent or deciduous, sometimes free, sometimes united to the leaf or the neighbouring stipule, entire, toothed or setose. Flowers hermaphrodite (rarely 1-sexual), usually regular. Inflorescence various. Calyx-tube adnate to the ovary; limb various. Corolla regular, gamopetalous, infundibuliform, hypocrateriform or rotate; limb of 4—6 segments, usually equal, valvate or imbricate or contorted (to the left as seen from outside). Stamens as many as the segments of the corolla, 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, 2-fid or multifid; stigmas various. Fruit berried, capsular, drupaceous or of dehiscent or indehiscent cocci, 2—10-celled. Seeds various; albumen fleshy or horny; embryo straight or curved; cotyledons flat or semi-terete; radicle superior or inferior.—DISTRIB. Chiefly tropical and subtropical; genera about 340; species about 4000.

Ovules more than 2, usually numerous to each cell [rarely solitary in some species of *Anotis* (12)].
- Flowers crowded in dense globose heads.
  - Calyx-tubes fused into a fleshy mass..... 1. SARCOCEPHALUS.
  - Calyx-tubes not fused into a fleshy mass.
    - Corolla-lobes imbricate.
      - Seeds not winged; stigma fusiform..... 2. ANTHOCEPHALUS.
      - Seeds winged; stigma globose..... 3. NAUCLEA.
    - Corolla-lobes valvate.
      - Calyx cleft ½-way down; stigma clavate..... 4. ADINA.
      - Calyx truncate; teeth obscure; stigma mitriform..... 5. MITRAGYNA.
- Flowers not in dense heads.
  - Fruit capsular.
    - Trees or shrubs.
      - Corolla-lobes valvate; seeds winged..... 6. HYMENODICTYON.
      - Corolla-lobes twisted; seeds not winged..... 7. WENDLANDIA.
    - Herbs (the Bombay species).
      - Corolla-lobes valvate.
        - Corolla-lobes with a tooth on each side..... 8. DENTELLA.
        - Corolla-lobes entire.
          - Anthers connivent, dehiscing by apical pores; capsule bursting irregularly at the apex ..... 9. ARGOSTEMMA.
          - Anthers not connivent, dehiscing laterally; capsule usually regularly dehiscing, rarely indehiscent.
            - Calyx-teeth 4.
              - Calyx-teeth contiguous on the capsule ..... 10. HEDYOTIS.

Calyx-teeth distant on the capsule.
Seeds numerous, minute, angular. 11. OLDENLANDIA.
Seeds few, plano-convex or globose with a large ventral cavity..... 12. ANOTIS.
Calyx-teeth 5 ..... 13. OPHIORRHIZA.
Fruit a fleshy berry.
Corolla-lobes valvate ..... 14. MUSSÆNDA.
Corolla-lobes twisted.
Inflorescence terminal [sometimes axillary or leaf-opposed in *Randia* (16)].
Ovary 2-celled.
Seeds few ..... 15. TARENNA.
Seeds numerous ..... 16. RANDIA.
Ovary 1-celled ..... 17. GARDENIA.
Inflorescence axillary [see also *Randia* (16)].
Flowers in clusters; ovary 2—3-celled..... 18. DIPLOSPORA.
Ovules solitary in each cell [see also *Anotis* (12)].
Leaves with stipules.
Radicle superior; corolla-lobes valvate.
Fruit of 2 cocci..... 19. KNOXIA.
Fruit a drupe with 2-many free or cohering pyrenes.
Ovary 2-celled ..... 20. PLECTRONIA.
Ovary 5—3-celled ..... 21 VANGUERIA.
Radicle inferior.
Corolla-lobes twisted.
Style shortly exserted, 2-branched..... 22. IXORA.
Style much exserted, entire..... 23. PAVETTA.
Corolla-lobes valvate.
Calyx-tubes confluent ..... 24. MORINDA.
Calyx-tubes not confluent.
Ovules basilar, erect, anatropous.
Stlye-branches 2.
Trees or shrubs.
Stipules intrapetiolar.
Corolla-tube short, straight..... 25. PSYCHOTRIA.
Corolla-tube long, curved..... 26. CHASALIA.
Stipules interpetiolar.
Corolla-tube funnel-shaped; berry blue; a fetid shrub..... 27. SAPROSMA.
Slender creeping herbs..... 28. GEOPHILA.
Style-branches 3—9
Fruit drupaceous ..... 29. LASIANTHUS.
Fruit capsular ..... 30. HAMILTONIA.
Ovules attached to the septum, amphitropous.
Herbs.
Fruit of 2 indehiscent cocci..... 31. HYDROPHYLAX.
Fruit of 2 cocci, both or 1 only dehiscing ventrally 32. SPERMACOCE.
A small shrub; fruit of 2 connate cocci; calyx-limb greatly enlarged..... 33. GAILLONIA.
Leaves without stipules.
Herbs; leaves whorled ..... 34. RUBIA.

1. **SARCOCEPHALUS,** Afzel.

Shrubs or trees. Leaves petiolate; stipules interpetiolar and caducous, or intrapetiolar and persistent. Flowers packed into globose heads, the calyx-tubes fused into a fleshy mass; peduncles simple, usually solitary, terminal, bracteate below the middle; bracts small. Calyx-lobes 4—5, persistent or caducous. Corolla-tube long, narrowly

funnel-shaped, glabrous; lobes 4—5, imbricate, glabrous or pubescent. Stamens 4—5, inserted on the mouth or throat of the corolla. Ovary 2-celled; ovules numerous, imbricate, on pendulous placentas; style filiform, exserted; stigma fusiform. Fruits combined into a fleshy globose mass of 2-celled pyrenes with very thin septa. Seeds few in each cell, not winged; testa crustaceous; albumen fleshy.—DISTRIB. Tropical Asia, Africa and Australia; species 13.

1. **Sarcocephalus missionis,** *Haviland, Rev. Naucl. in Journ. Linn. Soc.* v. 33 (1897) p. 32. A small tree. Leaves 4—6 by 1½—2¼ in., elliptic-lanceolate, subobtuse, membranous, glabrous, shining above, running down wing-like into the petiole; main nerves 10—12 pairs, slender; petioles scarcely ½ in. long; stipules intrapetiolar, persistent, ¼ in. long, triangular, acute, more or less connate, forming a sheath. Peduncles stout, solitary, usually inclined, ½—1 in. long, with stipular sheathing bracts at the base and 4 small bracts ⅛—¼ in. long united below into a cup attached on the peduncle below its middle. Heads of flowers 1—1¼ in. in diam. Calyx hairy, the calyx-tubes fused together, ⅛ in. long; calyx-lobes ¼—⅜ in. long, oblong, subclavate at the apex, hairy inside and outside. Corolla yellow; tube ¼—⅝ in. long, glabrous; lobes oblong, obtuse, hairy on both sides, ⅛ in. long. Anthers apiculate, reaching to about the middle of the corolla-lobes. Style exserted about ⅛ in. beyond the corolla-lobes; stigma fusiform. Fruits connate into a fleshy globose mass. Seeds arillate, irregularly flattened, imbricate; testa black, crustaceous. *Nauclea missionis,* Wall. Cat. 6099; Fl. B. I. v. 3, p. 27; Talb. Trees, Bomb. ed. 2, p. 186; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644. *Nauclea elliptica,* Dalz. & Gibs. Bomb. Fl. p. 118 (*not* of Bedd.).—Flowers: Apr.—May. VERN. *Phuga.*

KANARA: along rivers and watercourses in N. Kanara, *Talbot*; N. Kanara, *Woodrow*!; common near Yellapur, *Talbot*; Sirsi, *Talbot*!; Karwar, *Woodrow*!—DISTRIB. India (southern districts of the Western Peninsula).

Note.—I have carefully examined the specimens of what Dalzell called *Nauclea elliptica,* which were sent by Dalzell himself to Kew in 1873, with a letter to Prof. Oliver (which is preserved in Herb. Kew.), and these specimens certainly do not belong to the genus *Nauclea.* Indeed Dalzell himself admits, in the letter referred to, that they do not belong to that genus. In his description of *N. elliptica* (Bomb. Flora, p. 118) Dalzell gives the length of the peduncle as 2¼ in., whereas it does not exceed 1 in., and he moreover describes the stigma as round-headed, whereas in his specimens it is distinctly fusiform. Dalzell's description would apply to *Nauclea purpurea,* but the plant he has himself sent is *Nauclea missionis,* Wall., *Sarcocephalus missionis,* Haviland.

2. ANTHOCEPHALUS, A. Rich.

Glabrous trees. Leaves petiolate, coriaceous; stipules interpetiolar, caducous. Flowers orange, crowded in terminal globose pedunculed solitary heads, ebracteolate; peduncles with basal stipular bracts. Calyx-tubes closely pressed together but not fused; limb tubular, with 5 linear persistent or deciduous lobes. Corolla-tube long, funnel-shaped, the throat glabrous; segments 5, imbricate. Stamens inserted on the throat of the corolla; filaments short. Disk inconspicuous. Ovary 2-celled below, 4-celled above; ovules very

many, horizontal, on 2 bifid placentas which ascend from the septum below its middle and send an arm into each of the upper cells ; style filiform, exserted ; stigma fusiform. Fruits packed into a fleshy globose mass of many few-seeded coriaceous pyrenes. Seeds minute ; testa rather thin ; embryo clavate, in fleshy albumen.—DISTRIB. Tropical Asia and the Indian Archipelago ; species 2.

1. **Anthocephalus indicus,** *A. Rich. in Mém. Soc. Hist. Nat. Par.* (1834) v. 5, p. 238. A large tree with erect trunk and widely spreading horizontal branches ; young parts pubescent. Leaves coriaceous, decussate, 5—8 by 2¾—4 in., elliptic-oblong, shortly acuminate, entire, glabrous and shining above, more or less pubescent beneath, base usually rounded, sometimes cordate ; main nerves 8—12 pairs, parallel, prominent on both sides ; petioles ¾—1¼ in. long ; stipules lanceolate, acute, caducous. Flowers fragrant, in solitary terminal globular heads 1—1¾ in. in diam., on stout peduncles. Calyx ¼—½ in. long ; lobes 5, linear, obtuse, hairy at the top outside. Corolla orange, ⅜—½ in. long ; tube infundibuliform, slender ; segments about ⅒ in. long, erect, linear-oblong, acute, imbricate, slightly pubescent outside. Styles and stigmas white. Fruit the size of a small orange, yellow when ripe. Seeds muriculate. *Anthocephalus morindæfolius*, Korth. Verh. Nat. Gesch. Bot. (1839—42) p. 154, & Obs. Nauel. Ind. p. 20 ; Jackson, in Index Kewen. v. 1, p. 148. *Anthocephalus Cadamba*, Miq. Fl. Ind. Bat. v. 2 (1856) p. 135 ; Hook. f. in. Fl. B. I. v. 3, p. 23 ; Trim. Fl. Ceyl. v. 2, p. 293 ; Talb. Trees, Bomb. ed. 2, p. 184 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644 ; Watt, Dict. Econ. Prod. v. 1, p. 266. *Nauclea Cadamba*, Roxb. Hort. Beng. p. 14 ; Grah. Cat. p. 87 ; Dalz. & Gibs. Suppl. p. 43. Flowers : Nov.—Feb. VERN. *Nir* ; *Kadam*.

A doubtful native, common near villages throughout the Konkan, but apparently not found unmistakably wild. KONKAN : Poladpur, *Graham* ; Dasgaon (Ratnagiri districts), *Woodrow* ! ; Hátkhabe near Ratnagiri, *Bhica* ! KANARA : N. Kanara, rare, *Talbot* ; Kála naddi, *Ritchie*, 987 ! DISTRIB. Throughout India, often cultivated ; Ceylon, Sumatra, Borneo.

There used to be a very large tree at the Wada Travellers' Bungalow below Mahableshwar.

3. NAUCLEA, Linn.

Trees or shrubs. Leaves opposite, sessile or petiolate ; the secondary nerves usually few ; stipules interpetiolar, flat, entire, deciduous. Flowers crowded in globose bracteate heads ; peduncles terminal, simple, solitary or ternate ; bracts often large, caducous ; bracteoles 0 or glabrous, setiform, intermixed with the flowers. Calyx-tube prism-shaped ; lobes 5, deciduous, linear-subulate, often tipped with valvate processes at the apex. Corolla-tube infundibuliform ; 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 of 2 cocci, the cocci often separating from a persistent axis. Seeds imbricate ; testa winged, the upper wing 2-horned, the lower acuminate.—DISTRIB. Tropical Asia and Polynesia ; species 30.

Linnæus is usually cited as the author of the genus *Nauclea*, but the plant (*Nauclea orientalis*) on which Linnæus founded the genus is now *Sarcocephalus cordata*: hence the real *Nauclea* of Linnæus does not now exist as *Nauclea*.

1. **Nauclea purpurea,** *Roxb. Cor. Pl.* v. 1 (1795) p. 41, t. 54. A small glabrous tree. Leaves 4—8 by 1½—4 in., membranous, elliptic or lanceolate, acute or acuminate, glabrous, base much tapering; main nerves 8—10 pairs; petioles ½—1 in. long, drying black. Peduncles 1—2½ in. long, usually solitary, bracteate about the middle, terete, thickened above; bracts very caducous. Calyx ⅛ in. long; tube glabrous or nearly so; teeth triangular-subulate, $\frac{1}{16}$ in. long, silky. Corolla ¼ in. long, externally glabrous or nearly so; lobes ⅛ in. long, oblong-obovate, obtuse, glabrous or slightly pubescent outside. Anthers included within the corolla-lobes, apiculate. Fruit of 2 dehiscent many-seeded cocci. Fl. B. I. v. 3, p. 26; Talb. Trees, Bomb. ed. 2, p. 185; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644. *Nauclea elliptica*, Bedd. Icon. Pl. Ind. Or. t. 19; For. Man. in Flor. Sylvat. p. cxxix, t. 29, fig. 3 (*not* of Dalzell & Gibson).—Flowers: Feb. VERN. *Dev-phanas.*

Not common in the Bombay Presidency. *Stocks* in Herb. Ker. (without locality)! KANARA: *Woodrow*; Tinai Ghât (N. Kanara), *Talbot*, 1601!—DISTRIB. India (W. Peninsula).

4. **ADINA,** Salisb.

Trees or shrubs with terete branches. Leaves petiolate, ovate, lanceolate or cordate; stipules interpetiolar, large, oblong, obtuse, caducous. Flowers small, crowded in solitary panicled globose heads surrounded by paleaceous bracteoles, the calyces not fused together. Calyx-tube angled; lobes 5. Corolla-tube elongate, funnel-shaped, the throat glabrous inside; segments 5, valvate. Stamens 5, inserted on the mouth of the corolla; filaments short. Disk cup-shaped. Ovary 2-celled; ovules numerous, inserted on a pendulous placenta, imbricate; style-filiform; stigma clavate, rarely capitate. Capsule of 2 dehiscent cocci, many-seeded. Seeds oblong; testa winged; nucleus small; albumen copious, fleshy; radicle superior.—DISTRIB. Tropical and subtropical Asia and America; species 9.

1. **Adina cordifolia,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1873) p. 30. A tree with erect trunk and horizontal branches; bark brownish-grey, thick, furrowed; young parts pubescent. Leaves 4—10 in. long and about as broad as long, orbicular, shortly acuminate, glabrous or slightly pubescent above, more or less densely so (especially when young) beneath; main nerves 5—7 pairs; petioles 2—4 in. long, softly pubescent; stipules oblong, obtuse, pubescent, ½—¾ in. long. Flowers numerous, in globose heads ¾—1 in. in diam.; peduncles 1- 2 in. long, stout, axillary, 1—3 together, each bearing 1 (rarely 2) heads of yellow flowers. Calyx $\frac{1}{16}$ in. long, hairy; lobes club-shaped. Corolla ¼ in. long; tube slender, dilated above, pubescent; segments $\frac{1}{16}$ in. long, ovate-oblong, subacute, recurved. Style much exserted. Capsules ¼—⅓ in. long, cuneate, densely downy. Seeds about 6 in each cell. Fl. B. I. v. 3, p. 24;

Trim. Fl. Ceyl. v. 2, p. 293 ; Talb. Trees, Bomb. ed. 2, p. 184 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644 ; Watt, Dict. Econ. Prod. v. 1, p. 114. *Nauclea cordifolia*, Roxb. Cor. Pl. v. 1 (1795) p. 40, t. 53 ; Grah. Cat. p. 87 ; Dalz. & Gibs. p. 118.—Flowers : June—Sept. VERN. *Hedu* ; *Hedi* ; *Hed*.

KONKAN : near Kalyan, *Woodrow* ! DECCAN : Nasik, *Woodrow* ; Chikli near Nasik, *Bhiva* ! ; Gokak, *Ritchie*, 1771 !

5. **MITRAGYNA,** Korth. Obs. Naucl. (1839) p. 19 ; Index Kewensis, v. 3, p. 249.

STEPHEGYNE, Korth. Verh. Nat. Gesch. Bot. (1840 ?) p. 160 ; Benth. & Hook. f. Gen. Pl. v. 2 (1873) p. 31.

Shrubs or trees. Leaves petiolate, usually with transverse parallel nerves ; stipules interpetiolar, large, caducous. Flowers yellow, crowded in globose axillary and terminal solitary panicled or subumbellate usually 2-bracteate heads ; bracteoles paleaceous. Calyx-tube short, ovoid or obconic ; limb cupular or tubular, truncate or obscurely 5-toothed. Corolla funnel-shaped ; tube long, the throat glabrous or pilose ; lobes 5, short, valvate. Stamens 5, on the throat or below the apex of the corolla-tube ; filaments short, filiform ; anthers oblong, apiculate. Disk annular. Ovary 2-celled ; ovules numerous, on pendulous placentas, imbricate upwards ; style long, filiform ; stigmas much exserted, mitriform. Fruit of 2 dehiscent cocci. Seeds many ; testa winged ; albumen fleshy.—DISTRIB. Asia, Tropical Africa ; species 8.

1. **Mitragyna parvifolia,** *Korth. Obs. Naucl. Ind.* (1839) p. 19. A large deciduous tree, glabrous or pubescent. Leaves variable in size and shape, 2—5 by 1½—3 in., elliptic, suborbicular, or obovate, rounded, acute or bluntly acuminate at the apex, glabrous on both sides, base rounded or acute, sometimes cordate ; main nerves 6—8 pairs, oblique ; petioles ⅜—¾ in. long ; stipules ½ by $\frac{3}{16}$—$\frac{5}{16}$ in., oblong-spathulate, obtuse, parallel-nerved, pink. Flowers greenish-yellow, fragrant ; peduncles solitary, terminal, short, each carrying a globose head of flowers ¾—1 in. in diam. Calyx $\frac{1}{12}$ in. long, funnel-shaped ; limb truncate. Corolla ¼—$\frac{5}{16}$ in. long ; tube narrowly infundibuliform, glabrous ; lobes $\frac{1}{16}$ in. long, triangular-ovate, acute, recurved. Style white, much exserted ; stigma mitriform. Head of fruits ½—⅝ in. in diam. ; capsules ¼ in. long, oblong, with blunt rounded tops and 10 blunt ribs. Jackson, in Index Kewen. v. 3, p. 249 ; Hav. Rev. Naucl. in Journ. Linn. Soc. v. 33 (1897) p. 69. *Stephegyne parvifolia*, Korth. Verh. Nat. Gesch. Bot. (1840 ?) p. 161 ; Hook. f. Fl. B. I. v. 3, p. 25 ; Trim. Fl. Ceyl. v. 2, p. 294 ; Talb. trees, Bomb. ed. 2, p. 185 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 360. *Nauclea parvifolia*, Roxb. Cor. Pl. v. 1 (1795) p. 40, t. 52 ; Grah. Cat. p. 87 ; Bedd. Flor. Sylvat. t. 34. *Nauclea parviflora* (an evident misprint for *N. parvifolia*), Dalz. & Gibs. p. 118.—Flowers : May—Aug. VERN. *Kadam ; Kalam.*

In deciduous forests throughout the presidency, *Talbot.* KONKAN: *Graham.* DECCAN: Máwal districts, *Graham, Dalzell*; Chinchwad (near Poona), *Ranade;* GUJARAT: *Cooke*!; Baroda, *Cooke*!; Dabhoi, *Woodrow, Kanitkar*! S. M. COUNTRY: Belgaum, *Ritchie,* 341! KANARA: Kála naddi, *Ritchie,* 341! - DISTRIB. Throughout the drier parts of India; Ceylon.

6. HYMENODICTYON, Wall.

Trees or shrubs with thick branches and bitter bark. Leaves opposite, petiolate, deciduous; stipules interpetiolar, glandular-serrate, deciduous. Flowers small, spicate, in axillary and terminal nodding panicles; bracts 1 or 2, foliaceous, reticulate, subpersistent; bracteoles small or 0. Calyx-tube short; lobes 5—6, ovate or subulate, deciduous. Corolla infundibuliform or narrowly campanulate, glabrous inside; lobes 5, short, erect, reduplicato-valvate. Stamens 5, inserted below the throat of the corolla; filaments short, dilated upwards; anthers linear. Ovary 2-celled; ovules numerous, on cylindric placentas adnate to the septum; style filiform, exserted; stigma fusiform. Capsule loculicidally 2-valved, many-seeded; placentas at length free. Seeds imbricating upwards; testa broadly winged; embryo small in fleshy albumen.—DISTRIB. Tropical Asia and Africa; species 4—5.

Flowers pedicelled; corolla ½ in. long; capsules on decurved peduncles	1. *H. excelsum.*
Flowers sessile; corolla ⅕ in. long; capsules erect	2. *H. obovatum.*

1. **Hymenodictyon excelsum,** *Wall. in Roxb. Fl. Ind. ed. Carey,* v. 2 (1824) p. 149. A tree 30—40 ft. high; bark usually smooth. Leaves membranous, 4—9 by 3—4¼ in., ovate-elliptic, abruptly-acuminate, pubescent on both surfaces, base narrowed into the petiole; main nerves 7—10 pairs; petioles 1—3 in. long, pubescent; stipules broadly oblong, obtuse, recurved, deciduous. Flowers numerous, greenish-white, fragrant, pedicelled, in clusters along the rhachis of dense cylindrical pubescent spiciform racemes in erect terminal panicles; floral leaves shaped like the other leaves but smaller, colored, bullate, on petioles 1½—2½ in. long. Calyx 1/12 in. long, narrowly campanulate, pubescent; lobes 1/6 in. long, acute. Corolla ½ in. long, pubescent outside; tube slender; limb broadly campanulate with short acute lobes. Styles very long. Capsules ¾ in. long, ellipsoid, on stout decurved pedicels ¼—½ in. long. Fl. B. I. v. 3, p. 35; Grah. Cat. p. 87; Dalz. & Gibs. p. 117; Wight, Icon. t. 79; Talb. Trees, Bomb. ed. 2, p. 186; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644; Watt, Dict. Econ. Prod. v. 4, p. 317.—Flowers: June—Aug. VERN. *Kála-Kaddu*; *Bhorsal.*

Along the Ghâts, *Graham, Dalzell & Gibson.* KONKAN: *Law*!; Ghâts near Bombay, *Dalzell*!; Matheran (Porcupine Point), *H. M. Birdwood.* DECCAN: Kartriz Ghât, *Woodrow*! GUJARAT: Panch Máhâls, *Talbot.* S. M. COUNTRY: hills near Belgaum, *Ritchie,* 289!—DISTRIB. India (base of the Himalayas, W. Peninsula, Birma); Java.

The inner coat of the bark is bitter and has been used as a febrifuge. The wood is fine and close-grained and is employed for making agricultural implements, scabbards, palanquins, toys, &c. See Watt, Dict. Econ. Prod. l. c.

2. **Hymenodictyon obovatum,** *Wall. in Roxb. Fl. Ind. ed. Carey*, v. 2 (1824) p. 153. A large tree reaching 50 ft. high. Leaves 4—6 by 1¾—3 in., elliptic or obovate, abruptly-acuminate, glabrous above, more or less pubescent beneath, narrowed into the petiole; main nerves 6—8 pairs; petioles 1—2 in. long; stipules obovate-oblong with glandular margins. Flowers small, inconspicuous, greenish, with a pungent odor, in sessile clusters along the rhachis of dense cylindric pubescent panicled spikes; floral leaves bullate, white or cream-colored, with petioles 1¼—2 in. long. Calyx broadly campanulate, $\frac{1}{12}$ in. long, pubescent outside; teeth triangular, acute, $\frac{1}{30}$ in. long. Corolla $\frac{1}{10}$ in. long, pubescent outside; tube very short; limb broadly campanulate, $\frac{1}{15}$ in. long, the lobes ovate-oblong, acute. Capsules ½ in. long, ellipsoid, on very short erect pedicels. Fl. B. I. v. 3, p. 36; Grah. Cat. p. 88; Dalz. & Gibs. p. 117; Bedd. Flor. Sylvat. t. 219; Talb. Trees, Bomb. ed. 2, p. 186; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644; Watt, Dict. Econ. Prod. v. 4, p. 319. —Flowers: July—Sept. VERN. *Kadvá-sirid.*

KONKAN: moist forests, *Talbot*; Matheran, *Woodrow*; island of Karanja, *Dalzell & Gibson*. S. M. COUNTRY: Rámghát, *Law, Dalzell & Gibson, Ritchie*, 1048; KANARA: *Talbot*.—DISTRIB. India (W. Peninsula).

Mr. Talbot distinguishes 2 varieties of this tree, one with large obovate pubescent leaves and capsules 1 in. long, the other with small ovate nearly glabrous leaves and capsules ½ in. long. The erect capsules serve to distinguish this species from *H. flaccidum*, which it otherwise much resembles.

7. WENDLANDIA, Bartl.

Shrubs or small trees. Leaves opposite or ternately whorled, sub-sessile or petiolate ovate or oblong, subcoriaceous; stipules entire or 2-fid. Flowers rosy or white, in terminal dense thyrsoid or panicled cymes, 2—3-bracteate. Calyx-tube subglobose; lobes 4—5, subequal, persistent. Corolla tubular, salver-shaped or funnel-shaped, throat glabrous or hairy; lobes 4—5, imbricate in bud. Stamens 4—5, inserted between the corolla-lobes; filaments 0 or elongate; anthers versatile, exserted. Ovary 2 (rarely 3) -celled; ovules numerous, on small subglobose placentas adnate to the septum; style slender; stigma entire, 2-fid or 2-partite. Capsule small, globose, crustaceous, loculicidally (rarely septicidally) 2-valved, many-seeded. Seeds minute, horizontal, compressed; testa membranous, not winged; albumen fleshy; embryo short, cylindric.—DISTRIB. Tropical and subtropical Asia; species 16.

Leaves opposite; corolla-tube $\frac{1}{16}$ in. long, glabrous inside, filaments exserted	1. *W. exserta.*
Leaves usually ternately whorled; corolla-tube ¼—⅛ in. long, hairy inside; filaments not exserted	2. *W. Notoniana.*

1. **Wendlandia exserta,** *DC. Prod.* v. 4 (1830) p. 411. A small deciduous pubescent or tomentose crooked tree with brown rough bark; branches terete. Leaves coriaceous, opposite, 3—7 by 1¼—3½ in., lanceolate or ovate-lanceolate, entire, acute, more or less pubescent above, grey-tomentose or grey-pubescent beneath, base acute, often inequilateral; main nerves 10—18 pairs, arched; petioles ½—1 in. long, downy; stipules interpetiolar, ovate, acute, softly downy,

the upper part recurved. Flowers subsessile, fragrant, in sessile tomentose pyramidal panicles 6—10 in. long and as broad as long; bracteoles linear-lanceolate, hairy. Calyx hairy, $\frac{1}{16}$ in. long; tube subglobose; lobes 5, obtusely triangular, $\frac{1}{32}$ in. long. Corolla white; tube $\frac{1}{16}$ in. long, glabrous inside; lobes $\frac{1}{16}$ in. long, ovate-oblong, subacute, reflexed, veined with dark conspicuous veins. Filaments exserted, as long as the anthers. Style 2-fid nearly $\frac{1}{2}$-way down, the lobes oblong-spathulate, flattened on the inside. Capsules globose, $\frac{1}{12}$ in. in diam., pubescent. Seeds minute, black. Fl. B. I. v. 3, p. 37; Bedd. For. Man. in Flor. Sylvat. p. cxxx; Talb. Trees, Bomb. ed. 2, p. 187; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644; Watt, Dict. Econ. Prod. v. 6, part 4, p. 302.—Flowers: Mar.—Apr.

Rather rare. KONKAN: *Law!*, *Gibson!* DECCAN: N. Deccan, *Talbot*.—DISTRIB. India (Tropical Himalaya, Orissa, Central India, W. Peninsula).

2. **Wendlandia Notoniana,** *Wall. Cat.* (1828) 6273; *Wight & Arn. Prodr.* (1834) p. 403. A shrub or small tree; young branches pubescent, often reddish. Leaves usually ternately whorled (rarely opposite), 3—4½ by 1—2 in., elliptic-lanceolate, acuminate, glabrous or nearly so above, pubescent beneath, base much tapering; main nerves 8—10 pairs, prominent, pink on the young leaves; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long; stipules variable, about $\frac{1}{4}$ in. long, oblong and rounded at the apex, or linear-lanceolate, acute, sometimes 2-fid. Flowers fragrant, having somewhat the odor of newly mown hay, in dense pyramidal hirsute panicles 6—12 in. long. Calyx $\frac{1}{12}$ in. long; tube globose, pubescent; teeth as long as the tube, lanceolate, acute, more or less pubescent. Corolla white; tube cylindric, $\frac{1}{8}$—$\frac{1}{6}$ in. long, hairy inside; lobes $\frac{1}{16}$ in. long, oblong-orbicular, obtuse, not veined with dark veins. Filaments not exserted. Style 2-fid at the apex. Capsules globose, $\frac{1}{16}$ in. in diam., pubescent, crowned with the calyx-teeth. Fl. B. I. v. 3, p. 40; Grah. Cat. p. 89; Dalz. & Gibs. p. 117; Wight, Icon. t. 1033; Bedd. Flor. Sylvat. t. 224; Trim. Fl. Ceyl. v. 2, p. 297; Talb. Trees, Bomb. ed. 2, p. 187; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644; Watt, Dict. Econ. Prod. v. 6, part 4, p. 302.—Flowers: Feb.—Mar.

KONKAN: Wari jungles, *Stocks!* DECCAN: Koina river banks, *Dalzell & Gibson*; banks of the Yenna river below Lingmala, Mahableshwar, *Graham*, *Dalzell & Gibson*, *H. M. Birdwood*, *Cooke!* S. M. COUNTRY: Castlerock, *Woodrow*; Londa, *Cooke!*, *Woodrow!*; Rámghát, *Dalzell & Gibson*; Belgaum Ghâts, *Ritchie*, 350! KANARA: Supa Ghâts of N. Kanara, *Talbot*.—DISTRIB. India (hills of the W. Peninsula); Ceylon.

8. DENTELLA. Forst.

A small prostrate herb. Leaves small, opposite; stipules short, scarious, connate. Flowers minute, solitary, axillary and in the forks, sessile or shortly pedicelled, white. Calyx-tube subglobose; limb membranous, tubular, 5-fid, persistent. Corolla infundibuliform; tube hairy within; lobes 5, induplicato-valvate, 2—3-toothed. Stamens 5, inserted in the middle of the corolla-tube; filaments short; anthers linear. Ovary 2-celled; ovules numerous, on hemis-

pheric placentas ; style short ; stigmas filiform. Fruit small, dry, globose, 2-celled, indehiscent, many-seeded. Seeds minute, angled ; testa dotted ; albumen fleshy.—DISTRIB. Asia, Tropical Australia and the Pacific Islands ; species 1.

1. **Dentella repens,** *Forst. Char. Gen.* (1776) p. 26, t. 13. A slender prostrate herb ; stems long, slender, rooting at the nodes. Leaves $\frac{3}{16}$—$\frac{5}{16}$ by $\frac{1}{16}$—$\frac{1}{8}$ in., lanceolate or subspathulate, glabrous or with a few bristly hairs on the margins; petioles obscure; stipules scarious. Flowers $\frac{1}{12}$ in., solitary, often in the forks of the stem, subsessile. Calyx-tube subglobose ; limb persistent ; teeth acute. Corolla-lobes ovate, acute, with a tooth on each side. Filaments very short. Stigmas 2, filiform. Capsules $\frac{1}{10}$—$\frac{1}{8}$ in. in diam., usually densely villous with coarse hair, crowned by the persistent calyx-limb. Fl. B. I. v. 3, p. 42 ; Grah. Cat. p. 90 ; Dalz. & Gibs. p. 115 ; Trim. Fl. Ceyl. v. 2, p. 298 ; K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, part 4, p. 22, fig. 8, A ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644.—Flowers : Apr.—July.

Common in moist situations, *Dalzell & Gibson* KONKAN : Bombay, *Law* ! ; Salsette, common, *Graham* ; Dharamtar, *Woodrow* ! DECCAN : border of Parvati tank, Poona, *Ranade* ! ; Bijapur, *Woodrow* ! S. M. COUNTRY : Badami, *Cooke* ! KANARA : Kála naddi, *Ritchie*, 421 !—DISTRIB. Throughout India in moist places ; Ceylon, Malay Islands, China, N. Australia, Polynesia.

9. ARGOSTEMMA, Wall.

Low fleshy or membranous delicate herbs. Leaves opposite, the pairs equal or very unequal, or falsely whorled ; stipules interpetiolar, entire, persistent or obsolete. Flowers white, in peduncled cymes or umbels. Calyx-tube short ; lobes 5, rarely 3—7. Corolla rotate, 4—5-partite, valvate. Stamens 4—5, inserted on the corolla-tube ; filaments short ; anthers conniving or cohering, dehiscing by terminal pores. Ovary 2-celled ; ovules numerous, on swollen placentas attached to the middle of the septum ; style filiform ; stigma capitellate. Capsule coriaceous or membranous, 2-celled, many-seeded, dehiscing by a torn apex or by the top coming off operculately. Seeds minute, angled or compressed ; testa granulate or reticulate ; embryo very minute, in dense fleshy albumen.—DISTRIB. Mountains of India and the Indian Archipelago except one African species (which is also Indian) ; species about 40.

Flowers 4-merous	1. *A. courtallense.*
Flowers 5-merous	2. *A. verticillatum.*

1. **Argostemma courtallense,** *Arn. in Ann. Nat. Hist.* v. 3 (1839) p. 22. A small herb 3—6 in. high with a tuberous root. Leaves very variable in size and shape, in whorls of 4, thinly membranous, very unequal, 1 or 2 of the leaves of the whorl sometimes not being more than $\frac{1}{2}$ in. long, while 1 or both of the other 2 may exceed $2\frac{1}{2}$ in. long, subsessile or rarely shortly petioled, ovate or orbicular-ovate, obtuse or subobtuse (rarely acute), glabrous or sparsely puberulous on both sides ; stipules obsolete. Flowers 4-merous, in terminal 3—many-flowered usually simple umbels ; peduncles solitary, 1—$1\frac{1}{2}$ in. long ; bracts foliaceous, conspicuous beneath the umbel. Calyx

⅛ in. long ; teeth short, subacute. Corolla white, divided almost to the base ; lobes ⅛ in. long, ovate-oblong, subacute. Anthers 4, oblong-lanceolate, curved, opening by pores. Fl. B. I. v. 3, p. 42 ; Wight, Icon. t. 1160. *A. connatum*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 345. *A. cuneatum* (by error for *A. connatum*), Dalz. & Gibs. p. 118.—Flowers : Aug.

S. M. COUNTRY : on rocks at the Chorla Ghát, *Dalzell* ! KANARA : *Law* !—DISTRIB. India (W. Peninsula).

2. **Argostemma verticillatum,** *Wall. in Roxb. Fl. Ind. ed. Carey*, v. 2 (1824) p. 325. Erect, 4—6 in. high. Leaves thinly membranous, 4 in a whorl, unequal, 1—4½ by ¾—1¼ in., sessile or nearly so, lanceolate or ovate-lanceolate, acuminate, glabrous, inequilateral at the base. Flowers white, 5-merous, in terminal peduncled few-flowered umbels shorter than the leaves, often 3 umbels together of which the central one is frequently compound, the lateral ones usually simple ; bracts beneath the umbels conspicuous, oblong-lanceolate or linear-lanceolate. Calyx ⅓₀ in. long ; teeth ⅕₀ in. long, subacutely triangular from a broad base. Corolla ¼ in. long, divided almost to the base ; lobes narrowly triangular-oblong or ovate, very acute. Anthers linear-oblong, apiculate, opening by pores. Fl. B. I. v. 3, p. 43. *Argostemma glaberrimum*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 345 ; Dalz. & Gibs. p. 118.

KONKAN : on trees in the Wari country, *Dalzell* !

10. **HEDYOTIS,** Linn.

Herbs, undershrubs or shrubs (herbs in the Bombay species). Leaves opposite (rarely ternately whorled) ; stipules free, or connate with the petioles into a bristly sheath. Flowers usually white, in terminal or axillary dense or lax cymes. Calyx-tube ovoid, globose or turbinate ; lobes 4, usually short, acute, persistent, without interposed teeth. Corolla infundibuliform or campanulate ; lobes 4, ovate or linear, valvate in bud. Stamens 4, inserted in the tube or throat of the corolla. Ovary 2-celled ; ovules numerous, on sessile or pedicelled placentas attached to the septum at or below the middle ; style filiform ; stigma 2-fid or 2-lobed. Fruit small, coriaceous or crustaceous (very rarely membranous), indehiscent or septicidally or loculicidally dehiscent, or separable into 2 indehiscent cocci, 2—many-seeded. Seeds plano-convex or angled ; albumen horny.

Capsule indehiscent	1. *H. Auricularia.*
Capsule loculicidal on the crown only.	
Leaves linear-subulate, aristate	2. *H. Cærulea.*
Leaves elliptic or linear-lanceolate, acute	3. H. *nitida.*

1. **Hedyotis Auricularia,** *Linn. Sp. Pl.* (1753) p. 101. Annual ; branches numerous, prostrate or suberect, spreading, not rooting at the nodes, glabrous or hairy especially at the nodes, often purple when young. Leaves sessile, subsessile or shortly petioled, ovate or ovate-lanceolate or sometimes quite lanceolate, acuminate, glabrous or slightly pubescent on the nerves above, hairy on the nerves beneath, base acute or rounded ; main lateral nerves impressed above, prominent beneath, curved ; petioles very short or 0 ; stipules mem-

branous, furnished with 3 or 5 unequal filiform bristles. Flowers white, sessile or very shortly pedicelled, in dense sessile or subsessile axillary cymes. Calyx-teeth small, triangular or lanceolate, acuminate. Corolla-tube very short ; lobes oblong, obtuse, recurved, hairy at the base. Capsules globose, hard, hairy or nearly glabrous, indehiscent. Fl. B. I. v. 3, p. 58 ; Bedd. Icon. Pl. Ind. Or. t. 27 ; Trim. Fl. Ceyl. v. 2, p. 313 ; Watt, Dict. Econ. Prod. v. 4, p. 208. *Hedyotis vestita*, Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644 (*not* of Br. in Wall. Cat.).—Flowers : Sept.—Nov.

KONKAN : *Kanitkar* ! ; Savantwari, *Woodrow* ! S. M. COUNTRY : Londa, *Bhiva* ! ; Castlerock, *Cooke* ! ; north of Dharwar, *Ritchie*, 271 ! KANARA : Kumpta, *Woodrow* ! ; banks of the Kála naddi, *Ritchie*, 271 !

2. **Hedyotis cærulea,** *Wight & Arn. Prodr.* (1834) p. 412. Annual, erect, 4—15 in. high, much-branched from a little above the base ; branches terete, slender, rough to the touch. Leaves opposite or fascicled, usually $\frac{3}{8}$—$\frac{3}{4}$ by $\frac{1}{20}$—$\frac{1}{10}$ in., linear, sessile, bristle-pointed, minutely scaberulous above, 1-nerved, the margins reflexed ; stipules pectinate with filiform bristles. Flowers blue (*Wight & Arn.*), sessile or nearly so, in axillary and terminal sessile capitate few-flowered cymes, or sometimes solitary in the forks. Calyx $\frac{1}{8}$—$\frac{1}{4}$ in. long ; teeth lanceolate, rigid, tipped with a fine sharp bristle. Capsule globose, pubescent or glabrous, loculicidally dehiscent on the top only, crowned with the erect calyx-teeth which about equal the capsule. Fl. B. I. v. 3, p. 60 ; Bedd. Icon. Pl. Ind. Or. t. 30 ; Trim. Fl. Ceyl. v. 2, p. 312.

Rare. Herb. Stocks without locality ! Kanara, Dharwar, and Bellary districts, *Law* ! The plant is included on the authority of *Law*, who states that it has been found in the Dharwar districts. I have seen no specimens from the Bombay Presidency.

3. **Hedyotis nitida,** *Wight & Arn. Prodr.* (1834) p. 412. Annual ; branches numerous, prostrate or ascending, 4-angled, slightly rough on the angles. Leaves subsessile, 1—$2\frac{1}{4}$ by $\frac{1}{4}$—$\frac{1}{2}$ in., lanceolate or ovate-lanceolate, acute, rigid, light-green, glabrous and shining above, scabrous towards the much-recurved margins, whitish and with the midrib often rough beneath, base usually acute ; nerves (except the strong midrib) not visible ; stipules with numerous long bristles. Flowers solitary or few, axillary, sessile. Calyx glabrous ; teeth rigid, triangular, shortly spinoso-ciliate. Capsules $\frac{1}{4}$ in. long, dehiscent at the top only, ovoid, glabrous, veined, crowned by the erect calyx-teeth which about equal the capsule. Seeds numerous, pale-brown, angled. Fl. B. I. v. 3, p. 61 ; Trim. Fl. Ceyl. v. 2, p. 312. *Hedyotis glabella*, Br. in Wall. Cat. 886 ; Bedd. Icon. Pl. Ind. Or. t. 36 ; Watt, Dict. Econ. Prod. v. 4, p. 209.—Flowers : Sept.—Nov.

S. M. COUNTRY : north of Dharwar, *Ritchie*, 357 ! ; Londa, *Woodrow* ! , *Bhiva* ! KANARA : Kála naddi, *Ritchie*, 357 !—DISTRIB. India (W. Peninsula, Tenasserim) ; Ceylon.

11. **OLDENLANDIA,** Linn.

Slender erect or diffuse di-tri-chotomously-branched usually glabrous herbs. Leaves opposite, usually small, narrow ; stipules

acute or bristly. Flowers small, white or pink, in dichotomous axillary and terminal usually panicled cymes, rarely solitary. Calyx-tube turbinate, obovoid or subglobose ; teeth 4 (rarely 5), usually erect and distant in fruit ; sometimes with alternating teeth. Corolla rotate, infundibuliform or hypocrateriform ; tube short or long ; lobes 4 (rarely 5), obtuse, valvate. Stamens 4 (rarely 5), inserted in the throat of the corolla ; filaments short ; anthers usually exserted. Ovary 2-celled ; ovules numerous, the placentas attached to the septum ; style filiform ; stigmas 2, linear. Capsule small, usually membranous, terete, didymous or angled, loculicidal at top, rarely indehiscent, many-seeded. Seeds angled, globose or ellipsoid ; testa not winged, smooth or pitted ; embryo clavate in fleshy albumen.—DISTRIB. Tropical and subtropical, chiefly Asiatic ; species about 70.

Corolla-tube short.
Peduncles 1—4-flowered from the lower or all the axils.
Leaves linear, not exceeding $\frac{1}{8}$ in. broad ; bases of calyx-teeth not touching in fruit.
Top of capsule flat, not protruded.
Flowers pedicelled, usually in pairs ..... 1. *O. corymbosa.*
Flowers sessile or nearly so, solitary ..... 2. *O. diffusa.*
Top of capsule rounded, protruded ..... 3. *O. herbacea.*
Leaves elliptic, exceeding $\frac{1}{4}$ in. broad ; base of calyx-teeth touching in fruit ..... 4. *O. crystallina.*
Peduncles many-flowered, chiefly from the axils.
Flowers in umbels ; pedicels very short ..... 5. *O. umbellata*
Flowers in axillary clusters, sessile or nearly so ; capsule hairy ..... 6. *O. trinervia.*
Flowers on long capillary pedicels or in slender panicles ; capsule minute, glabrous ..... 7. *O. dichotoma.*
Corolla-tube long.
Leaves whorled.
Branches scabrid with whitish points ; capsule scabrid ..... 8 *O. aspera.*
Branches retrorsely hispid ; capsule glabrous ..... 9. *O. retrorsa.*
Leaves opposite, not whorled.
Corolla-tube $\frac{1}{16}$ in. long ; lobes obtuse ; capsule obovoid ..... 10. *O. gracilis.*
Corolla-tube $\frac{1}{4}$ in. long ; lobes acuminate ; capsule globose ..... 11. *O. senegalensis.*

1. **Oldenlandia corymbosa,** *Linn. Sp.* (1753) p. 119. Annual, varying from 3—15 in. high ; stems terete, numerous, slender, erect, ascending or spreading, glabrous or pubescent. Leaves subsessile, $\frac{3}{4}$—$1\frac{3}{4}$ by $\frac{1}{16}$—$\frac{1}{8}$ in., linear or linear-lanceolate, acute, often with recurved and frequently scabrous margins ; stipules short, membranous, truncate, with a few short bristles. Flowers on filiform pedicels longer than the calyx, usually 2—3 (rarely 1 or very rarely 4) on the top of a very slender axillary solitary peduncle ; bract beneath the pedicels $\frac{1}{20}$—$\frac{1}{16}$ in. long, subulate. Calyx $\frac{1}{12}$ in. long, pubescent ; teeth narrowly triangular, about equalling the calyx-tube when in flower. Corolla white, $\frac{1}{16}$ in. long ; lobes acute, about $\frac{1}{20}$ in. long. Capsules globose or sometimes slightly pyriform, somewhat didymous, the top rather flat and not protruded beyond the calyx, glabrous. Seeds pale-brown, angular. Fl. B. I. v. 3, p. 64 ; Trim. Fl. Ceyl. v. 2, p. 314 ; K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, part 4, p. 22, fig. 8, D—G ; Woodr. in Journ. Bomb. Nat. v. 11 (1898)

p. 644 ; Watt, Dict. Econ. Prod. v. 5, p. 480. *Oldenlandia herbacea*, DC. Prodr. v. 4, p. 425 (*not* of Linn.). *Hedyotis Burmanniana*, Br. in Wall. Cat. 868 (in part) ; Grah. Cat. p. 90 ; Dalz. & Gibs. p. 116.—Flowers : Sept.—Nov. VERN. *Pitpápda.*

A common weed. KONKAN : *Stocks* ! ; Dharamtar, *Woodrow* ! ; Savantwari, *Kanitkar* ! ; Kalyan, *Woodrow* ! DECCAN : Khandala, *Cooke* ! ; Poona, *Woodrow* ! ; Koina valley, *Cooke* ! S. M. COUNTRY : Londa, *Cooke* ! ; Belgaum, *Ritchie*, $\frac{2}{3}$! —DISTRIB. Throughout India ; Ceylon, Tropical E. Asia to Java and the Philippines, Tropical Africa, and America.

The plant has some repute in native medicine and is employed in the treatment of bilious fevers. See Watt, Dict. Econ Prod. l. c.

2. **Oldenlandia diffusa,** *Roxb. Hort. Beng.* (1814) p. 11. Annual, diffuse, glabrous ; stems numerous, prostrate, often rooting at the nodes. Leaves subsessile, $\frac{3}{4}$—$1\frac{1}{4}$ by $\frac{1}{20}$—$\frac{1}{8}$ in., linear or linear-lanceolate, acute, glabrous ; stipules short, slightly pectinate. Flowers usually solitary (rarely 2 together), sessile or on very short pedicels. Calyx-teeth long, narrowly triangular, cuspidate, finely ciliate, very distant in fruit. Capsules larger than in *O. corymbosa*, broader than long, very truncate and flat on the top, not protruded beyond the calyx. Seeds angular. Fl. B. I. v. 3, p. 65 ; Trim. Fl. Ceyl. v. 2, p. 315 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644.—Flowers : Aug.—Oct.

Not common. S. M. COUNTRY : Belgaum, *Ritchie*, $\frac{2}{3}$! KANARA : N. Kanara, *Woodrow* ; Sirsi, *Talbot* ex *Woodrow*. DISTRIB. Throughout India ; Ceylon, Borneo, Philippines, Japan.

3. **Oldenlandia herbacea,** *Roxb. Hort. Beng.* (1814) p. 11 ; *Fl. Ind.* v. 1, p. 424. An erect glabrous annual or biennial 3—18 in. high ; branches numerous, dichotomous, slender, 4-gonous, divaricate. Leaves $\frac{3}{8}$—$1\frac{1}{4}$ by $\frac{1}{20}$—$\frac{1}{8}$, the lower leaves often broader than the upper ones, sessile, linear or linear-lanceolate, acute, glabrous, usually with recurved margins ; stipules very short, inconspicuous or very shortly setose. Flowers usually on solitary or 2-nate axillary filiform peduncles, sometimes however (especially the upper flowers) forming a paniculate cyme. Calyx-teeth triangular-subulate, acute, distant on the fruit, very short. Corolla $\frac{1}{8}$ in. long ; tube $\frac{1}{8}$ in. long, slender. Capsules $\frac{1}{10}$ in. in diam., ovoid or subglobose, somewhat didymous, the crown much protruded beyond the calyx, glabrous. Seeds somewhat ellipsoid in outline. Trim. Fl. Ceyl. v. 2, p. 315. *Oldenlandia Heynii*, G. Don, Gen. Syst. v. 3 (1834) p. 531 ; Hook. f. in Fl. B. I. v. 3, p. 65 ; Woodr. in. Journ. Bomb. Nat. v. 11 (1898) p. 644. *Hedyotis herbacea*, Linn. Sp. Pl. (1753) p. 102. *Hedyotis Heynii*, Br. in Wall. Cat. 867 ; Grah. Cat. p. 90 ; Dalz. & Gibs. p. 116.—Flowers : Aug.—Oct. VERN. *Paripáth.*

KONKAN : *Stocks* !, *Ritchie*, $\frac{2}{3}$! ; Malwán, *Woodrow*. DECCAN : Koina valley, *Cooke* ! S. M. COUNTRY : Belgaum hills, *Ritchie*, 1162 ! ; Belgaum, *Supekar* ! ; *Woodrow*. KANARA : *Thomson* ! —DISTRIB. Throughout India in hilly districts ; Malay Islands, Tropical Africa.

4. **Oldenlandia crystallina,** *Roxb. Hort. Beng.* (1814) p. 11. A prostrate glabrous herb, much-branched from the base ; branches leafy, 2—6 in. long. Leaves $\frac{1}{2}$—$\frac{3}{8}$ by $\frac{1}{8}$—$\frac{1}{4}$ in., elliptic or elliptic-lanceolate, subacute, flat, sessile or nearly so, tapering to the base ;

stipules with a few short bristles. Flowers on solitary 1—2 (rarely 3) -flowered filiform peduncles equalling the leaves. Calyx (in flower) $\frac{1}{12}$ in. long, the teeth $\frac{1}{20}$ in. long; the teeth in fruit $\frac{1}{10}$ in. long, triangular, acute, their bases touching. Corolla white, short, but little exserted beyond the calyx; tube about $\frac{1}{16}$ in. long. Capsules $\frac{1}{8}$ in. long, obovoid or pyriform, glabrous, ribbed, crowned by the broad triangular calyx-teeth which touch at their bases, the crown of the capsule not protruded. Fl. B. I. v. 3, p. 65. *Oldenlandia pumila,* DC. Prodr. v. 4, p. 425.

Rare. S. M. COUNTRY: Belgaum, *Stocks*, 336!, *Ritchie*, 1781!—DISTRIB. Sparingly throughout the plains of India; Java.

5. **Oldenlandia umbellata,** *Linn. Sp. Pl.* (1753) p. 119. Annual; stems semi-woody at the base, 6—10 in. high, much-branched from the base; branches more or less angular and rough. Leaves numerous, often fascicled, rather close, sessile, $\frac{1}{2}$—1 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, flat, very acute; stipules short, pectinate. Flowers 3—10, in small irregular axillary peduncled umbels; peduncles usually longer than the leaves, stout, erect, pubescent; pedicels very short, pubescent. Calyx (in flower) $\frac{1}{8}$ in. long; teeth $\frac{1}{12}$ in. long, triangular, cuspidate, ciliolate. Corolla $\frac{1}{8}$ in. long, glabrous on both sides; lobes triangular-oblong, equalling the tube. Capsules globose, $\frac{1}{16}$ in. in diam., glabrous, crowned with the not very distant calyx-teeth, the top of the capsule not protruded. Fl. B. I. v. 2, p. 66; Roxb. Cor. Pl. t. 3; Trim. Fl. Ceyl. v. 2, p. 316; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644; Watt, Dict. Econ. Prod. v. 5, p. 481.—Flowers: Aug.—Dec. VERN. *Chirval.*

DECCAN: Wadi on the G. I. P. Railway line, *Woodrow*! I have only had the plant from the locality above named.—DISTRIB. India (Orissa, Bengal, Birma, W. Peninsula); Ceylon.

The root of the plant known commercially as *Chay-root* or *Indian Madder* furnishes a permanent red dye which was much used in Madras where the plant has been extensively cultivated. See Watt, Dict. Econ. Prod. l. c.

6. **Oldenlandia trinervia,** *Retz. Obs. Bot.* fasc. 4 (1786) p. 23. A small procumbent leafy annual; stems weak, flaccid, slender, angular, glabrous or slightly hairy, often rooting near the base. Leaves numerous, $\frac{1}{4}$—$\frac{3}{4}$ in., broadly elliptic or suborbicular, tapering to the base or to an obscure petiole, glabrous or nearly so, very thin, distinctly 3-nerved from the base; stipules 2-partite, acuminate. Flowers 1—6 in the axils of the leaves, sessile or very shortly pedicelled. Calyx hairy; teeth short, narrowly lanceolate, acute. Corolla rotate, white (*Dalzell*). Fruit globose, very hairy, dehiscing by a wide circular opening at the top, the crown not protruded. Fl. B. I. v. 3, p. 66; Trim. Fl. Ceyl. v. 2, p. 316. *Hedyotis trinervia,* Rœm. & Schult. Syst. v. 3 (1818) p. 197; Dalz. & Gibs. p. 115; Bedd. Icon. Pl. Ind. Or. t. 29.—Flowers: July.

Ritchie (ex Herb. *Dalzell*), 1780! without locality. Herb Stocks without locality in Herb Kew.! KONKAN: Malwán, *Dalzell & Gibson.*

7. **Oldenlandia dichotoma,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 67. A very slender annual 8—18 in. high; stem erect, terete, usually glabrous; branches filiform, the ultimate ones like fine hairs. Leaves

linear-lanceolate, acute, flat, the lower leaves larger than the upper, 1—3 by $\frac{1}{8}$—$\frac{5}{16}$ in., some of the uppermost leaves sometimes not being more than $\frac{1}{2}$—$\frac{3}{4}$ by $\frac{1}{30}$—$\frac{1}{10}$ in.; stipules small, truncate, without bristles, or sometimes with 2—3 short bristles. Flowers white (*Ritchie*), on long capillary pedicels, rarely solitary, sometimes 2—3 from the apex of a filiform elongated peduncle, or often arranged in terminal and axillary slender lax panicles. Calyx (in flower) $\frac{1}{16}$ in. long; teeth $\frac{1}{30}$ in. long, subulate, in fruit distant. Corolla $\frac{1}{8}$—$\frac{1}{5}$ in. long; tube $\frac{1}{16}$—$\frac{1}{12}$ in. long; lobes nearly as long as the tube. Capsules $\frac{1}{16}$—$\frac{1}{12}$ in. in diam., globose. Fl. B. I. v. 3, p. 67; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644. *Hedyotis Heyneï*, Bedd. Icon. Pl. Ind. Or. t. 33 (*not* of Br.).—Flowers: July—Oct. VERN. *Kajuri*.

Rare. DECCAN: Poona districts, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, 1162!—DISTRIB. India (Bandelkand, W. Peninsula).

8. **Oldenlandia aspera,** *DC. Prodr.* v. 4 (1830) p. 428. A stout annual herb 6—15 in. high; stems and branches scabrid with minute whitish points. Leaves whorled, 1—2 by $\frac{1}{8}$—$\frac{1}{4}$ in., linear, acute, subsessile, with slightly recurved margins; stipules membranous, with 1—3 bristles. Flowers pale blue (*Dalzell*), rose-colored (*Ritchie*), small, in terminal branched cymes, solitary or in pairs, sessile or shortly pedicelled along the branches of the cyme. Calyx (in flower) $\frac{1}{16}$ in. long; teeth $\frac{1}{20}$ in. long, triangular-subulate. Corolla infundibuliform, $\frac{1}{8}$—$\frac{1}{6}$ in. long; tube very slender, $\frac{1}{16}$ in. long. Capsules $\frac{1}{6}$—$\frac{1}{5}$ in. in diam., globose, somewhat didymous, scabrid with white points, crowned by the distant calyx-teeth. Fl. B. I. v. 3, p. 68; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644. *Hedyotis aspera*, Heyne, in Roth, Nov. Pl. Sp. p. 94; Dalz. & Gibs. p. 115.—Flowers: Aug.

DECCAN: Poona, *Cooke*!, *Woodrow*!, *Ranade*!, *Kanitkar*!. GUJARAT: Surat, *Dalzell*! S. M. COUNTRY: Badami, *Woodrow*!, Kolhapur, *Ritchie*, 1782!—DISTRIB. India (W. Peninsula).

9. **Oldenlandia retrorsa,** *Boiss. Fl. Orient.* v. 3 (1875) p. 12. Rootstock woody; stems 12—18 in. long, numerous, terete, slender, retrorsely hispid with short stiff hairs. Leaves whorled, $\frac{1}{2}$—1 by $\frac{1}{16}$—$\frac{1}{8}$ in., subsessile, linear-oblong, subobtuse, flat, hispid on both sides with short stiff hairs; stipules membranous, with 1—3 bristles. Flowers sessile and pedicelled, scattered along the long branches of glabrous spreading terminal cymes. Calyx (in flower) slightly pubescent, $\frac{1}{16}$ in. long; lobes $\frac{1}{20}$ in. long, linear or subtriangular, acute. Corolla $\frac{1}{2}$—$\frac{5}{8}$ in. long; tube very slender (almost filiform), $\frac{3}{8}$—$\frac{1}{2}$ in. long, glabrous; lobes $\frac{1}{4}$ in. long, linear-oblong, obtuse. Capsules $\frac{1}{8}$—$\frac{1}{6}$ in. in diam., crowned by the distant calyx-teeth, subglobose, truncate, didymous, quite glabrous, the crown of the capsule about level with the top of the calyx or very slightly protruding. Fl. B. I. v. 3, p. 68; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644.—Flowers: Oct.—Nov.

Confined to Sind. SIND: *Stocks*!, *Bhola Puran*!, on sand hills, *Dalzell*!; banks of Mulir river near Karachi, *Woodrow*; Jemadar ka Landa near Karachi, *Stocks*, 481!—DISTRIB. Arabia.

10. **Oldenlandia gracilis,** *Hook. f. in Fl. B. I.* v. 3 (1880) p. 68. A slender erect herb 6—12 in. high ; branches few, erect, slender, glabrous. Leaves opposite (not whorled), 2—3 by $\frac{1}{16}$—$\frac{1}{4}$ in. (the uppermost leaves often much narrower, sometimes not more than $\frac{1}{32}$ in. wide), linear, acuminate, glabrous, flat ; stipules truncate. Flowers in lax branched cymes, the branches slender, spreading in flower, erect in fruit ; pedicels very slender. Calyx $\frac{1}{8}$ in. long, glabrous ; teeth triangular-subulate, $\frac{1}{16}$ in. long, very acute. Corolla brown (*Hooker*) ; tube $\frac{7}{16}$ in. long, very slender ; lobes $\frac{1}{8}$ in. long, linear-oblong, obtuse. Capsules ellipsoid, $\frac{1}{8}$—$\frac{1}{4}$ in. long, glabrous, slightly protruded beyond the calyx. *Hedyotis aspera,* Bedd. Icon. Pl. Ind. Or. t. 32 (*not* of Heyne).—Flowers : Apr.

Rare in the Bombay Presidency. S. M. COUNTRY : Belgaum, *Ritchie* !—DISTRIB. Throughout India in hilly districts ; Ava.

11. **Oldenlandia senegalensis,** *Hiern, in Oliver, Fl. Trop. Afr.* v. 3 (1877) p. 56. Annual, 8—16 in. high, sparingly branched ; stem very erect, glabrous or minutely scaberulous, slender, wiry. Leaves 1$\frac{1}{2}$—2 by $\frac{1}{20}$—$\frac{1}{8}$ in., not whorled, linear-lanceolate, acute or acuminate, apiculate, flat or with slightly recurved margins ; stipules with lateral bristles. Flowers in very lax open terminal pyramidal panicled cymes ; peduncles long, slender ; pedicels capillary, 1—2 in. long. Calyx $\frac{1}{16}$ in. long ; teeth subulate, slightly shorter than the obovoid calyx-tube. Corolla $\frac{1}{8}$—$\frac{1}{4}$ in. long ; lobes $\frac{1}{12}$ in. long, linear, acute or acuminate. Capsules $\frac{1}{8}$ in. in diam., on long filiform pedicels, globose, crowned by the very distant calyx-teeth which are below the top of the capsule. Fl. B. I. v. 3, p. 68 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 644.—Flowers : Sept.

DECCAN : Kirkee, *Woodrow* ; Poona, *Woodrow*, 192 !—DISTRIB. India (Chota Nagpore), W. Tropical Africa.

Sir J. Hooker (Fl. B. I. l. c.) referred this to the Senegal plant with hesitation. The flowers are smaller than those of the African plant, but as there are only 3 sheets in Herb. Kew., of which 2 (collected by one and the same collector) are from Chota Nagpore and the other from the Deccan, the material is still insufficient for accurate determination.

12. ANOTIS, DC.

Herbs prostrate or ascending, rarely erect, often with flaccid hairs. Leaves opposite ; stipules interpetiolar, usually bristly. Flowers small, in heads or in axillary and terminal cymes. Calyx-tube compressed ; lobes 4, erect or recurved, usually with broad sinuses. Corolla tubular or infundibuliform ; lobes 4, ovate, usually shorter than the tube, valvate in bud. Stamens 4 ; filaments short or long ; anthers included or exserted. Ovary 2 (rarely 3—4) -celled ; ovules usually few (rarely 1) in each cell on placentas ascending from near the base of the septum ; style filiform ; stigmas 2—4, linear. Capsule didymous, laterally compressed, the crown produced, loculicidally 2-valved at top, rarely indehiscent ; cells 1—few (rarely many) -seeded. Seeds peltate, boat-shaped or plano-convex ; testa coarsely pitted ; embryo clavate in horny albumen.—DISTRIB. Chiefly Tropical Asia ; species about 25.

Cymes corymbose.
Capsule subglobose; calyx-teeth suberect in fruit, a little below the top of the capsule ..... 1. *A. Leschenaultiana.*
Capsule broader than long, reaching ¼ in. broad, calyx-teeth large, deflexed in fruit, a little below the top of the capsule ..... 2. *A. lancifolia.*
Capsule globose, 1/16 in. in diam.; calyx-teeth minute, ½-way down or more from the top of the capsule in fruit ..... 3. *A. Rheedei.*
Cymes clustered; capsules in clusters or heads.
Leaves fleshy; calyx-teeth large ..... 4. *A. carnosa.*
Leaves membranous.
Capsule usually 4-lobed and 4-celled; calyx-teeth minute ..... 5. *A. quadrilocularis.*
Capsule 2-lobed, 2-celled.
Calyx-teeth nearer the pedicel than the top of the capsule, tipped with a fine bristle ..... 6. *A. Montholoni.*
Calyx-teeth not bristle-tipped.
Leaves exceeding ½ in. long ..... 7. *A. fœtida.*
Leaves not exceeding ½ in. long ..... 8. *A. Ritchiei.*

1. **Anotis Leschenaultiana,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1873) p. 59, & *Hook f. Fl. B. I.* v. 3 (1880) p. 72. A stout plant 1—2 ft. high with a perennial root; stems straggling, more or less hairy especially near the extremities and beneath the nodes, sometimes glabrous or nearly so. Leaves 1—2½ by ⅜—1⅛ in., sessile or petioled, ovate or ovate-lanceolate, acute or subobtuse, usually densely villous on both sides, base obtuse or acute, sometimes cordate; lateral nerves numerous, prominent beneath; petioles 0—½ in. long; stipules bristly. Flowers in corymbose usually hairy dense peduncled terminal cymes; pedicels slender, short, hairy. Calyx in flower 1/16 in. long; teeth equalling the tube, narrowly triangular, acute. Corolla red-purple; tube 3/16—¼ in. long; lobes 1/12 in. long, oblong, obtuse. Anthers blue. Capsules subglobose, didymous, with the calyx-teeth near the top. Seeds 1—2, plano-convex, 1/20—1/16 in. long, deeply pitted. The plant varies much in hairiness. *Hedyotis Leschenaultiana,* Wight & Arn. Prodr. p. 411; Wight, Ill. t. 125; Dalz. & Gibs. p. 115.

S. M. COUNTRY: Belgaum, *Dalzell & Gibson.*

I have seen no authentic specimens from the Bombay Presidency. Dalzell & Gibson (Bo. Fl. l. c.) gave Belgaum as the locality in which the plant occurs, and there are in Herb. Kew. specimens of one of the varieties of the plant from Stocks' Herbarium and also one from Dalzell's Herbarium, but none of these have localities assigned to them. Woodrow does not include the plant in his list

2. **Anotis lancifolia,** *Hook. f. in Fl. B. I.* v. 3 (1880) p. 73. Herbaceous, erect, diffusely branched, 2—3 ft. high; stems and branches glabrous. Leaves membranous, 1—3 by ⅜—1 in., ovate or ovate-lanceolate, acuminate, bright-green and pubescent above, paler and hairy on the nerves beneath, base acute or obtuse; petioles ¼—⅜ in. long; stipules pubescent, shortly bristly. Flowers purple, in terminal and subterminal many-flowered corymbose (usually glabrous) cymes which are sometimes 4—6 in. in diam.; peduncles 4-gonous, pubescent or glabrous. Calyx 1/12 in. long, hairy; teeth 1/16 in. long, triangular, acuminate. Corolla ¼ in. long; lobes triangular-oblong, acute, 1/16 in. long, hairy outside. Capsules compressed, 3/16—¼ in.

broad, much broader than long, dehiscing across the top, 2-lobed at the apex, crowned by the large distant recurved calyx-teeth. Seeds 4—6, broadly ellipsoid or suborbicular, convex on the back, deeply excavated on the face, pitted, black. Woodr. in Journ. Bomb. Nat v. 11 (1898) p. 645. *Hedyotis lancifolia,* Dalz. in Kew. Journ. Bot. v. 2 (1850) p. 135 ; Dalz. & Gibs. p. 116.—Flowers : Sept.—Oct.

KONKAN : *Stocks* !, *Dalzell* ! DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ! ; Purandhar, *Woodrow*; Phunda Ghát, *Dalzell & Gibson*. S. M. COUNTRY : Belgaum south, *Ritchie*, 1777 ! ; Castlerock *Cooke* ! ; Belgaum, *Ritchie*, 356 !—DISTRIB. India (W. Peninsula).

3. **Anotis Rheedei,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1873) p. 59, & *Hook. f. Fl. B. I.* v. 3 (1880) p. 73. Annual, slender ; stem erect, glabrous, 4-gonous, almost 4-winged. Leaves 1½—3 by ¾—1 in., membranous, ovate, acute or acuminate, with a few scattered hairs on both surfaces, tapering at the base into the petiole ; petioles slender, ⅛—½ in. long ; stipules short, crenate. Flowers few, minute, in axillary and terminal very lax and open cymes ; peduncles and pedicels long, capillary. Calyx-teeth very minute. Corolla pale rose-colored ; tube short, cylindric. Capsules $\frac{1}{10}$ in. in diam., appearing after dehiscence as 4 connate cups, globose, puberulous, broadly didymous, much protruded, the calyx-teeth being about the middle of the capsule. Seeds 4—12, semiellipsoid, rounded on the back, deeply excavated on the face, microscopically reticulate, black. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645. *Hedyotis latifolia,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 133 ; Dalz. & Gibs. p. 116. *Hedyotis Rheedei,* Wight & Arn. Prodr. p. 409.—Rheede, Hort. Mal. v. 10, p. 49, t. 25.—Flowers : July.

KONKAN : *Stocks* !, *Dalzell* ! ; Malwán, *Dalzell & Gibson* ; near Matheran, *Woodrow* ; hills near Matheran, *Kanitkar* ! ; Ghâts near Goa, *Woodrow*.—DISTRIB. India (W. Peninsula).

4. **Anotis carnosa,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1878) p. 59, & *Hook. f. Fl. B. I.* v. 3 (1880) p. 74. Annual, 4—6 in. high, diffusely branched from the base. Leaves ¾—1¼ by ⅛—⅜ in., elliptic-lanceolate, subobtuse, thick and fleshy, scaberulous with papillæ above, pale beneath and with recurved margins, attenuated at the base into a short petiole or almost sessile ; stipules truncate or almost obsolete. Flowers sessile, 3—6, in capitate cymes which are sessile and axillary, or peduncled and terminal, each head of flowers with 2 large floral leaves (bracts) at its base ; peduncles ¼—1 in. long. Calyx ⅛ in. long, externally papillose ; teeth $\frac{1}{10}$ in. long, slightly longer than the tube, linear-oblong, acute, when in fruit about ¼ the way down from the top of the capsule. Corolla purple, $\frac{3}{10}$ in. long ; lobes ovate, $\frac{1}{20}$ in. long. Capsules ⅛—⅛ in., broader than long, sessile, 2-lobed, 2-celled, glabrous, crowned by the large papillose calyx-teeth ; cells 3—6-seeded. Seeds elliptic or orbicular in horizontal section, compressed, convex on the back, excavated on the face, pitted, black. *Hedyotis carnosa,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 135 ; Dalz. & Gibs. p. 116.

KONKAN : on rocky sea-shore Málwan, *Dalzell* ; sandy margins of rivulets Ooran, *Dalzell* ! KANARA : *Law* !—DISTRIB. India (W Peninsula).

5. **Anotis quadrilocularis,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 74. Annual, 6—18 in. high, with many flaccid spreading glabrous cylindric branches. Leaves ¾—1¼ by ½—¾ in., thinly membranous, subacute, more or less hairy on both surfaces, pale beneath, shortly tapering at the base ; petioles ⅛—¼ in. long ; stipules short, truncate, the upper with short bristles. Flowers sessile or nearly so, solitary or 2—4 together in the axils (those on short branchlets with a single pair of leaves appearing terminal). Calyx-teeth 1/20 in. long, broadly ovate, acute, apiculate, ciliate in fruit, about ⅓ the way down from the top of the capsule. Corolla ⅛ in. long ; lobes 1/16 in. long, ovate, subacute, pubescent on the back. Capsules sessile, broader than long, usually 4 (sometimes 2 or 3) -lobed, usually 4 (sometimes 2 or 3) -celled. Seeds 3 in each cell, hemispheric or semiellipsoid, deeply excavated on the face, pitted, black. Trim. Fl. Ceyl. v. 2, p. 318. *Hedyotis quadrilocularis,* Thw. Enum. p. 144.

Belgaum, *Ritchie,* 191!

I have seen only one specimen from the Bombay Presidency collected by *Ritchie* at Belgaum.—Distrib. India (W. Peninsula) ; Ceylon.

6. **Anotis Montholoni,** *Hook. f. in Fl. B. I.* v. 3 (1880) p. 73. Annual, erect, sparingly branched ; stem and branches more or less hispid. Leaves 1⅜—2 by ⅜—¾ in., ovate or ovate-lanceolate, acute, more or less hairy on both surfaces ; petioles 1/10—¼ in. long ; stipules with short bristles. Flowers in terminal and axillary pedunculed many-flowered (not capitate) cymes ; peduncles hairy. Calyx 1/16 in. long ; teeth longer than the tube, in fruit below the middle of the capsule nearer to the pedicel than the crown, ovate, pointed with a fine capillary bristle. Corolla funnel-shaped, purple, ⅛ in. long ; lobes 1/12 in. long, oblong, subacute, glabrous outside. Capsules clustered, subsessile, didymous, broader than long, with a large double convex crown giving the appearance of two hemispheric bosses, pubescent ; cells 1—3-seeded. Seeds globose or somewhat beehive-shaped, deeply excavated on the face, pitted, black. The hair-points on the calyx-teeth are a good distinctive mark. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645.—Flowers : Aug.

Konkan : Poona, *Ranade* !, *Woodrow* ! S. M. Country : Belgaum, *Ritchie,* 1778! ; banks of nálas near Belgaum, *Ritchie* ! Kanara : *Law* ! Distrib. India (W. Peninsula).

7. **Anotis fœtida,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1873) p. 59, & *Hook. f. Fl. B. I.* v. 3 (1880) p. 74. A slender annual 4—6 in. high ; stem simple or sometimes excessively branched ; branches erect, very slender, more or less 4-gonous, glabrous. Leaves sessile, ¾—1 by 1/20—3/16 in., linear or narrowly linear-lanceolate, subacute, scaberulous with minute papillæ above, pale beneath and with recurved margins ; stipules small, bristly. Flowers subsessile, in 2—3-flowered capitate cymes terminating simple or forked subterminal capillary erect peduncles. Calyx 1/16 in. long ; teeth 1/32 in long, narrowly triangular, acute, apiculate. Corolla ⅛ in. long, funnel-shaped, purple ; lobes ovate, acute, 1/20 in. long, externally papillose. Capsules 1/10—⅛ in., sessile, broader than long, didymous, the crown very prominent, with the calyx-teeth about ½-way down from the top of the capsule ;

cells 1—6-seeded. Seeds elliptic or orbicular in horizontal section, compressed, convex on the back, excavated on the face, pitted, black. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645. *Hedyotis fœtida*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 134 ; Dalz. & Gibs. p. 116.—Flowers : July—Aug.

KONKAN : Malwán in stony ground during the rains, *Dalzell* ! ; Bombay, *Lambert* ! DECCAN : Khandala, *Bhiva* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1163 ! ; Londa, *Woodrow*. KANARA : *Woodrow* ; Karwar, *Talbot*, 554 !—DISTRIB. Apparently endemic.

8. **Anotis Ritchiei,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 74. A small slender plant 4—7 in. high ; stems cæspitose, more or less angled, glabrous or pubescent. Leaves ¼—½ by $\frac{1}{10}$—⅙ in., oblong-lanceolate, acute or obtuse, hairy on both surfaces, narrowed at the base into a very short petiole ; stipules inconspicuous. Flowers in small terminal shortly peduncled cymes ; branches of the cyme few, pubescent, each carrying a head of 2—3 sessile or subsessile flowers. Calyx $\frac{1}{10}$ in. long, hairy ; teeth $\frac{1}{17}$ in. long, linear-lanceolate, acute. Corolla purple, ⅛—¼ in. long ; tube very slender ; lobes $\frac{1}{16}$ in. long, pubescent on both sides, with a darker purple spot at the base of each lobe (*Ritchie*). Stamens exserted ; anthers linear, blue (*Ritchie*). Ovary 2-celled ; cells 2—4-seeded. Fruit unknown.

There is but a single sheet of this species (without fruit) in Herb. Kew. The specimens on it were collected by Dr. Ritchie, but the locality whence they were obtained is not given. They may have been collected at or near Belgaum, where Dr. Ritchie collected largely, but there is absolutely no evidence that such was the case or that they were found within the limits of the Presidency at all.

13. OPHIORRHIZA, Linn.

Erect, creeping or decumbent small herbs, rarely undershrubs. Leaves opposite ; stipules interpetiolar, caducous. Flowers secund on the branches of axillary or terminal dichotomous cymes, with or without bracts. Calyx-tube short ; lobes 5, small, persistent. Corolla tubular or funnel-shaped ; lobes 5, valvate in bud, often winged or appendaged at the back, sometimes also with a fold in the sinus. Stamens 5, inserted below the throat of the corolla, usually included ; anthers linear. Disk of 2 large prominent erect lobes which become much enlarged in fruit. Ovary 2-celled ; ovules many in each cell, inserted on basal ascending placentas ; style filiform ; stigmas 2, broad or linear. Capsule coriaceous, compressed, obcordate, girt by the calyx-limb, the crown dehiscing by 2 broad gaping valves ; placentas divaricating, many-seeded. Seeds minute, angled ; testa thinly crustaceous ; embryo clavate in fleshy albumen.—DISTRIB. Tropical Asian, with a few Australian and Polynesian ; species about 50.

1. **Ophiorrhiza Harrisiana,** *Heyne, in Wall. Cat.* (1828) 6236. Herbaceous, woody at the base, 6—15 in. high ; branches numerous, often rooting near the base, glabrous or more or less pubescent. Leaves 2—3½ by 1—1½ in., elliptic or elliptic-lanceolate, acute or

acuminate, glabrous or with a few scattered hairs above, whitish on the lower surface and pubescent on the nerves beneath ; petioles $\frac{1}{8}$—$\frac{3}{8}$ in. long ; stipules with 1 or more long rather stout bristles. Flowers in rather dense terminal cymes ; peduncles and pedicels densely hairy ; bracteoles at base of pedicels $\frac{1}{12}$ in. long, linear, acute, hairy. Calyx $\frac{1}{10}$ in. long, hairy ; tube turbinate ; teeth $\frac{1}{10}$ in. long, triangular, acute. Corolla $\frac{1}{4}$ in. long, externally pubescent ; lobes $\frac{1}{12}$ in. long, triangular-oblong, acute, not keeled on the back, pubescent inside. Capsules somewhat canoe-shaped, pubescent, much compressed, $\frac{1}{4}$—$\frac{1}{3}$ in. broad, much broader than long, rounded at the ends, surmounted by the very distant short calyx-teeth. Fl. B. I. v. 3, p. 78 ; Trim. Fl. Ceyl. v. 2, p. 321. *Ophiorrhiza Harrisonii*, Wight, Icon. t. 1162 ; Dalz. & Gibs. p. 117.—Flowers : Aug.

KONKAN : *Stocks* ! ; Amba Ghât, *Woodrow*. S. M. COUNTRY : Rámghât, *Dalzell & Gibson*. KANARA : *Hohenbacker* 792a ! ; Divimana, *Woodrow* ; near Gondabel, *Dalzell* ; Bombardi, *Ritchie*, 1775 !—DISTRIB. Throughout India in hilly districts ; Ceylon.

14. **MUSSÆNDA,** Linn.

Shrubs or undershrubs (rarely herbs), erect or climbing. Leaves opposite or 3-nately whorled ; stipules interpetiolar, solitary or twin, usually deciduous. Flowers yellow or scarlet (rarely white) in terminal cymes ; bracts and bracteoles deciduous. Calyx-tube oblong or turbinate ; lobes 5, usually deciduous, one frequently forming a large stalked white or colored leaf. Corolla infundibuliform ; tube usually silky, throat villous ; lobes 5, short, induplicate-valvate. Stamens 5, inserted in the throat of the corolla or lower down ; filaments very short ; anthers linear. Ovary 2-celled ; ovules very numerous in each cell, on peltate fleshy placentas ; style filiform ; stigmas 2, linear. Fruit a fleshy berry, areolate at the apex, many-seeded. Seeds minute ; testa pitted ; embryo minute in dense fleshy albumen.—DISTRIB. Asia, Africa, and the Pacific Islands ; species about 40.

1. **Mussænda frondosa,** *Linn. Sp. Pl.* (1753) p. 177. A rambling shrub, climbing by its long flexuose divaricate branches which are cylindric and appressedly hairy (rarely glabrous). Leaves 3—5 by 2—3½ in., broadly elliptic, shortly acuminate, more or less pubescent (rarely glabrous) above, pubescent on the nerves and on the numerous reticulate veins beneath, base rounded or often tapering into the petiole ; main nerves 8—12 pairs conspicuous on both surfaces, curving upwards ; petioles $\frac{1}{4}$—1 in. long, more or less appressedly hairy ; stipules twin, $\frac{1}{4}$ in. long and about $\frac{1}{10}$ in. broad at the base, linear-lanceolate, very acute, hairy. Flowers in terminal somewhat open cymes ; peduncles stout, coarsely hairy ; pedicels short, hairy ; buds densely hairy, clavate, 5-angled ; bracteoles subulate. Calyx-teeth reaching $\frac{5}{8}$ in. long, linear-subulate, hairy, the enlarged segments (only developed on the outer side of a few flowers) leaf-like, creamy-white, persistent, 2½—4½ by 1½—2½ in., broadly ovate or elliptic, acuminate, usually tapering at the base, more or less velvety when young, when older nearly glabrous or with a few scattered hairs, strongly 5—7-nerved from the base and reticulately

veined between the nerves, the stalk about ½—1 in. long. Corolla 1⅛—1½ in. long, of a deep golden-yellow ; tube slender, very hairy outside and with a dense lining of yellowish hairs completely blocking the mouth ; lobes ¼ in. long, broadly ovate or elliptic, apiculate, pubescent on the back. Berries ⅜—½ in., subglobose or obovoid, glabrous. This is the var. *glabrata* of Hook. f. Fl. B. I. Fl. B. I. v. 3, p. 89 ; Grah. Cat. p. 88 ; Dalz. & Gibs. p. 121 ; Bedd. For. Man. in Flor. Sylvat. p. cxxxi, t. 16, fig. 3 ; Talb. Trees, Bomb. ed. 2, p. 187 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645.—Flowers : July—Oct. VERN. *Sarvad* ; *Bhutkes*.

KONKAN : *Law* ! ; hills, *Dalzell & Gibson* ; Matheran, *Cooke* ! ; near Simpson's Lake, *H. M. Birdwood* ; Vingorla, *Kanitkar* ! DECCAN : Khandala, *Woodrow* ! ; Koina valley, *Cooke* ! KANARA : moist forests where there is a heavy rainfall, *Talbot* ; N. Kanara, *Woodrow*.—DISTRIB. India (Tropical Himalaya, Assam, Andamans, W. Peninsula) ; Ceylon, Malay Islands.

15. **TARENNA,** Gærtn.

Shrubs or trees. Leaves opposite, petiolate ; stipules usually deciduous. Flowers in terminal many-flowered corymbiform cymes. Calyx-tube obovoid or turbinate ; limb small, shortly tubular, 5-fid or 5-partite (very rarely 4- or 6-fid or -partite), deciduous or subpersistent. Corolla infundibuliform or hypocrateriform ; tube short or long, the throat glabrous or villous ; lobes 5, spreading or reflexed, twisted in bud. Stamens 5, inserted on the mouth of the corolla ; filaments short, or 0 ; anthers narrow, often acute. Ovary 2-celled ; ovules few in each cell, immersed or ½-immersed in fleshy peltate placentas ; style stout, usually pubescent ; stigma fusiform, grooved, usually much exserted. Fruit a hard 2-celled berry. Seeds few.—DISTRIB. Tropical Asia and Africa.

The genus should properly be called *Chomelia*, Linn., which dates from 1737 (Gen. Pl. ed. 1, p. 55), but the name has been retained for another (American) genus of the Order as *Chomelia*, Jacq. (1760). K. Schum. in Engl. & Prantl. Pflanzenf. v. 4, part 4, p. 74, adopts *Chomelia* as the name of the genus.

Note.—The genus was founded by Gærtner from the Ceylon plant *Tarenna zeylanica*. In his original description, Gærtner describes the calyx as 4-partite, a condition of rare occurrence, but, as has been pointed out by Wight & Arnott (Prodr. p. 401), the calyx is sometimes (though rarely), 4- or even 6-cleft, and from the fact that Gærtner does not describe the corolla, his specimens may have been few or imperfect. There can scarcely be any doubt as to the plant Gærtner, whose figures of the fruit are excellent, intended to describe ; in fact *Tarenna zeylanica* appears to be generally recognised as a synonym for *Webera corymbosa*, Willd., and *Stylocoryna Webera*, A. Rich. It is significant too that the name *Tarenna* was derived from the Cinghalese name (Tarana) of *Tarenna zeylanica* (see Trim. Fl. Ceyl. v. 2, p. 328, and Wight & Arn. Prodr. l. c.) As the name *Tarenna* dates from 1788 it is clearly prior to *Webera*, Schreb. (1791), or *Stylocoryna*, Car. (1797).

1. **Tarenna zeylanica,** *Gærtn. Fruct.* v. 1 (1788) p. 139, t. 28. A large shrub or small tree ; bark smooth, pale-grey ; twigs compressed, glabrous ; young shoots often covered with a resinous exudation. Leaves coriaceous, 3—6 by ¾—2½ in., oblong-lanceolate, acute at both ends (sometimes acuminate at the apex), glabrous, polished

above, pale beneath ; main nerves 10—12 pairs, prominent on the lower side ; petioles ¼—½ in. long, stout ; stipules triangular from a broad base, acute, closely appressed to the stem and at first glued to it by a waxy secretion, ¼ in. long, subpersistent. Flowers faintly odorous, in terminal trichotomous corymbose cymes ; peduncles stout ; ultimate pedicels about $\frac{1}{10}$ in. long. Calyx ⅛ in. long, slightly pubescent ; teeth triangular, $\frac{1}{20}$ in. long, ciliolate. Corolla white, ⅓ in. long ; lobes ⅕ in. long, oblong, subacute, hairy at the mouth. Berries the size of a pea, 2-celled, globose, glabrous, at first dark-green, becoming black when fully ripe, surmounted at first by the calyx-lobes, which however often drop off before maturity leaving a conspicuous scar. Seeds 6—10, semilunate, wedge-shaped, rounded on the back, in shape like a section of an orange, hard, rugose, black, shining. I have never found more than 10 seeds in a berry. Jackson, in Index Kewen. v. 4 (1895) p. 1038. *Webera corymbosa*, Willd. sp. Pl. v. 1 (1797) p. 1224 ; Hook. f. in Fl. B. I. v. 3, p. 102 ; Trim. Fl. Ceyl. v. 2, p. 328 ; Talb. Trees, Bomb. ed. 2, p. 188 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 300. *Stylocoryna Webera*, A. Rich. Mém. Fam. Rubiac. (1829) p. 168, & in Mém. Soc. Hist. Nat. Par. v. 5 (1834) p. 248. *Stylocoryne Webera*, Wight & Arn. Prodr. (1834) p. 401 ; Wight, Icon. tt. 309 & 584 ; Grah. Cat. p. 89 ; Dalz. & Gibs. p. 119.—Flowers : Apr.—June and again in Dec. VERN. *Kare*.

KONKAN : S. Konkan, *Nimmo* ex *Graham*, *Dalzell & Gibson* ; jungles near Goa, *Dr. Lush* ex *Graham*. KANARA : *Law!*, *Hohenhacker*, 123! ; N. Kanara in moist forests on the Ghâts, common near the Ainshi Ghât, *Talbot*.—DISTRIB. India (southern parts of the Western Peninsula) ; Ceylon, Malay Islands.

16. **RANDIA,** Linn.

Trees and shrubs unarmed or spinous. Leaves opposite, or with one of the pair often arrested ; stipules short, intrapetiolar, free or connate. Flowers rather large, solitary and terminal or in axillary or leaf-opposed cymes, white or yellowish. Calyx-tube ovoid or turbinate, ribbed or terete ; limb often tubular, truncate, toothed or lobed, the lobes sometimes foliaceous. Corolla various ; tube long or short, the throat glabrous or villous ; lobes 5 (rarely more), short or long, twisted in bud. Stamens 5 (rarely more) ; anthers subsessile, narrowly linear. Disk annular or cushion-shaped. Ovary 2-celled ; ovules numerous, sunk in fleshy placentas ; style short or slender ; stigma large, clavate or fusiform, entire or 2-fid. Berry globose, ovoid or ellipsoid, 2-celled, many-seeded. Seeds often immersed in pulp, angled ; testa thin ; albumen horny ; cotyledons orbicular.—DISTRIB. Throughout the tropics of the world ; species about 90.

Armed. Erect trees or shrubs.		
Flowers 1—3, terminal; calyx-limb persistent.		
Flowers exceeding 1½ in. in diam.; fruit exceeding 2 in. in diam	1.	*R. uliginosa.*
Flowers and fruit both less than 1 in. in diam	2.	*R. dumetorum.*
Flowers in cymes; calyx-limb not persistent	3.	*R. malabarica.*
Unarmed; a climbing shrub	4.	*R. rugulosa.*

1. **Randia uliginosa,** *DC. Prodr.* v. 4 (1830) p. 386. A small tree rarely reaching 20 ft. high ; bark reddish-brown, scaly ; branches numerous, thick, horizontal (the younger 4-angled), many of them short and terminating in 1—2 pairs of strong sharp thorns ½ in. long. Leaves fascicled on suppressed branchlets, thin, 2½—5 by 1⅜—2 in., obovate or obovate-oblong, obtuse, glabrous above, more or less pubescent and reticulately veined beneath, tapering to the base ; main nerves 6—8 pairs ; petioles very short ; stipules acute from a broad base. Flowers solitary at the ends of suppressed branches, white, fragrant, 1½—2 in. in diam. ; pedicels short. Calyx ½ in. long, fleshy, green ; limb broadly tubular with 5—7 broad rounded ciliate shallow lobes scarcely ⅛ in. long. Corolla glabrous outside ; tube very short with a ring of white hairs at the mouth ; lobes 5—7, orbicular, much overlapping. Stamens 5—7, sessile. Ovary 2-celled ; ovules ∞ ; style ribbed ; stigma large with subconvolute spiral laciniæ. Fruit 2—2½ in. long, ovoid, smooth, yellowish-brown, crowned with the persistent calyx-limb, 2-celled. Seeds numerous, compressed, smooth, closely packed in pulp. Fl. B. I. v. 3, p. 110 ; Grah. Cat. p. 89 ; Dalz. & Gibs. p. 119 ; Wight, Icon. t. 397 ; Trim. Fl. Ceyl. v. 2, p. 330 ; Talb. Trees, Bomb ed. 2, p. 188 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 391.—Flowers : May—June. VERN. *Pándhara* ; *Pándri.*

Throughout the Presidency often in abandoned rice-fields, *Talbot.* KONKAN : banks of rivers in the Konkan, *Graham* ; S. Konkan, *Dalzell & Gibson* ; near Pen, *Woodrow.* GUJARAT : Porbander (Kathiawar), *Woodrow.* S. M. COUNTRY : *Graham* ; S. of Belgaum, *Ritchie,* 343 *a* ! KANARA : Kála naddi, *Ritchie,* 343 ! DISTRIB. Throughout India ; Ceylon.

The fruit is eaten when boiled or roasted. See Watt, Dict. Econ. Prod. l. c.

2. **Randia dumetorum,** *Lamk. Tab. Encyc.* v. 2 (1793) p. 227. A large shrub or small tree armed with strong straight nearly opposite decussate spines ½—1½ in. long, coming off from above the branchlets ; branches horizontal, rigid, many of the lateral ones suppressed and very short. Leaves usually fascicled on the suppressed branches, 1½—2½ by ¾—1½ in., obovate, obtuse, wrinkled, shining above, more or less pubescent above and on the nerves beneath (especially when young), base cuneate ; main nerves 6—10 pairs ; petioles ¼—⅜ in. long, densely pubescent ; stipules ovate, acuminate. Flowers at the ends of short leaf-bearing branchlets, fragrant, solitary or 2 (rarely 3) together ; peduncles short. Calyx ½ in. long, densely hairy ; tube broadly campanulate ; teeth 5, foliaceous, ¼ in. long, ovate-oblong, subacute, often with small intermediate teeth between. Corolla ¾ in. long, at first white, afterwards becoming yellow ; tube ⅛—¼ in. long, densely hairy outside ; lobes ½ in. long and nearly as broad as long, obovate-oblong, rounded at the apex, pubescent outside, spreading. Fruit like a small crab-apple, yellowish, globose or broadly ovoid, smooth or obscurely longitudinally ribbed, crowned with the large calyx-limb, 2-celled, glabrous ; pericarp thick. Seeds many, flat, imbedded in pulp. Fl. B. I. v. 3, p. 110 ; Grah. Cat. p. 89 ; Dalz. & Gibs. p. 119 ; Wight, Icon. t. 580 ;

Bedd. For. Man. in Flor. Sylvat. p. cxxxii, t. 16, f. 1 ; Trim. Fl. Ceyl. v. 2, p. 330 ; Talb. Trees, Bomb. ed. 2, p. 189 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Watt, Dict. Econ. Prodr. v. 6, part I, p. 389. *Randia longispina,* DC. Prodr. v. 4, p. 386 ; Grah. Cat. p. 89 ; Dalz. & Gibs. p. 119.—Flowers : Mar.—June. VERN. *Gehelá* ; *Gel.*

Common throughout the Presidency in deciduous forests. KONKAN : Matheran, *Woodrow* ! DECCAN : Khandala, *Bhiva* ! ; Mahableshwar, *Cooke* !, *Woodrow* ; Kadkalla near Lanoli, *Ranade* ! ; Karli, *Bhiva* ! ; Lanoli, *Bhiva* ! ; Khandesh, *Dalzell & Gibson.* S. M. COUNTRY : Sulebhavi near Belgaum, *Woodrow.* KANARA : Sampkhand, *Woodrow.*—DISTRIB. Throughout India ; Ceylon, Java, Sumatra, South China, E. Tropical Africa.

The bark, rind, and fruit are used medicinally and the bruised root and unripe fruit are used to poison fish. See Watt, Dict. Econ. Prod. l. c.

3. **Randia malabarica,** *Lamk. Encyc. Méthod.* v. 3 (1789) p. 25. An erect much-branched glabrous shrub ; branchlets sometimes reduced to short sharp spines which are, however, often absent. Leaves coriaceous, 1½—2½ by ¾—1¼, elliptic-oblong or oblong-lanceolate, subacute, glabrous, tapering to the base ; nerves not conspicuous ; petioles ⅛—⅜ in. long ; stipules triangular, caducous. Flowers white, in leaf-opposed spreading glabrous cymes fascicled on the top of a very short peduncle ; pedicels ⅛—⅓ in. long, each with a pair of acute connate bracts forming a cup at its base. Calyx ⅛ in. long, campanulate, glabrous ; teeth triangular, acute, about 1/20 in. long. Corolla lemon-yellow, hairy at the mouth ; tube ⅓ in. long, glabrous ; lobes ¼ by 1/10 in., ovate-oblong, acute, veined. Stigma fusiform. Anthers long, exserted. Fruit globose, ¼—⅜ in. in diam., red (*Graham*), marked at the apex with the scar of the calyx-limb. Seeds 6—8 in each cell, closely packed, angled, compressed. Fl. B. I. v. 3, p. 111 ; Trim. Fl. Ceyl. v. 2, p. 331. *Griffithia fragrans,* Wight & Arn. Prodr. p. 400 ; Wight, Icon. t. 310 ; Grah. Cat. p. 89 ; Dalz. & Gibs. p. 119.

S. KONKAN : *Dalzell & Gibson, Nimmo* ex *Graham,* l. c.

I have seen no specimens from Bombay and there are none from that Presidency in Herb. Kew. Nimmo ex Graham (Cat. p. 89) and Dalzell & Gibson (Bo. Fl. p. 119) give its habitat as S. Konkan. Neither Talbot nor Woodrow enumerates the species.—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **Randia rugulosa,** *Hook. f. in Fl. B. I.* v. 3 (1880) p. 113. A large climbing unarmed shrub with many drooping branches ; stem reaching 4 in. in diam. at the base. Leaves 2½—4½ by 1—2¼ in., elliptic-oblong or elliptic-lanceolate, acuminate, glabrous ; main nerves 5—6 pairs, prominent beneath ; petioles ⅜—½ in. long, glabrous ; stipules ovate, cuspidate. Flowers in leaf-opposed paniculate cymes ; peduncles very short ; pedicels longer than the calyx ; bracts numerous, connate, cuspidate. Calyx ⅛ in. long, leathery, glabrous or puberulous ; tube campanulate ; limb truncate, with minute distant triangular teeth not more than 1/20 in. long. Corolla white ; tube ⅓ in. long ; lobes ⅜ by ⅛ in., oblong, subacute, glabrous. Stigma very large, fusiform. Berry ⅜ in. in diam., pisiform, the calyx-limb not persistent in fruit, but soon falling and leaving a conspicuous scar. Seeds rugose. Trim. Fl. Ceyl. v. 2, p. 331 ; Talb. Trees, Bomb. ed. 2, p. 189 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645. *Griffithia speciosa,* Bedd. Icon. Pl. Ind. Or. t. 37.—Flowers : Jan.—Mar.

KONKAN: Matheran, *Woodrow*; near Simpson's lake, *Cooke*!; Chowk plateau, *H. M. Birdwood*. S. M COUNTRY: Castlerock, *Kanitkar*! KANARA: common in the forests near the Tinai and Gairsoppa Ghâts, *Talbot*; Divimana, *Woodrow*; Mendele (N. Kanara), *Ritchie*, 1772!—DISTRIB. India (W. Peninsula); Ceylon.

17. **GARDENIA,** Linn.

Shrubs rarely trees, armed or not. Leaves opposite, rarely 3-nately whorled; stipules intrapetiolar, often connate. Flowers often large, terminal or axillary, solitary, fascicled, or rarely cymose, sometimes dimorphic and polygamous. Calyx-tube ovoid or obconic; limb tubular or dilated, variously cleft or lobed. Corolla various; lobes 5—12, twisted in bud. Stamens as many as the corolla-lobes, inserted in the throat of the corolla; anthers sessile or subsessile, linear, included. Ovary 1-celled; ovules numerous, 2-seriate, on 2—6 parietal placentas; style thick; stigma large, club-shaped or fusiform, usually 2-fid. Fruit often large, ovoid, ellipsoid or globose, coriaceous or fleshy and irregularly bursting, or with a hard bony endocarp which sometimes splits along the placental sutures. Seeds many, imbedded in the placentas, compressed; testa thin; embryo small, in horny albumen.—DISTRIB. Tropical and subtropical parts of the Old World; species 60.

Small trees.		
Armed; flowers dimorphic; placentas 5—6	1.	*G. turgida.* [var. *montana.*
Unarmed; flowers not dimorphic.		
Leaves petioled; calyx-teeth long, subulate, erect; placentas 2	2.	*G. lucida.*
Leaves sessile; calyx-teeth long, recurved; placentas 4—5	3.	*G. latifolia.*
A shrub unarmed; leaves sessile; calyx-teeth minute; placentas 4—5	4.	*G. gummifera.*

1. **Gardenia turgida,** *Roxb. Hort. Beng.* (1814) p. 15, var. **montana,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 118. A small deciduous tree reaching 25 ft. high; bark smooth, thick, soft, that on the young branches yellowish; branches numerous, thick and stout, usually armed with strong straight sometimes leaf-bearing thorns. Leaves 2—3½ by 1½—2¼ in., oblong or semiorbicular, obtuse, glabrous above, velvety-tomentose beneath, base much tapered into an obscure petiole; nerves inconspicuous; stipules triangular, cuspidate, caducous. Flowers from the young leafless shoots, dimorphic, the males in fascicles, the females solitary. MALE FLOWERS: Calyx ⅛ in. long, turbinate, pubescent, the mouth wide, truncate; teeth minute. Corolla ¾—1 in. long, glabrous; lobes ½—⅝ in. long, oblong, obtuse. FEMALE FLOWERS: Calyx ⅝—¾ in. long, flask-shaped, the mouth dilated; teeth foliaceous, ½ in. long, narrowly linear, obtuse. Corolla as in the male. Fruit 1—3 in. in diam., ovoid or subglobose, often bluntly pointed but not beaked, smooth; pericarp thick; endocarp woody, shining inside; placentas 5 or 6. Talb. Trees, Bomb. ed. 2, p. 190; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645; Watt, Dict. Econ. Prod. v. 3, p. 483. *Gardenia montana* (sp.), Roxb. Fl. Ind. v. 1, p. 709; Wight, Icon. t. 577; Grab. Cat. p. 88; Dalz. & Gibs. p. 120.—Flowers: Apr.—June.

Dalzell (without locality) in his Herbarium of Bombay Plants in Herb. Kew.! DECCAN: Poona districts, *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 1087!; Dharwar, *Talbot*. KANARA: common in the N. Kanara jungles, *Talbot*.—DISTRIB. India (Himalayas, Behar, W. Peninsula).

2. **Gardenia lucida,** *Roxb. Hort. Beng.* (1814) p. 15. A large glabrous shrub or small tree reaching 20—25 ft. high; bark smooth, grey; young shoots greyish-green, smooth, resinous. Leaves 2½—8 by 1—3 in., elliptic-oblong, subacute or shortly acuminate, base narrowed into a short petiole; main nerves 20—25 pairs, slender, prominent beneath; petioles somewhat obscure, about ⅛ in. long; stipules large, broadly ovate, acute, membranous. Flowers fragrant, axillary, solitary, from the axils of the uppermost leaves near the ends of the branches; pedicels ¼—½ in. long. Calyx ¾ in. long, pubescent or tomentose; teeth ⅜ in. long, erect, lanceolate, subulate. Corolla large, at first pure white, soon turning yellow; tube 1¼—2 in. long, slender, puberulous outside; lobes 5, obovate, obtuse, 1¼ by ¾ in., spreading, veined, glabrous. Fruit ellipsoid or globose, ¾—1 in. in diam., smooth, marked with longitudinal lines, crowned by the persistent calyx-limb; pericarp thick, woody; placentas 2. The flowers open in the evening, soon turn from white to yellow and die. Fl. B. I. v. 3, p. 115; Grah. Cat. p. 88; Dalz. & Gibs. p. 120; Wight, Icon. t. 575; Bedd. For. Man. in Flor. Sylvat. p. cxxxiv, t. 15, fig. 6; Talb. Trees, Bomb. ed. 2, p. 190; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645; Watt, Dict. Econ. Prod. v. 3, p. 482. Flowers: Mar.—June. VERN. *Dikemáli.*

KONKAN: *Lambert*!, *Dalzell*!, *Law*!; Elephanta, *Graham*; Kanheri jungles, *Graham*. S. M. COUNTRY: *Graham*; Belgaum, *Talbot*. KANARA: N. Kanara, *Woodrow*.—DISTRIB. India (Birma, Chittagong, W. Peninsula).

This species is, as well as *G. gummifera*, one of the sources of the *Dikemáli* resin which is much used by the natives in medicine. The resin, which has a most offensive odor, is employed extensively to keep off flies from sores. See Watt, Dict. Econ. Prod. l. c.

3. **Gardenia latifolia,** *Ait. Hort. Kew.* v. 1 (1789) p. 294 (*not* of Roxb.). A small deciduous tree reaching 30 ft. high, with stiff divergent branches forming a rounded head; bark smooth, pale-grey, flaking off in small round pieces; young parts glabrous but coated with a resinous exudation. Leaves opposite or 3-nately whorled, crowded towards the ends of the branches, subsessile, 4—8 by 2½—6½ in., broadly elliptic or obovate, rounded or very shortly and obtusely acuminate at the apex, apple-green above, paler beneath, glabrous or more or less pubescent; main nerves 10—20 pairs; stipules adnate to the base of the petiole, connate, forming a thin truncate tube at first enclosing the young leaves, but, after the fall of the leaf, separating at the base and forming a loose ring round the stem. Flowers solitary or 2-nate, subsessile, white changing to yellow, fragrant. Calyx ¾—1 in. long, densely pubescent; limb broadly tubular, slightly dilated at the apex; teeth 5—9, lanceolate-subulate, unequal, recurved, and with ciliate margins. Corolla-tube 2 in. or more long, striate, densely pubescent outside; lobes 5—9, obliquely obovate-oblong, obtuse, 1½—1¾ by ½—¾ in. Fruit nearly globose, 1¼—1¾ in. in diam., without ribs, appressedly pubescent when young, pale-green and speckled, surmounted by the calyx-limb, which is

½ in. or more long ; epicarp dry, fleshy ; endocarp bony, yellow, polished within, 3-valved. Seeds numerous, small, flattened, pale-brown, in purplish-grey pulp ; placentas 4—5. Fl. B. I. v. 3, p. 116 ; Grah. Cat. p. 88 ; Dalz. & Gibs. p. 120 ; Wight, Icon. t. 759 ; Trim. Fl. Ceyl. v. 2, p. 332 ; Talb. Trees, Bomb. ed. 2, p. 190 ; Watt, Dict. Econ. Prod. v. 3, p. 482.—Flowers : Mar.—May.

S. M. COUNTRY : sandstone hills north of Belgaum, *Ritchie*, 1085 ! KANARA : *Law* ! ; near Duddi on the Gatpraba river, *Law* ex *Graham*, *Ritchie*, 1085 !—DISTRIB. Dry hilly districts of Western, Central and South-western India, Behar and W. Bengal ; Ceylon.

The wood has been recommended as a substitute for boxwood for engravers' use. It is employed by the natives to make combs. See Watt, Dict. Econ. Prod. l. c.

4. **Gardenia gummifera,** *Linn. f. Suppl.* (1781) p. 164. A shrub about 6 ft. high, glabrous or nearly so, unarmed ; buds resinous. Leaves sessile or nearly so, 1¾—2¾ by ¾—1 in., elliptic-oblong or obovate-oblong, obtuse or subacute, glabrous, shining, base obtuse, acute, or sometimes cordate ; main nerves 12—18 pairs ; stipules connate, truncate or mucronate. Flowers not odorous (*Ritchie*), subsessile, 1—3 together. Calyx ¾ in. long, densely pubescent ; teeth triangular, ½—¾ in. long. Corolla at first white, soon changing to yellow ; tube pubescent outside, 1¼—1½ in. long ; lobes oblong, obtuse, 1—1¼ by ½—¾ in. Fruit 1—1½ in. long, oblong or ellipsoid, with numerous longitudinal elevated lines and with a stout beak, smooth ; pericarp thin ; placentas 4—5. Fl. B. I. v. 3, p. 116 ; Grah. Cat. p. 88 ; Dalz. & Gibs. p. 120 ; Wight, Icon. t. 576 (*figure not good*) ; Talb. Trees, Bomb. ed. 2, p. 190 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Watt, Dict. Econ. Prod. v. 3, p. 480.—Flowers : Feb.—June. VERN. *Dikemáli* ; *Kamarri*.

S. M. COUNTRY : barren plains south of Dharwar, *Dalzell & Gibson* ; Belgaum, *Ritchie*, 344 ! KANARA : *Dalzell & Gibson*, common on the laterite plains from Kumpta southwards, also near Siddapur, *Talbot* ; Bhatkal (N. Kanara), *Woodrow* !, *Bhiza* ! ; Duddi on the Gatpraba river, *Law* ex *Graham*. DISTRIB. India (W. Peninsula).

This shrub, as well as the small tree *G. lucida*, produces the resinous material known as *Dikemáli*, which is largely used by the natives in medicine and to keep flies off sores. See Watt, Dict. Econ. Prod. l. c.

Gardenia jasminoides, Ellis, in Phil. Trans. v. 51 (1761) part ii. p. 935, sometimes known as the *Cape Jasmine*, has been introduced from China and is much valued as an ornamental plant in gardens in districts where there is a tolerably heavy rainfall. The double-flowered variety is that most commonly cultivated. It has oblong-elliptic coriaceous leaves 2—4 in. long, large white very fragrant flowers, and oblong fruit about 1 in. long. *Gardenia florida*, Linn. Sp. Pl. ed. 2 (1762) p. 305 ; Bot. Mag. (1826) t. 2627 (the double-flowered variety) ; Grah. Cat. p. 88 ; Dalz. & Gibs. Suppl. p. 43 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645, & Gard. in Ind. ed. 5, p. 355 ; Watt, Dict. Econ. Prod. v. 3, p. 480.—Flowers in the rains. VERN. *Gandaráj á*.

18. **DIPLOSPORA,** DC.

Evergreen shrubs or trees ; branches terete. Leaves opposite, petiolate, coriaceous ; stipules triangular, long-pointed or acuminate. Flowers small, inconspicuous, in axillary fascicles or short cymes, usually polygamo-dioecious ; bracts connate, often involucellate. Calyx-tube short, obconic or hemispheric ; limb truncate or 4—5-lobed or -toothed. Corolla-tube short, cylindric or campanulate ; lobes 4—5, spreading, twisted in bud. Stamens 4—5, inserted at the mouth of the corolla ; filaments short or long ; anthers oblong or linear, often recurved, exserted. Ovary 2 (rarely 3) -celled ; ovules 2—5 in each cell on placentas attached to the septum ; style short or long, with oblong or linear branches. Berry ovoid or globose, 2-celled, few-seeded. Seeds rather large ; testa various ; embryo small.

Fruit umbonate with a conical beak within the calyx-limb	1. *D. apiocarpa.*
Fruit not umbonate, marked at the apex with the scar of the calyx-limb	2. *D. sphærocarpa.*

1. **Diplospora apiocarpa,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 123. A moderate-sized tree ; bark pale. Leaves 3½—6 by 1½—3 in., ovate or elliptic-lanceolate, obtusely acuminate, glabrous, base tapering ; main nerves 6—8 pairs, sometimes with hairy glands (? galls) in their axils beneath ; petioles ½—¾ in. long ; stipules ⅜ in. long, triangular, acuminate. Flowers subsessile, in axillary fascicles ; buds resinous ; bracts connate into a cup or epicalyx. Calyx $\frac{1}{10}$ in. long, campanulate, covered with a resinous substance ; limb truncate, entire or with several minute irregular teeth. Corolla ¼ in. long, glabrous ; lobes ⅛ in. long, oblong, obtuse. Stamens in the male and 2-sexual flowers much exserted. Fruit ⅝ in. long, sessile or subsessile, ellipsoid or pyriform, bluntly umbonate with a conical beak within the calyx-limb. Seeds flat, irregularly compressed, few. Bedd. Flor. Sylvat. t. 223? ; Talb. Trees, Bomb. ed. 2, p. 191. *Discospermum apiocarpum,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 257 ; Dalz. & Gibs. p. 120 ; Watt, Dict. Econ. Prod. v. 3, p. 156.—Flowers : July—Oct.

KONKAN : *Stocks*; the Ghâts lat. 16°, *Dalzell & Gibson*; about the latitude of Vingorla, *Talbot.* KANARA : *Law!*—DISTRIB. Apparently endemic in the Western Peninsula of India.

I have cited Beddome's t. 223 in Flor. Sylvat. for this, with hesitation. The fruit, as figured by Beddome, does not agree at all with that of Dalzell's plant; in fact Beddome, in For. Man. p. cxxxiv-3, is himself doubtful of the correctness of the identification.

2. **Diplospora sphærocarpa,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 123. A small glabrous tree. Leaves elliptic-lanceolate, obtuse, subacute or shortly acuminate, glabrous, base tapering ; main nerves 4—6 pairs ; petioles ¼—½ in. long ; stipules ⅛—¼ in. long, triangular, acute. Flowers sessile, fascicled on a very short peduncle, without connate bracts. Calyx resinous outside, $\frac{1}{10}$ in. long ; lobes 4, equalling the tube, orbicular-oblong, ciliolate. Corolla-tube very short, not as long as the lobes of the calyx, throat glabrous ; lobes ⅛ in. long, oblong, obtuse. Fruit globose, ⅔ in. in diam., shortly pedicelled, marked at

the apex with the scar of the calyx-limb, not umbonate. Seeds few, vertically imbricate, much compressed. Bedd. For. Man. in Flor. Sylvat. p. cxxxiv—3 (exclud. syn.) ; Talb. Trees, Bomb. ed. 2, p. 191. *Discospermum sphærocarpum, Dalz.* in Kew Journ. Bot. v. 2 (1850) p. 257 ; Dalz. & Gibs. p. 120.—Flowers : Oct.

Rare. KONKAN : Western Peninsula on the Ghâts from Bombay southwards, *Talbot.* Sahyádri mountains, lat. 16° N., *Dalzell & Gibson.*—DISTRIB. Endemic in the Western Peninsula of India.

19. **KNOXIA,** Linn.

Erect herbs or undershrubs ; stems terete or obtusely angled. Leaves opposite ; stipules connate with the petiole into an entire or bristly sheath. Flowers dimorphic, pink or lilac, subsessile on the elongating branches of terminal cymes (rarely spicate), ebracteolate. Calyx-tube ovoid or didymous ; teeth 4, minute, and subequal or 1 or 2 elongate, persistent. Corolla-tube long, throat usually villous ; lobes 4, valvate in bud, with inflexed tips. Stamens 4, inserted within the throat of the corolla ; anthers linear, included or exserted. Ovary 2-celled ; ovule 1, pendulous in each cell ; style filiform ; stigma 2-lobed. Fruit small, of 2 semi-terete or dorsally compressed indehiscent cocci. Seeds with a thickened funicle ; testa membranous ; albumen fleshy ; embryo axile ; cotyledons thin ; radicle superior.—DISTRIB. India, Java, China, Philippines, Tropical Australia ; species 6—8.

1. **Knoxia corymbosa,** *Willd. Sp. Pl.* v. 1 (1797) p. 582. An erect annual 1—4 ft. high ; stem sparingly branched, somewhat stout, with long internodes, often obtusely 4-angled, softly and more or less densely hairy. Leaves 2—4 by $\frac{1}{2}$—1 in., lanceolate or linear-lanceolate, sessile or shortly petioled, acute, more or less hairy on both sides, tapering much at the base into a short petiole ; main nerves 8—12 pairs, conspicuous on the lower side, very oblique ; stipules with 3—5 filiform hairy bristles. Flowers small, numerous, on the sides of slender pubescent branches of large lax corymbose cymes ; pedicels very short, almost 0. Calyx $\frac{1}{25}$ in. long ; teeth minute, triangular, subequal. Corolla $\frac{1}{8}$ in. long, somewhat club-shaped ; lobes short, $\frac{1}{16}$—$\frac{1}{20}$ in. long, triangular-oblong, subacute. Fruit $\frac{1}{16}$ in. long, sessile or shortly pedicelled, ellipsoid, 4-angled, secund, indehiscent, perforate at the base. The mericarps when ripe separate from the persistent columella with the least pressure. Fl. B. I. v. 3, p. 128 ; Dalz. & Gibs. p. 111 ; Wight, Ill. t. 128 ; Trim. Fl. Ceyl. v. 2, p. 340 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645.—Flowers : Aug.—Oct.

KONKAN : Wág Donger near Vingorla, *Dalzell & Graham.* S. M. COUNTRY : Londa, *Cooke* !; Gamji Station (S. M. Railway), *Woodrow* !; Belgaum, *Ritchie,* 1089 ! KANARA : Kála naddi, *Ritchie,* 1089 !—DISTRIB. Throughout Tropical India ; Ceylon, Malay Archipelago, Tropical Australia.

20. **PLECTRONIA,** Linn.

Shrubs (sometimes small trees), armed or unarmed, sometimes scandent. Leaves opposite, shortly petiolate ; stipules connate.

Flowers axillary, fascicled, or in corymbose peduncled cymes, small, white or green. Calyx-tube short, obconic, turbinate or hemispheric; limb very short, truncate or 4—5-toothed. Corolla-tube infundibuliform, campanulate, globose or urceolate, usually with a ring of deflexed hairs within; lobes 4—5, at length reflexed, valvate in bud. Stamens 4—5, subsessile, on the throat or mouth of the corolla. Ovary 2-celled; ovules solitary in each cell, pendulous; style stout; stigma large. Drupe didymous or subglobose, or with one carpel suppressed, then reniform or oblong, with 1—2 pyrenes or a 2-celled putamen. Seeds oblong, pendulous; testa membranous; albumen fleshy; embryo elongate; cotyledons short; radicle superior.—DISTRIB. Tropical Asia, Africa and Australia, South Africa and Pacific Islands; species about 70.

Branches without spines.	
Flowers 5-merous	1. *P. Wightii.*
Branches with spines.	
Flowers 5-merous	2. *P. Rheedei.*
Flowers 4-merous	3. *P. parviflora.*

1. **Plectronia Wightii,** *T. Cooke.* An unarmed handsome large erect shrub or small tree; young shoots 4-angled. Leaves 3½—4½ by 1½—2 in., elliptic-lanceolate, obtuse or shortly acuminate, coriaceous, entire, bright-green, polished and shining above, paler beneath, quite glabrous on both sides, base narrowed into a very short petiole; main nerves 4—6 pairs, oblique, often with hollow galls (the work of insects) in their axils; stipules rounded-ovate at base, with a long subulate acumination. Flowers 5-merous, in peduncled umbels in the opposite axils; peduncles stout, ¼ in. long, glabrous; pedicels very numerous, ¼—½ in. long, slender, glabrous. Calyx ⅛ in. long, glabrous; teeth triangular, $\frac{1}{32}$ in. long, slightly ciliolate. Corolla thick and subfleshy, ⅛ in. long, densely bearded with white hairs in the throat; lobes 5, oblong, acute, ⅛ by $\frac{1}{16}$ in. Fruit obovoid, didymous, ⅜—½ in. long, warted, black when ripe, polished. The wood is very hard; even the young branches test the penknife. *Canthium umbellatum,* Wight, Icon. t. 1034 (*not* of Korth.); Hook. f. Fl. B. I. v. 3, p. 132; Dalz. & Gibs. p. 113; Talb. Trees, Bomb. ed. 2, p. 192; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645; Watt, Dict. Econ. Prod. v. 2, p. 129. *Canthium didymum,* Grah. Cat. p. 91 (*not* of Gærtn.); Trim. Fl. Ceyl. v. 2, p. 343.—Flowers: Nov.—Jan. VERN. *Tupá; Arsul.*

KONKAN: evergreen forests, *Talbot*; hills in the Konkan, *Law*! DECCAN: Mahableshwar, common, *Cooke*!; Khandala, *Cooke*!, *Woodrow*! S. M. COUNTRY: Rámghát, *Ritchie,* 1787! KANARA: evergreen forests of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula, Ava).

Trimen (*l. c.*) makes this synonymous with *Canthium didymum,* Gærtn., but the inflorescence is sufficiently distinctive to warrant its retention as a separate species. As the name *Plectronia umbellata* has been already adopted for a Madagascar plant with 4-merous flowers by Mr. Baker (Journ. Linn. Soc. v. 20 [1884] p. 168), Wight's specific name cannot be used for this plant. I have therefore named the plant *P. Wightii* after Dr. Wight, who first discovered, described, and figured it.

2. **Plectronia Rheedei,** *Bedd. For. Man. in Flor. Sylvat.* p. cxxxiv—5 (1874). A scandent armed shrub; stem slender, 1 in.

in diam., spinous to near the base ; bark smooth, shining ; branches divaricate, slender, terete, more or less clothed with appressed pubescence, usually armed with straight or slightly curved sharp supra-axillary spines ¼—½ in. long. Leaves thin, 1—4 by ¾—2 in., ovate, acute or acuminate, glabrous on both sides or with a few scattered hairs on the nerves beneath, rounded or cordate at the base ; main nerves 4—6 pairs, often with galls in their axils ; petioles ⅛—¼ in. long ; stipules ovate, cuspidate, hairy. Flowers greenish, axillary solitary or in fascicles of 2—4 (rarely in very shortly peduncled cymes) ; pedicels very short ; buds very acute. Calyx $\frac{1}{16}$—$\frac{1}{12}$ in. long, turbinate ; limb truncate or with 5 very minute distant teeth. Corolla ⅛ in. long ; tube short and wide ; lobes 5, linear-lanceolate, acuminate, $\frac{3}{16}$—¼ by $\frac{1}{16}$ in. Style hairy ; stigma mitriform, bifid. Fruit slightly broader than long, about ⅛ in. broad, didymous, compressed, 2-lobed at the apex, rugose. *Canthium Rheedei*, DC. Prodr. v. 4 (1830) p. 474 ; Hook. f. Fl. B. I. v. 3, p. 134 ; Grah. Cat. p. 91 ; Dalz. & Gibs. p. 113 ; Trim. Fl. Ceyl. v. 2, p. 344 ; Talb. Trees, Bomb. ed. 2, p. 192 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645. *Canthium angustifolium*, Roxb. Fl. Ind. v. 1 (1832) p. 533 ; Hook. f. Fl. B. I. v. 3, p. 135 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645. *Canthium Leschenaultii*, Wight & Arn. Prodr. p. 426 ; Dalz. & Gibs. p. 113.—Flowers : Feb.—May.

KONKAN : *Stocks* ! ; foot of the Ghâts, *Dalzell* ! ; evergreen forests, *Talbot* ; near Sewree Fort (Bombay), *Graham*. S. M. COUNTRY : Râmghât, *Ritchie*, 1193 ! ; Mulas, foot of Râmghât, *Dalzell & Gibson*, near Belgaum, *Cooke* ! ; Párva Ghât, *Ritchie*, 1193 ! KANARA : evergreen forests of N. Kanara, *Talbot* ; Yacombi, *Woodrow* ! —DISTRIB. India (W. Peninsula) ; Ceylon.

The fruit has the taste of the blæberry, *Dalzell*.

3. **Plectronia parviflora**, *Bedd. For. Man. in Flor. Sylvat.* p. cxxxiv—5 (1874). A shrub usually rigid but sometimes subscandent in hedges (*Talbot*) ; branches many, with opposite supra-axillary nearly horizontal sharp straight spines ¾—1½ in. long, the spines sometimes wanting when the branches are less rigid. Leaves ½—1½ by ½—1 in., often fascicled on the young shoots, ovate, obovate or suborbicular, obtuse, glabrous, green above, whitish beneath, base cuneate ; main nerves 4—6 pairs ; petioles $\frac{1}{16}$—¼ in. long, slender ; stipules shortly triangular at the base, with a long subulate point. Flowers 4-merous, small, yellowish, in many-flowered usually peduncled cymes which are sometimes fascicled ; peduncles and pedicels slender, of variable length. Calyx $\frac{1}{20}$—$\frac{1}{16}$ in. long ; lobes 4, triangular, acute, $\frac{1}{50}$ in. long. Corolla ⅛ in. long ; tube inflated ; lobes as long as the tube, ovate, acute. Style glabrous ; stigma large, globose. Drupe ¾—$\frac{7}{16}$ in. long, about $\frac{3}{16}$ in. broad, oblong-ellipsoid, compressed, didymous, areolate at the apex, yellow when ripe, edible. *Canthium parviflorum*, Lamk. Encyc. Méthod. v. 1 (1783) p. 602 ; Hook. f. Fl. B. I. v. 3, p. 136 ; Dalz. & Gibs. p. 113 ; Roxb. Cor. Pl. t. 51 ; Trim. Fl. Ceyl. v. 2, p. 346 ; Talb. Trees, Bomb. ed. 2, p. 192 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Watt, Dict. Econ. Prod. v. 2, p. 129.—Flowers : Apr.—May. VERN. *Kirni*.

DECCAN : Kothrud near Poona, *Woodrow* ! S. M. COUNTRY : Ghâts between Belgaum and Nipani (rare), *Dalzell & Gibson* ; Belgaum, *Ritchie*, 1007 !

KANARA: Mangod (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula); Ceylon.

The leaves are eaten in curries and the wood is hard and used for turning.

21. **VANGUERIA,** Juss.

A genus closely allied to *Plectronia,* from which it differs chiefly in the ovary which is 3—6 (usually 5) -celled, and in the fruit which is larger than that of *Plectronia ;* pyrenes 5—3 or putamen 5—3-celled.

1. **Vangueria spinosa,** *Roxb. Hort. Beng.* (1814) p. 15. A large shrub or small tree with straight opposite (sometimes 3-nate) sharp spines ½—1½ in. long ; bark dark-colored, nearly smooth. Leaves 2—5 by 1¼—2¾ in., membranous, elliptic-oblong, acuminate, glabrous, base shortly cuneate ; main nerves 6—8 pairs ; petioles ¼—1 in. long ; stipules ⅓ in. long, glabrous, broadly triangular at the base, with a slender subulate acumination about ⅛—½ in. long. Flowers greenish-white, in peduncled cymes from the old scars below the leaves ; peduncles usually short ; pedicels slender ; buds acute, somewhat mitre-shaped. Calyx 1/16 in. long, glabrous ; tube cup-shaped, ribbed, rugose ; teeth 5, somewhat scarious, 3/16 in. long, distant, triangular, very acute. Corolla ⅓ in. long ; tube very broad, glabrous outside, the throat densely hairy within ; lobes 5, ovate-lanceolate, acute, equalling the tube. Fruit about 1 in. in diam., on slender pedicels, globose, smooth, yellowish when ripe, edible ; pyrenes 4—5, woody, smooth. Fl. B. I. v. 3, p. 136 ; Grah. Cat. p. 90 ; Talb. Trees, Bomb. ed. 2, p. 192 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 221.—Flowers : Jan.—Apr. VERN. *A'lu.*

KONKAN : Thal Ghát, *Kanitkar*! ; Matheran, *Cooke*!, *Kanitkar*! DECCAN : Lanoli, *Woodrow*! S. M. COUNTRY : near Belgaum, *Ritchie,* 1786/3 ; KANARA : common, *Ritchie,* 1786!—DISTRIB. India (N. Bengal, W. Peninsula, Birma, Pegu) ; Java.

22. **IXORA,** Linn.

Shrubs or small trees usually glabrous. Leaves opposite (rarely 3-nately verticelled) ; stipules interpetiolar. Flowers usually 4-merous, in terminal 3-chotomously branched often corymbose cymes, 2-bracteolate. Calyx-tube ovoid ; limb short, 4 (rarely 5) -toothed, persistent. Corolla-tube long, very slender ; lobes 4 (rarely 5), usually shorter than the tube, spreading, twisted in bud. Stamens 4 (rarely 5), on the mouth of the corolla ; filaments short or 0 ; anthers slender, often with an apiculate tip. Ovary 2-celled ; ovules solitary in each cell, peltately attached to the septum ; style filiform ; stigma slender, fusiform, 2-branched, the branches rarely persistently connate. Fruit globose or subdidymous, with 2 plano-convex or ventrally concave coriaceous pyrenes. Seeds peltate ; testa membranous ; albumen horny ; cotyledons flat, thin ; radicle inferior.—DISTRIB. Tropical Asia and Africa, America, Australia, and the Pacific Islands.

Calyx-teeth longer than the ovary.

Calyx ¼ in. long; corolla-tube reaching ¾ in.....	1. *I. lanceolaria.*
Calyx ½ in. long; corolla-tube reaching 1½ in.....	2. *I. polyantha.*

Calyx-teeth shorter than the ovary.
Leaves and inflorescence turning black in drying.... 3. *I. nigricans.*
Leaves and inflorescence not turning black in drying.
Peduncles 4—7 in. long ..... 4. *I. elongata.*
Peduncles less than 3 in. long.
Flowers white.
Small trees.
Corolla-tube less than ¼ in. long; flower-buds globose ..... 5. *I. brachiata.*
Corolla-tube exceeding ¼ in. long; flower-buds ellipsoid ..... 6. *I. parviflora.*
Flowers bright-scarlet.
A shrub; corolla-tube 1½ in. long..... 7. *I. coccinea.*

1. **Ixora lanceolaria,** *Colebr. in Roxb. Fl. Ind. ed. Carey,* v. 1 (1820) p. 397. A small erect shrub ; branches ash-colored. Leaves 4—5½ by 1—2 in., oblong-lanceolate, acute, glabrous, attenuate (rarely rounded) at the base ; main nerves slender, 14—18 pairs ; petioles ⅛—⅜ in. long ; stipules shortly triangular at the base, with a long slender point which is sometimes ½ in. long. Flowers numerous, in brachiate cymes 2—3 in. in diam., supported by a pair of floral leaves ; bracts beneath the branches of the cyme lanceolate-subulate, caducous ; bracteoles 2, appressed to the calyx, linear-lanceolate, acute, ⅛ in. long. Calyx more or less pubescent, ¼ in. long ; teeth 4, fleshy, linear-lanceolate, acute, ⅛—⅛ in. long by 1/20 in. broad. Corolla white ; tube very slender, up to ¾ in. long, mouth naked ; lobes linear-oblong, obtuse, 7/16 by ⅛ in. Filaments ⅛—⅛ in. long, flattened, slender. Style exserted beyond the corolla-tube, but the exserted portion shorter than the corolla-lobes ; branches of the stigma linear, 1/20—1/16 in. long. Fruit globose or didymous, ¼ in. in diam., smooth, crowned with the 4 erect calyx-teeth. Fl. B. I. v. 3, p. 138 ; Wight, Icon. t. 827 ; Talb. Trees, Bomb. ed. 2, p. 193 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645.—Flowers : June—July.

Chiefly in the southern districts of the Presidency. KANARA : evergreen forests of N. Kanara particularly on the southern Ghâts, *Talbot*; Godhuli, *Woodrow* ; Kanara, *Woodrow* ; Elai jungles below Supa (N. Kanara), *Ritchie,* 1789—DISTRIB. Southern districts of the Western Peninsula of India.

2. **Ixora polyantha,** *Wight, Icon.* t. 1066. A small shrub. Leaves 6—11 by 2½—5½ in., obovate, elliptic-oblong or oblong, lanceolate, acute or acuminate, coriaceous, glabrous on both sides, base usually acute ; main nerves about 8—12 pairs ; petioles ⅛—⅜ in. long, rugose ; stipules broadly ovate, cuspidate. Flowers in corymbiform cymes open or collected into a globose head ; branches of the cyme usually densely clothed with white hairs ; bracts ovate, acute, caducous ; bracteoles reaching ¼ in. long, ovate, very acute. Calyx ⅜—½ in. long ; tube hairy, ⅛—¼ in. long ; teeth ¼—⅜ by 1/10—⅛ in., elliptic-lanceolate, acute, the upper part of each glabrous, the lower half with a few scattered hairs. Corolla-tube reaching 1½ in. long, slender, glabrous, without hairs in the mouth ; lobes reaching 7/16 by ¼ in., broadly elliptic, obtuse. Style exserted beyond the tube, the exserted portion much shorter than the corolla-lobes ; branches of the stigma 1/10—⅛ in. long, linear, recurved. Fruit ½ in. long, ovoid, on hairy pedicels ½ in. long, striate, sparsely hairy, crowned with the persistent calyx-teeth, red when ripe. Fl. B. I. v. 3, p. 140 ; Talb. Trees,

Bomb. ed. 2, p. 193; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645.—Flowers: Mar.

KONKAN: N. & S. Konkan, *Law*! KANARA: Southern Ghâts of N. Kanara, *Talbot*; Gondabel Ghât, *Stocks*!; Nilkund, *Woodrow*!—DISTRIB. India (W Peninsula).

3. **Ixora nigricans,** *Br. in Wall. Cat.* (1828) 6154. A large evergreen shrub or small tree; young branches, leaves, and inflorescence turning black in drying. Leaves 4—6 by 1½—2½ in., membranous, elliptic-oblong, elliptic-lanceolate, or (sometimes) elliptic-obovate, acute or shortly acuminate, glabrous, base acute or rounded; main nerves 12—15 pairs, slender, arched; petioles ¼—⅜ in. long; stipules shortly triangular at base, cuspidate with a long stiff bristle. Flowers white, odorous, in sessile or peduncled brachiate usually glabrous cymes which are broader than long; bracts at the base of the main peduncles foliaceous, ⅜ in. long, lanceolate, cuspidate, those beneath the branches of the cyme subulate; bracteoles minute, subulate. Buds very narrowly fusiform, not much broader than the corolla-tube. Calyx glabrous, 1/10 in. long; teeth 1/15 in. long, triangular, acute, subfleshy. Corolla-tube ⅜ in. long, slender, glabrous, without hairs in the mouth; lobes 3/10 by 1/10 in., oblong, subacute, glabrous. Style glabrous. Stigma-branches recurved. Fruit globose or didymous, size of a pea. Seeds plano-convex, rugose on the back. Fl. B. I. v. 3, p. 148; Dalz. & Gibs. p. 113; Wight, Icon. t. 318; Talb. Trees, Bomb. ed. 2, p. 195; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646.—Flowers more or less throughout the year. VERN. *Kât-kuda.*

Common in thick shaded jungles of the Ghâts, *Dalzell & Gibson* KONKAN: Miradonger near Pen, *Kanitkar*! DECCAN: Lanoli, *Woodrow*!, Khandala, *Woodrow*; Mahableshwar, *Cooke*!, *Woodrow* KANARA: Kumpta, *Woodrow*; Kâla naddi, *Ritchie*, 351!; common in the evergreen forests of N Kanara, *Talbot*.—DISTRIB. India (E. & W Peninsula, Birma); Malay Archipelago.

VAR. *arguta,* Hook. f. Fl. B. I. v. 3, p. 149. Leaves narrowly oblanceolate or elliptic-lanceolate, acuminate, 4—5 by 1—1¼ in.

S M. COUNTRY: Párva Ghât, *Ritchie*, 241!

4. **Ixora elongata,** *Heyne, in Wall. Cat.* (1828) 6131. A small shrub, glabrous except the calyx, bracts and corolla-lobes. Leaves 4—7 by 1⅝—2½ in., elliptic-lanceolate, obtuse, or subacute, glabrous, base narrowed into the petiole; main nerves 10—15 pairs; petioles ¼—¾ in. long; stipules broadly ovate, with a long slender cuspidate point. Flowers pink, in peduncled brachiate cymes; main peduncles 4—7 in. long, with a pair of sessile leaves 1—4 in. long below the middle; branches of the cyme hairy, the lowest pair sometimes 3 in. long; bracteoles linear, 1/20 in. long, very hairy. Calyx 1/12 in. long, hairy; teeth 4, triangular, subobtuse, hairy, 1/10 in. long. Corolla-tube ⅛—½ in. long, without hairs at the mouth; lobes 4, ovate-oblong, acute, ¼ by 1/10 in., usually hairy on the back. Filaments thick, short. Anthers sagittate at the base, apiculate at the apex. Branches of the stigma 1/20 in. long, linear. Fruit glabrous, slightly 2-lobed (*Dalzell*), smooth, black when ripe. Fl. B. I. v. 3, p. 141; Talb. Trees, Bom. ed. 2, p. 194; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645. *Ixora pedunculata,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 121; Dalz. & Gibs. p. 113.—Flowers: Feb.

KONKAN: *Stocks*! DECCAN: Bhimashankar, *Dalzell*!, *Woodrow*. S. M. COUNTRY: Párva Ghát, *Dalzell & Gibson*. KANARA: Ghâts of N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula).

5. **Ixora brachiata,** *Roxb. Hort. Beng.* (1814) p. 10. A small tree 15—30 ft. high; bark smooth, grey. Leaves 3—5½ by 1½—2¼, pale when dry, elliptic-oblong or lanceolate, obtuse, reticulately veined, glabrous, usually attenuated at the base; main nerves numerous, faint, very slender; patioles ¼—¾ in. long, stout, rugose; stipules short, broad, shortly cuspidate. Flowers white, odorous, in sessile or shortly peduncled cymes brachiate with 2—3 pairs of long puberulous or sometimes nearly glabrous branches; flower-buds globose; the lowest bracts like the stipules, the upper lanceolate-subulate united by a stipule-like membrane across the nodes; bracteoles minute, subulate. Calyx $\frac{1}{20}$ in. long, urceolate; teeth 4, minute, triangular, membranous. Corolla-tube ⅛—¼ in. long, without hairs in the mouth; lobes $\frac{1}{12}$ by $\frac{1}{16}$ in., broadly oblong, rounded at the apex, deflexed. Style clothed sparingly with long white hairs, not much exserted; branches of the stigma at first connate, usually separating later. Fruit globose or didymous, the size of a pea, smooth, purplish-black, edible Seeds hemispheric, with a deep pit on the ventral side within which the funicle was attached, rugose The flowers are the smallest of the genus and the only ones with globose buds (*Hooker*) Fl. B. I. v. 3, p. 142; Wight, Icon. t 710; Talb. Trees, Bomb. ed. 2, p. 194.—Flowers: Nov.—Feb. VERN. *Gorbál*

KONKAN: *Law*!, *Stocks*! S. Konkan, *Ritchie*, 354! DECCAN: Khandala, *Woodrow*! KANARA: *Mrs. Ward*!, Mendele, *Ritchie*, 354 *2*.—DISTRIB. India (W. Peninsula).

6. **Ixora parviflora,** *Vahl, Symb* v. 3 (1724) p. 11, t. 52. A small much-branched evergreen tree; bark thick, reddish-brown; branchlets somewhat compressed, glabrous. Leaves 3—5 by 1½—2¼ in., very coriaceous and hard, reticulately veined, oblong or elliptic, obtuse, glabrous and shining, pale when dry, base usually rounded, sometimes cordate; main lateral nerves 8—10 pairs, slender, faint; petioles scarcely ¼ in. long, rugose; stipules ¼ in. long, broadly ovate, with a cuspidate point about ⅛ in. long. Flowers white, odorous, small and very numerous, in subglobose clusters, in sessile cymes brachiate with 3—5 pairs of short branches; pedicels very short or 0; bracts and bracteoles as in *I. brachiata*; flower-buds ellipsoid. Calyx $\frac{1}{16}$ in long, ovoid-oblong; teeth 4, minute, not more than $\frac{1}{16}$ in. long, triangular, subacute Corolla-tube $\frac{1}{8}$—$\frac{7}{16}$ in. long, without hairs in the mouth; lobes 4, linear-oblong, obtuse; $\frac{3}{16}$—¼ by $\frac{1}{20}$ in. Style densely clothed with white hairs; branches of the stigma elliptic-lanceolate. Fruit ¼ in. in diam., didymous. Fl. B. I. v. 3, p. 142; Grah. Cat. p. 92; Dalz. & Gibs. p. 113; Trim. Fl. Ceyl. v. 2, p. 348; Talb. Trees, Bomb. ed. 2, p. 194; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645; Watt, Dict. Econ. Prod. v. 4, p. 533. —Flowers: Jan.—Apr. VERN. *Rai-Kudá*.

Throughout the Presidency in deciduous forests, *Talbot*. KONKAN: Elephanta, *Graham*; Matheran, *Cooke*!, *Woodrow*! DECCAN: Nasik, *Kanitkar*!, Khandala, *Cooke*!; Gokak, *Bhiva*! S. M COUNTRY: Kákti hills near Belgaum, *Ritchie*, 1788! KANARA: on the Kála naddi, *Ritchie*!—DISTRIB. Throughout a considerable part of India, chiefly in hilly districts; Ceylon.

The tree has been called the *"Torch Tree"* in consequence of its branches having been used by dák runners for torches. The wood is very hard and close-grained and takes a good polish

7. Ixora coccinea, *Linn. Sp. Pl.* (1753) p. 110. A glabrous shrub 2—3 ft. high. Leaves 2—4 by 1½—2½ in., coriaceous, pale when dry, sessile or nearly so, oblong, obtuse (rarely acute), apiculate, base rounded or subcordate ; main nerves 8—12 pairs, slender ; stipules with a long rigid cuspidate point. Flowers numerous, bright-scarlet, in dense sessile or very shortly pedunculed corymbiform cymes ; pedicels very short, glabrous or puberulous ; bracts and bracteoles small, lanceolate-subulate, acute ; buds fusiform, very acute. Calyx $\frac{1}{10}$ in. long, glabrous ; teeth $\frac{1}{20}$ in. long, triangular, acute. Corolla-tube reaching 1½ in. long, slender, without hairs in the mouth ; lobes ½ by ⅛—¼ in., elliptic-oblong, subacute. Fruit globose, size of a pea, smooth, fleshy, crowned with the calyx-teeth, purple when ripe. Seeds deeply ventrally concave. Fl. B. I. v. 3, p. 145 ; Grah. Cat. p. 91 ; Dalz. & Gibs. p. 112 ; Wight, Icon. t. 153 ; Trim. Fl. Ceyl. v. 2, p. 348 ; Talb. Trees, Bomb. ed. 2, p. 194 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Watt, Dict. Econ. Prod. v. 4, p. 533. *Ixora Bandhuca*, Roxb. Hort. Beng. (1814) p. 10 ; Grah. Cat. p. 92.—Flowers more or less throughout the year. VERN. *Bakorá*

A handsome shrub known as the *"Flame of the Woods,"* often grown in gardens, but indigenous in the Presidency. KONKAN : common, *Dalzell & Gibson*; S. Konkan, *Ritchie*, 348! Vingorla, *Woodrow*! Ooran (an island in Bombay harbour), *Cooke*!, Salsette, *Graham*, Thana, *Woodrow*, Ratnagiri, *Kanitkar*! DECCAN : Kolhapur, *Cooke*! KANARA : common in the moist forests of N. Kanara near the sea-coast, *Talbot*, Kâla naddi, *Ritchie*, 348!—DISTRIB. Cultivated throughout India as an ornamental shrub, indigenous in the W Peninsula ; Ceylon.

23. PAVETTA, Linn.

Shrubs or small trees. Leaves opposite, petiolate, usually membranous ; stipules intrapetiolar, usually connate into a lax sheath, deciduous. Flowers in axillary or terminal 3-chotomously branched usually many-flowered corymbose cymes, white or greenish, bracteolate. Calyx-tube ovoid, turbinate or campanulate ; lobes 4 (very rarely 5), short or long. Corolla hypocrateriform ; tube slender, cylindric ; throat naked or bearded ; lobes 4 (very rarely 5), frequently longer than the tube, twisted. Stamens 4 (very rarely 5), inserted in the throat or mouth of the corolla ; filaments short or long, or 0. Ovary 2-celled ; ovules solitary in each cell, attached to the middle of the septum, amphitropous, the placenta fleshy, often tumid ; style long, much exserted ; stigma fusiform or somewhat clavate, undivided or 2-dentate. Berry pisiform, fleshy, with 2 pyrenes which are convex on the back and concave on the face. Seeds conform to the pyrenes ; testa membranous ; albumen horny ; cotyledons foliaceous ; radicle inferior.—DISTRIB. Tropics of the Old World and S. Africa ; species about 60.

A genus very closely allied to *Ixora* from which it may be distinguished by the stipules, the very long style, and the tumid placentas.

Leaves pale when dry; corolla-tube ½ in. long..... 1. *P. indica.*
Leaves black when dry; corolla-tube 1 in. long..... 2. *P. hispidula,* [var. *siphonantha.*

1. **Pavetta indica,** *Linn. Sp. Pl.* (1753) p. 110. A stout bushy shrub 2—4 ft. high ; bark thin, smooth, yellowish ; young branches terete, glabrous. Leaves 3—6 by 1—2½ in., membranous, variable in shape and size, elliptic-oblong or elliptic-lanceolate, sometimes obovate-oblong, obtuse, acute or acuminate, glabrous on both sides, base tapering ; main nerves 8—10 pairs ; petioles ¼—½ in. long ; stipules connate, triangular, acute, thin, deciduous. Flowers white, odorous, in terminal sessile corymbose pubescent cymes ; pedicels ⅛—¼ in. long, densely pubescent ; bracts broad, membranous, the lower cupular ; buds oblong-clavate. Calyx densely pubescent, ⅛ in. long ; tube narrowly campanulate ; teeth $\frac{1}{20}$ in long, triangular, acute, slightly reflexed at the tip. Corolla-tube ½ in. long ; lobes ¼—$\frac{5}{16}$ in. by $\frac{1}{16}$ in., linear-oblong, subacute. Style white, glabrous or nearly so ; stigma green, narrowly clavate, puberulous. Fruit ¼—⅜ in. in diam., globose, black, smooth. In all the specimens I have examined from the Bombay hills I have found the pedicels and calyx to be densely pubescent even though the leaves were quite glabrous. Fl. B. I. v. 3, p. 150 ; Grah. Cat. p. 92 ; Dalz. & Gibs. p. 112 ; Wight, Icon. t. 148 ; Trim. Fl. Ceyl. v. 2, p. 349 ; Talb. Trees, Bomb. ed. 2, p. 195 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Watt, Dict. Econ. Prod v. 6, part 1, p. 114.—Flowers : Mar.—May. VERN. *Pápat.*

Very common on hills throughout the Presidency. KONKAN : Matheran, *H. M Buduood, Woodrow*, Karanja hill, *Dalzell & Gibson.* DECCAN : Mahableshwar, very common, *Cooke* !, *Graham*; Khandala, *Woodrow* !; Igatpuri, *Kanitkar* !—DISTRIB. Throughout India ; Ceylon, Malay Archipelago, S. China, N. Australia.

VAR. *tomentosa*, Hook. f. in Fl. B. I. v. 3 (1880) p. 150. Leaves glabrous or slightly or harshly puberulous above, tomentose or softly villous beneath. Cymes pubescent, tomentose or softly villous. Talb. Trees, Bomb. ed. 2, p. 195. *Pavetta tomentosa* (sp.), Roxb. ex Sm. in Rees Cyclop. v. 26 (1819) n. 2 ; Wight & Arn. Prodr. p. 431. *P. Brunonis*, Wight, Icon. t. 1065 ; Dalz. & Gibs. p. 112.

2. **Pavetta hispidula,** *Wight & Arn. Prodr.* (1834) p. 431 ; var. **siphonantha,** *Hook. f. Fl. B. I.* v. 3, p. 151. A slender branched shrub 3—12 ft. high (*Ritchie*). Leaves 3—7 by 1—2½ in., elliptic-lanceolate, acuminate, black when dry, glabrous, attenuated into the petiole ; petioles ½—1 in. long ; stipules connate, triangular, acute, from a broad base, membranous, pilose within. Flowers white, in large terminal corymbose more or less pubescent peduncled cymes. Calyx pubescent, ⅛ in. long ; teeth $\frac{1}{32}$ in. long, triangular, acute, slightly reflexed at the tip. Corolla-tube 1—1⅛ in. long, slender, glabrous ; lobes ¼—½ by $\frac{1}{12}$—$\frac{1}{10}$ in., linear-oblong, subacute. Style very slender, exserted for 1½ in. or even more, gradually tapering ; stigma hardly distinguishable from the style, scarcely if at all fusiform. Fruit size of a pea, globose, smooth, purple. Talb. Trees, Bomb. ed. 2, p. 195 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646. *Pavetta siphonantha* (sp.), Dalz. in Kew Journ. Bot. v. 2

(1850) p. 133 ; Dalz. & Gibs. p. 112 ; Bedd. For. Man. in Flor. Sylvat. p. cxxxiv—8.—Flowers : May.

KONKAN : *Stocks* !, *Dalzell* ! ; Matheran, *Woodrow* ; Bhimashankar, *Woodrow*. S. M. COUNTRY : Parpoli Ghát (Belgaum districts), *Dalzell & Gibson* ; Rámghát, *Ritchie*, 676 ! KANARA : Supa Ghâts of S. Kanara (rare), *Talbot* ; Mendele, *Ritchie*, 676 !—DISTRIB. India (W. Peninsula).

24. MORINDA, Linn.

Shrubs or trees ; branches terete or obscurely 4-gonous. Leaves opposite, rarely 3-nately verticillate, usually membranous ; stipules connate, sheathing. Flowers in axillary or terminal simple, panicled, or umbellate heads, white, more or less connate by the calyces. Calyx-tube urceolate or hemispheric ; limb short, truncate or obscurely toothed, persistent. Corolla-tube short or long ; lobes 4—7, coriaceous, valvate in bud. Stamens 4—7 ; filaments short ; anthers linear or oblong. Ovary 2- or (sometimes imperfectly) 4-celled ; ovules solitary, ascending from towards the base of the septum in each cell ; style slender, with 2 short or long linear branches. Fruit a syncarpium formed by the succulent enlarged calyces enclosing many cartilaginous or bony 1-seeded pyrenes which sometimes cohere into a 2—4-celled putamen, rarely of nearly free drupes. Seeds obovoid or reniform ; testa membranous ; albumen fleshy or horny ; embryo terete ; radicle inferior.

Leaves 5—8 in. long, glabrous, shining..... 1. *M. citrifolia.*
Leaves 4—6 in. long, tomentose, dull, not shining..... 2. *M. tinctoria,* [var. *tomentosa.*

1. **Morinda citrifolia,** *Linn. Sp. Pl.* (1753) p. 176. A small glabrous tree ; trunk straight ; bark smooth, yellowish-white ; branchlets obtusely 4-angled. Leaves 5—8 by 3—4 in., broadly elliptic, acute, acuminate or obtuse, bright-green, glabrous, shining, one of the pair next the peduncle often suppressed, base acute ; main nerves 8—10 pairs, prominent ; petioles ½ in. long ; stipules connate, short, broad, obtuse, membranous. Flowers white, in dense ovoid heads over 1 in. long ; peduncles solitary (rarely 2—3 together), usually leaf-opposed, 1—2 in. long. Calyx-limb truncate. Corolla infundibuliform ; tube ⅜ in. long, the mouth hairy ; lobes 5, lanceolate, acute. Stamens 5 ; filaments hairy ; anthers about ½-exserted. Fruit white when ripe, smooth and glossy, about the size of a small egg ; pyrenes ovoid, compressed, concavo-convex, winged on the edge. Fl. B. I. v. 3, p. 155 ; Grah. Cat. p. 90 ; Dalz. & Gibs. p. 114 ; Gærtn. Fruct. v. 1, t. 29 ; Wall. Cat. 8418 ; Roxb. Fl. Ind. v. 1, p. 541 ; Talb. Trees, Bomb. ed. 2, p. 196 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Watt, Dict. Econ. Prod. v. 5, p. 261.—Flowers : May—June. VERN. *Al* ; *Bartondi.*

Cultivated widely in many places throughout India, found also as an escape, but not truly wild.—It has not been much cultivated in the Bombay Presidency except in Khandesh and less commonly at Pandarpur in the Deccan. The roots furnish a valuable red dye. A very full description of the mode of cultivation of the tree and of preparing and using the dye may be found in Watt's Dict. Econ. Prod. l. c.

VAR. 1. *bracteata*, Hook. f. Fl. B. I. v. 3 (1880) p. 156. Anthers included within the hairy mouth of the corolla-tube. Calyx-limb often with a lanceolate or spathulate white foliaceous lobe sometimes nearly ½ in. long. Talb. Trees, Bomb. ed. 2, p. 196 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646. *Morinda bracteata*, Roxb. Hort. Beng. p. 15 ; Fl. Ind. v. 1, p. 544 ; Dalz. & Gibs. p. 114. *M. citrifolia*, Trim. Fl. Ceyl. v. 2, p. 354 (*not* of Linn.).

KONKAN : Malwán, *Dalzell & Gibson*; Vingorla, *Dalzell & Gibson*; coast of the Konkan near the sea, *Talbot*; near Marmagao close to the sea, *Woodrow*.

This ought perhaps to take rank as a separate species. It is certainly indigenous along the coast, while *M. citrifolia* is an introduction.

VAR. 2. *elliptica*, Hook. f. Fl. B. I. v. 3 (1880) p. 156. Leaves 6—8 in. long, elliptic, polished, acuminate ; nerves strong on both surfaces.

I have seen no authentic specimens which can with certainty be referred to Bombay. There is one specimen in Herb. Kew. marked "Herb. Stocks," but, like many of the specimens in the Stocksian Herbarium, this has had no locality assigned to it. It is merely a supposition that this specimen was collected in the Konkan. Other specimens of the var. in Herb. Kew. have come from Tenasserim, the Andamans, Birma, the Malay Peninsula, Malacca.

2. **Morinda tinctoria,** *Roxb. Hort. Beng.* (1814) p. 15, var. **tomentosa,** *Hook. f. Fl. B. I.* v. 2, p. 156. A small tree ; young branches 4-angled, tomentose. Leaves 4—6 by 2—3 in., elliptic, or oblong-lanceolate, acuminate, tomentose on both surfaces, one of the pair of leaves near the peduncle usually suppressed or its place sometimes taken by a small linear leaf from the axil of which the peduncle arises ; petioles ¼—½ in. long, densely tomentose ; stipules often bifid, the lobes triangular, acute. Flowers pure white, in globose heads ; peduncles ¾—1 in. long, tomentose, solitary, leaf-opposed, or sometimes in the axil of a small linear leaf which has taken the place of the suppressed leaf. Calyx ⅛ in. long, truncate ; the limb sometimes (though rarely) with a foliaceous oblong obtuse or subacute veined lobe reaching ⅝ in. long, hairy outside. Corolla-tube ⅝—1 in. long, very hairy outside, but not hairy at the mouth ; lobes ⅜—⅝ by ⅛—¼ in., oblong, obtuse or subacute, hairy on the back. Anthers included within the tube. Fruit globose or ellipsoid, fleshy. ¾ in. in diam.—Flowers : Apr. Talb. Trees, Bomb. ed. 2, p. 196. *Morinda tomentosa* (sp.), Heyne, in both, Nov. Pl. Sp. (1821) p. 147 ; Dalz. & Gibs. p. 114.

DECCAN : Chattersingi hill near Poona, *Bhiva*! ; Sholapur districts, *Woodrow*! ; Gokák jungles, *Ritchie*, 1785! ; Hotgi, *Cooke*! S. M. COUNTRY : Badami, *Woodrow*! KANARA : *Kanitkar*!

25. PSYCHOTRIA, Linn.

Shrubs or small trees, usually erect. Leaves opposite, rarely whorled ; stipules intrapetiolar, often connate, solitary or in pairs, often with glandular hairs. Flowers in terminal (rarely axillary) cymes, heads or fascicles, bracteate or not. Calyx-tube short ; limb often deciduous. Corolla-tube straight, short (in the Indian species), throat naked or hairy ; 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 ; filaments short or long ; anthers included or exserted. Ovary 2-celled ; ovules solitary in each cell, basal, erect, anatropous, usually cuneate ; style long or short, with 2 branches. Fruit small, ovoid, globose or oblong (rarely didymous), with 2 plano-convex 1-seeded pyrenes, rarely separating into 2 cocci. Seeds usually plano-convex (the ventral base rarely concave), often longitudinally grooved ; testa thin ; albumen hard, sometimes ruminate ; embryo small, basal ; cotyledons broad, thin ; radicle inferior.—DISTRIB. Tropics of the world ; species about 500.

Albumen ruminate.	
Cyme-branches whorled.	
Flowers mixed with reddish-brown hairs.....	1. *P. Thwaitesii.*
Flowers not mixed with reddish-brown hairs.	
Calyx truncate, teeth 0 or obscure; seeds without dorsal ridges	2. *P. truncata.*
Calyx-teeth distinct, with membranous ciliate margins; seeds with 1 dorsal ridge.....	3. *P. Dalzellii.*
Cyme-branches opposite, bright-yellow in fruit; seeds with 1 dorsal ridge	4. *P. flavida.*
Albumen uniform (not ruminate).	
Cyme-branches opposite or whorled; seeds with 1 dorsal ridge	5. *P. canarensis.*
Cyme-branches opposite; seeds with 4 dorsal ridges.	6. *P. octosulcata.*

1. **Psychotria Thwaitesii,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 162. A stout glabrous shrub ; branchlets smooth, compressed. Leaves 4—8 by 1½—2¾ in., subcoriaceous, elliptic-oblong, obovate-oblong or oblong-lanceolate, acuminate or acute, glabrous ; base tapering into the petiole ; main nerves 12—15 pairs, prominent ; petioles ¼—¾ in. long ; stipules variable, usually broadly ovate, acute, small. Flowers sessile or nearly sessile, with reddish-brown hairs at their bases, in small round heads on the usually whorled glabrous branches of pyramidal peduncled cymes. Calyx $\frac{1}{12}$ in. long ; limb deciduous ; segments broad. Corolla ⅛ in. long ; tube short, straight, with a few white hairs at the mouth ; lobes $\frac{1}{16}$ in. long, oblong, obtuse. Fruit ellipsoid or subglobose, ¼—⅜ in. in diam., marked with the scar of but not crowned by the calyx-limb ; pyrenes without furrows, plano-convex. Seeds plano-convex ; albumen very ruminate. Trim. Fl. Ceyl. v. 2, p. 358 ; Talb. Trees, Bomb. ed. 2, p. 197 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646.—Flowers : Mar.—Apr.

KANARA : Southern Ghâts of N. Kanara in evergreen forests ; common on the Nilkund Ghât, *Talbot*, Falls of Gairsoppa, *Talbot*, 258!

VAR. *peninsularis*, Hook. f. Fl. B. I. l. c. Leaves smaller, more obovate ; cymes always sessile, their branches moderate or short, or 0, or the inflorescence a penduncled globose head.

KONKAN : *Law*, 34!

2. **Psychotria truncata,** *Wall. in Roxb. Fl. Ind. ed. Carey*, v. 2 (1824) p. 162. A stout erect glabrous shrub. Leaves 4—7 by 2—3 in., green above, pale beneath, obovate, shortly and abruptly acuminate, margins slightly recurved, base cuneate ; main nerves 14—16 pairs, arcuate, very prominent ; petioles ¼—1 in. long, stout ; stipules large, reaching sometimes 1 in. and even more in length,

combined into a sheath, very caducous. Flowers sessile or shortly pedicelled, in dense terminal cymes ; branches long or short, usually whorled. Calyx $\frac{1}{16}$ in. long, broadly campanulate, truncate ; teeth 0 or very obscure. Corolla waxy-white ; tube $\frac{1}{16}$ in. long, straight, broad, glabrous outside, with a ring of hairs at the mouth ; lobes $\frac{1}{8}$ in. long, oblong, subacute. Fruit ellipsoid, $\frac{1}{3}$ in. long, smooth, crowned by the truncate calyx ; pyrenes without furrows, plano-convex. Seeds plano-convex ; albumen ruminate. Talb. Trees, Bomb. ed. 2, p. 197 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646. *Grumilea vaginnans*, Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 111. *Grumilea congesta*, Grah. Cat. p. 92 (*not* of Wight & Arn.).—Flowers : Apr.—May.

DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ; near Carnac Point, Mahableshwar, *H. M. Birdwood*. S. M. COUNTRY : Chorla Ghát, *Ritchie*, 1792 ! KANARA : *Law* ! ; Mendele, *Ritchie*, 1792 ! ; Diggi, *Woodrow* ; evergreen forests of N. Kanara Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula).

3. **Psychotria Dalzellii,** *Hook. f. Fl. B. I.* v. 3 (1880) p. 163. A large shrub reaching 20 ft. high ; stem 2 in. in diam. at the base, not much branched. Leaves coriaceous, 5½—9 by 2—3¼ in., obovate-oblong, rounded and apiculate at the apex, glabrous, cuneate at the base ; main nerves 12-20 pairs, prominent ; petioles ¼—½ in. long, stout ; stipules ⅝ in. long, broadly ovate, acuminate. Flowers in terminal peduncled brachiate cymes ; branches whorled, the lower usually in whorls of 5, subtended by 4 large bracts, the upper in whorls of 3 subtended by 2 bracts ; branches of the lower whorl often reaching 2 in. long ; each branch carrying a head of 1—5 sessile or nearly sessile flowers surrounded by large oblong or suborbicular more or less cucullate bracteoles. Calyx broadly campanulate, glabrous, ⅛ in. long ; teeth a little shorter than the tube, oblong, rounded or truncate at the apex, emarginate, the margins membranous, ciliate. Corolla-tube very short, straight, densely bearded in the throat ; lobes ⅛ by $\frac{1}{20}$ in., ovate-oblong, acute. Fruit ⅜ in. in diam., subglobose, smooth, succulent, black when ripe, edible, crowned by the calyx-limb ; pyrenes with 1 conspicuous dorsal ridge. Seeds plano-convex, rugose, with a conspicuous dorsal ridge ; albumen ruminate. Talb. Trees, Bomb. ed. 2, p. 197 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646. *Psychotria bracteata*, Wight & Arn. Prodr. (1834) p. 434 (not of DC.).—Flowers : June—July.

The name *P. bracteata* given to the plant by Wight & Arn. (1834) had been given by DC. in 1830 to a different plant, a native of Guiana.

KONKAN : *Stocks* ! *Dalzell* ! ; Banda (Wari Country), *Kanitkar* ! KANARA : *Woodrow* ! ; common throughout the evergreen forests of N. Kanara, *Talbot* ; Yellapur, *Talbot*, 235 !—DISTRIB. India (W. Peninsula), apparently endemic.

4. **Psychotria flavida,** *Talbot, Trees & Shrubs, Bomb.* ed. 1 (1894) p. 113. A small shrub. Leaves coriaceous, 4—10 by 2—4 in., elliptic-oblong, acute or shortly acuminate, glabrous, tapering to the base ; main nerves 10—12 pairs ; petioles ¼—⅜ in. long ; stipules ovate, acuminate, deciduous. Flowers numerous, small, in terminal peduncled cymes ; peduncles 1—2 in. long ; cyme-branches oppo-

site, flattened, shorter than the peduncles; pedicels very short; bracts leafy, deciduous. Calyx $\frac{1}{16}$—$\frac{1}{12}$ in. long, truncate; teeth obscure or 0. Corolla $\frac{1}{6}$ in. long; tube $\frac{1}{10}$ in. long, densely hairy in the throat inside. Fruit $\frac{1}{4}$ in. in diam., ellipsoid, compressed, crowned with the calyx, black when ripe; pyrenes with 1 dorsal ridge. Seeds plano-convex, with a narrow dorsal ridge, rugose, black; albumen ruminate. Cyme-branches turning bright yellow in fruit. Talb. Trees, Bomb. ed. 2, p. 197. Closely allied to *P. nudiflora*, Wight & Arn., from which it differs by the short corolla-tube which is densely hairy within, that of *P. nudiflora* being longer and glabrous inside.—Flowers: May—July. VERN. *Shivan-Yallaki.*

KONKAN: *Hohenhacker*, 735 *a*!, *Law*! KANARA: abundant in the evergreen forests of Sirsi and Siddapur; Hulikal, *Talbot*, 3661!; Ghâts near Yellapur, *Talbot*, 236!—DISTRIB. Konkan and Kanara, apparently endemic.

5. **Psychotria canarensis,** *Talbot, Trees & Shrubs, Bomb.* ed. 1 (1894) p. 113. A small erect shrub with smooth branches. Leaves 2—5 by $\frac{1}{2}$—$1\frac{3}{4}$ in., ovate, obovate, or lanceolate, acute, thin, nearly glabrous, minutely punctate and pale beneath, attenuate at the base; main nerves 8 pairs, distinctly looping within the margin; petioles $\frac{1}{4}$ in. long; stipules short, acute, caducous. Flowers small, sessile, in few- or many-flowered mostly terminal cymes 1—3 in. long; branches opposite or whorled, slender, as long as or longer than the peduncles; bracts and bracteoles minute, linear, caducous. Calyx short, tubular, 4-toothed. Corolla white, tubular or slightly funnel-shaped, the mouth of the tube hairy inside; lobes 4, spreading or reflexed. Stamens at the mouth of the tube; filaments very short. Ovary 4-loved; style as long as the corolla-tube. Fruit ovoid, slightly curved, black, shining, ridged, about $\frac{1}{2}$ in. long, crowned with the toothed calyx. Seeds with 1 ridge along the back, ventrally flat; albumen uniform. There is but 1 specimen in Herb. Kew. (in fruit). The description has been taken from Mr. Talbot (*l. c.*). Talb. in Journ. Bomb. Nat. v. 11 (1898) p. 691, t. 12; Trees, Bomb. ed. 2, p. 197.

KANARA: moist evergreen forests near the Falls of Gairsoppa in N. Kanara, *Talbot*.—DISTRIB. Apparently endemic.

6. **Psychotria octosulcata,** *Talbot, in Journ. Bomb. Nat. Hist. Soc.* v. 11 (1897) p. 237, t. 7. An erect shrub 10—20 ft. high; stem 1—2 in. in diam. at the base; bark smooth; branches green, glabrous. Leaves thin, 3—6 by 1—2 in., elliptic, obovate, or oblanceolate, shortly and abruptly acuminate, shining above, pale beneath, glabrous, base much tapered; main nerves 8—10 pairs, prominent, frequently with galls in their axils; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long; stipules connate at the base, acuminate, deciduous. Flowers white, in short terminal corymbose cymes 1—2 in. long; branches opposite. Calyx $\frac{1}{20}$ in. long; teeth 5, minute, triangular. Corolla-tube very short, hairy at the mouth inside. Fruit obovoid or pyriform, $\frac{3}{8}$—$\frac{1}{2}$ in. long, straight or slightly curved, 8-ridged, black and succulent when ripe, soon drying and becoming regularly ridged with a flattened top. Seeds dorsally 4-ridged (*Talbot*); albumen uniform, horny. Talb.

Trees, Bomb. ed. 2, p. 198. *Psychotria sarmentosa*, Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 (*not* of Blume).—Flowers: July—Aug.

KANARA: common in some of the evergreen forests of the Siddapur and Sirsi subdivisions of N. Kanara, *Talbot*; Yacombi, *Talbot*, 3556!, *Woodrow*!, *Bhiva*!—DISTRIB. Apparently endemic.

26. **CHASALIA**, Commers.

Shrubs or small trees; branchlets terete. Leaves opposite or 3-nately whorled, petiolate; stipules intrapetiolar, simple or 2-fid, free or connate. Flowers in terminal cymes. Calyx-tube ovoid or subglobose; limb truncate or 5-toothed, persistent. Corolla-tube elongate, terete, usually curved, the throat bearded or naked; lobes 5, much smaller than the tube, erect or spreading, valvate. Stamens 5, inserted in the corolla-tube; filaments 0 or short. Disk annular or tumid. Ovary 2-celled; ovules solitary in each cell, erect from the base. Fruit dry or slightly fleshy; pyrenes 2, very thin, very concave on the ventral face, cup-shaped (crescent-shaped in section). Seeds orbicular, compressed, convex on the back, concave on the ventral face; testa membranous; albumen horny, not ruminate; embryo small; cotyledons broad; radicle terete, inferior.—DISTRIB. Asia, Tropical Africa, Mascarene Islands; species 10.

1. **Chasalia curviflora**, *Thw. Enum.* (1859) p. 150. A small shrub 2—4½ ft. high; branchlets compressed, glabrous. Leaves 5—9 by 1½—2¾ in., elliptic, oblong-lanceolate, or sometimes obovate, acute, acuminate, or obtuse, glabrous, base tapering, sometimes much so; main nerves 8—10 pairs; petioles ¼—1¼ in. long, often obscure owing to the tapering of the leaf-blade; stipules short, ¼ in. long, usually 2-fid. Flowers dimorphic, one form with exserted anthers and included styles, the other the opposite, sessile or nearly so, in trichotomously branched terminal peduncled cymes 1½—2 in. long; peduncles 1—2 in. long; branches short, often purplish; bracts persistent, ovate-lanceolate or subulate. Calyx ⅛ in. long, glabrous; limb slightly dilated above; teeth scarcely $\frac{1}{16}$ in. long, triangular, acute. Corolla waxy-white or pinkish, with a yellow throat, variable in length, sometimes reaching nearly ¾ in. long; tube slender, glabrous outside, hairy in the throat inside; lobes $\frac{1}{10}$ in. long, oblong, subobtuse. Berry size of a pea, depressed-globose or more or less didymous, dark-purple; pyrenes thin, dorsally compressed. Fl. B. I. v. 3, p. 176; Trim. Fl. Ceyl. v. 2, p. 362; Talb. Trees, Bomb. ed. 2, p. 198; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646. *Psychotria longifolia*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 133 (*not* of Beddome). *Psychotria ambigua*, Wight & Arn. Prodr. p. 433; Wight, Ill. t. 127; Dalz. & Gibs. p. 111.—Flowers: Apr.—July.

KONKAN: *Law*!; Malwán, *Ritchie*, 1793! S. M COUNTRY: Párva Ghát, *Dalzell & Gibson*, *Ritchie*, 1795! KANARA: evergreen forests of N. Kanara, *Talbot*; Karwar, *Woodrow*; Divimana, *Woodrow*; Siddapur, *Woodrow*; Usheli, *Ritchie*, 1793!—DISTRIB. More or less throughout India; Ceylon, Malaya, Borneo.

27. **SAPROSMA,** Blume.

Shrubs usually glabrous, fetid when bruised, often with subulate bristles at the tips of the branches and bases of the peduncles. Leaves opposite or 3—4-whorled, membranous ; stipules interpetiolar, broad, usually connate, 1—3-cuspidate, deciduous. Flowers small, white, sessile and congested, or on axillary or terminal peduncles, solitary or 3-nate ; bracts and bracteoles minute, often connate. Calyx-tube obconic ; limb dilated, 4—6-lobed or -toothed, persistent. Corolla campanulate or infundibuliform, 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. Ovary 2-celled ; ovules solitary in each cell, erect from the base anatropous. Drupes small ; pyrenes 1—2, thin, crustaceous. Seeds erect, plano-convex, the ventral face not hollowed out ; test membranous ; cotyledons foliaceous ; radicle elongate, terete, truncate, inferior, next the hilum.— DISTRIB. Tropical Asia ; species 8.

1. **Saprosma indicum,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 37. A shrub 3—4 ft. high ; branches pale, terete, dichotomous, glabrous. Leaves opposite (one of the pair often smaller than the other), sessile or nearly so, 2½—5 by ⅞—1¾ in., thin, elliptic-oblong or oblong-lanceolate, acute or acuminate, glabrous, base acute or rounded ; main nerves 8—10 pairs ; stipules usually 3-cuspidate, small. Flowers terminal, on short pedicels, 1—3 in a fascicle at the apices of twigs between the last pairs of leaves ; pedicels $\frac{1}{20}$ in. long, with a cup-shaped whorl of rigid connate glabrous scaly bracts at the base. Calyx $\frac{1}{12}$ in. long, cup-shaped, unequally 4—5-toothed ; teeth triangular, acuminate, with broad sinuses between. Corolla ¼ in. long, white ; lobes ovate, acute, as long as the tube. Style shortly 2-fid. Berry ⅓—½ in. long, ellipsoid, smooth, crowned by the calyx, blue, very fetid, usually 1-seeded by suppression. Seeds broadly ellipsoid or globose. Fl. B. I. v. 3, p. 192 ; Dalz. & Gibs. p. 112 ; Trim. Fl. Ceyl. v. 2, p. 368 ; Talb. Trees, Bomb. ed. 2, p. 199 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646.

KONKAN : Western Ghâts, *Woodrow.* S. M. COUNTRY : Chorla Ghât, *Dalzell* ! KANARA : common on the southern Ghâts of N. Kanara, *Talbot.*

28. **GEOPHILA,** D. Don.

Small slender perennial herbs, creeping and rooting. Leaves opposite, long-petiolate, orbicular-reniform or ovate-cordate ; stipules inter-petiolar, ovate, 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-toothed or -partite, persistent. Corolla elongate, infundibuliform, throat hairy ; lobes 4—7, spreading or recurved, valvate. Stamens 4—7, inserted on the corolla-tube ; filaments filiform ; anthers linear. Ovary 2-celled ; ovules solitary in each cell, erect from the base, anatropous ; style slender, with 2 short or elongate branches. Drupe-fleshy ; pyrenes 2, plano-convex, not grooved on the ventral face ; testa membranous ; albumen horny ; embryo basal, minute ; radicle inferior.— DISTRIB. Tropical Asia, Africa and America ; species 8—10.

1. **Geophila reniformis,** *D. Don, Prodr. Fl. Nepal.* (1825) p. 136. A small creeping herb ; stems prostrate, 1 ft. long or less, rooting at the nodes, filiform, puberulous. Leaves ½—1½ in. in diam., orbicular, deeply cordate, pubescent or glabrous ; petioles ½—2 in. long, pubescent ; stipules broadly ovate, obtuse. Flowers terminal, solitary, or in peduncled 2—3-flowered umbels ; peduncles ½—1½ in. long ; pedicels very short ; bracts lanceolate-subulate. Calyx ¼ in. long ; teeth longer than the tube, lanceolate, acuminate, ciliate. Corolla glabrous or slightly pubescent outside ; tube dilated upwards, hairy in the throat ; lobes ovate-oblong, acute, shorter than the tube, recurved. Berry ¼—⅜ in. in diam., globose, crowned with the large calyx-limb, smooth, pulpy, red when ripe ; pyrenes small, flat and smooth on the ventral, rough and bluntly keeled on the convex dorsal surface. Fl. B. I. v. 3, p. 178 ; Dalz. & Gibs. p. 111 ; Trim. Fl. Ceyl. v. 2, p. 363 ; Watt, Dict. Econ. Prod. v. 3, p. 488. *Psychotria herbacea,* Jacq. Enum. Pl. Carib. (1760) p. 16 ; Grah. Cat. p. 92.

Rare. KONKAN : S. Konkan, *Nimmo* ex *Graham*, Vingorla, *Dalzell & Gibson.*

The plant is said by Kurz to possess properties similar though inferior to those of *Cephælis Ipecacuanha.* See Watt, Dict. Econ Prod. l. c.—DISTRIB. India (Silhet and Khasia hills, Tenasserim, the Andamans, W. Peninsula); Ceylon.

29. LASIANTHUS, Jack.

Shrubs often fetid ; branches terete, compressed at the nodes. Leaves distichous, opposite, shortly petiolate, usually caudate-acuminate, with arching nerves and closely-set transverse veins which are simple or forked, or branched and reticulate ; stipules interpetiolar, broad, rarely narrow. Flowers small, in axillary, rarely peduncled, often bracteate clusters, cymes or heads. Calyx-tube short, subglobose, ovoid or oblong ; limb short or long, 3—7-toothed or -lobed, persistent. Corolla infundibuliform or hypocrateriform, throat villous ; lobes 3—7, valvate. Stamens 4—6 on the corolla-throat ; filaments short ; anthers included, often apiculate. Ovary 4—9-celled; ovules solitary in each cell, erect from the base, anatropous. Drupes of 4—9 pyrenes ; pyrenes cartilaginous or crustaceous, triquetrous, sometimes keeled or winged on the back, 1-seeded. Seeds narrowly oblong, slightly curved ; testa membranous ; albumen fleshy ; embryo terete, elongate ; cotyledons short, obtuse ; radicle elongate, inferior.—DISTRIB. Chiefly Tropical Asian ; species about 80.

Cymes sessile; corolla hairy outside; drupe black..... 1. *L. sessilis.*
Cymes peduncled; corolla glabrous outside; drupe black. 2. *P. venulosus.*

1. **Lasianthus sessilis,** *Talbot, Trees & Shrubs, Bomb.* ed. 1 (1894) p. 114. A stout gregarious shrub usually branched from the base ; branchlets appressedly hairy. Leaves opposite, 2—5 by 1—2 in., elliptic, acuminate, glabrous above, hairy on the nerves beneath, base acute or rounded ; main nerves 6 pairs, prominent beneath, curved upwards ; petioles ¼ in. long, hairy ; stipules broad, acuminate, hairy. Flowers small, white, sessile, in axillary fascicles ; bracts triangular, hairy. Calyx-tube short ; teeth triangular, hairy. Corolla

tubular, slightly hairy outside, villous inside. Ovary 4-celled ; style with 4 branches. Drupe fleshy, black ; pyrenes 4, triangular, dorsally tubercled. The leaves and fruit are fetid when bruised. Talb. Trees, Bomb. ed. 2, p. 199.—Flowers : Aug.—Sept.

The above description is taken from that of Mr. Talbot (*l. c.*). I have seen only 2 somewhat imperfect specimens which are in Herb. Kew.

KANARA : evergreen forests of N. Kanara from Yellapur southwards to Gairsoppa Falls, *Talbot* !

2. **Lasianthus venulosus,** *Wight, in Calc. Journ. Nat. Hist.* v. 6 (1846) p. 508. A large robust nearly glabrous leafy shrub. Leaves light-green, 1½—3¾ by ⅝—1½ in., elliptic-oblong, acute, acuminate or cuspidate, glabrous above, more or less hairy on the midrib and nerves beneath, base rounded ; main nerves 6—8 pairs, prominent on both sides, the veins between closely reticulated ; petioles ⅛ in. long ; stipules small, triangular, hairy. Flowers yellowish-white, sessile, or shortly pedicelled and racemose, on short stout peduncles longer than the petioles ; pedicels hairy ; bracts hairy. Calyx hairy, ⅛ in. long ; teeth 4—5, linear-subulate, hairy, ⅛ in. long. Corolla ¼ in. long ; tube glabrous outside, throat hairy ; lobes 4—5, shorter than the tube, villous inside. Stamens 4—5. Style 3—5-branched. Drupe globose, ⅛ in. in diam., blue, crowned by the persistent calyx-teeth ; pyrenes 3—5, with thick walls. Fl. B. I. v. 3, p. 190 ; Wight, Icon. t. 1032 ; Bedd. For. Man. in Flor. Sylvat. p. cxxxiv—11, t. 17, f. 5. *Santia venulosa,* Weight & Arn. Prodr. p. 422 ; Dalz. & Gibs. p. 114.

On the Ghâts but very rare, *Dalzell & Gibson.* Western Ghâts, *De Crespigny* ex *Woodrow.*

This is included on the authority of Dalzell & Gibson (Bo. Fl. p. 114). I am inclined to doubt its occurrence within the limits of the Bombay Presidency. Dalzell says that it is to be found on the Ghâts, and that it is very rare, but there are no specimens in Dalzell's Herbarium in Herb. Kew. The only specimen which reached the Poona Herbarium was furnished by Dr. DeCrespigny and ticketed "Western Ghâts." Neither Woodrow nor Talbot have found the plant, which seems to flourish at higher elevations than are obtainable in the Bombay Presidency.—DISTRIB. India (W. Peninsula).

30. **HAMILTONIA,** Roxb.

Trichotomously branched undershrubs ; branches terete. Leaves opposite, petiolate, fetid when bruised, many-nerved ; stipules intrapetiolar, short, acute, persistent. Flowers small, in broad terminal trichotomously branched panicled or subumbellate cymes, white or blue, fragrant, bracteate and bracteolate. Calyx-tube ovoid ; teeth 4—5, persistent. Corolla infundibuliform ; tube long, straight ; lobes 5, short, valvate. Stamens 5, inserted in the throat of the corolla ; filaments short, subulate ; anthers included, obovate-oblong, obtuse. Ovary 5-furrowed, 5-celled, the septa soon disappearing ; ovules solitary in each cell, erect from the base, anatropous ; style filiform, with 5 linear arms. Capsules 1-celled, from the absorption of the septa, 5-valved, 5- or fewer-seeded. Seeds surrounded by a loose clathrate envelope which splits into 3—4 segments from the base ; cotyledons foliaceous, induplicate, cordate ; radicle terete, inferior.—DISTRIB.

Mountains of the East Indies, 1 species in Northern China ; species 3—4.

1. **Hamiltonia suaveolens,** *Roxb. Hort. Beng.* (1814) p. 15. A small shrub with divaricate more or less herbaceous branches. Leaves rather rigid, 5—8 by 1½—3½ in., elliptic-lanceolate, acute, glabrous or pubescent above, more or less hairy especially on the nerves beneath, reticulately veined, base acute ; main nerves 10—16 pairs, arcuate ; petioles ½—¾ in. long ; stipules triangular, hairy. Flowers numerous, sessile or nearly so, in subglobose heads in terminal trichotomous pubescent panicles, white or blue ; bracteoles beneath the calyx minute, subulate. Calyx ⅛—⅛ in. long, hairy ; tube narrow ; teeth 4—5, linear-lanceolate, acute, $\frac{1}{12}$ in. long, pubescent. Corolla up to ½ in. long, pubescent outside ; tube slender, slightly enlarged at the top, without hairs in the throat ; lobes 4—5, ovate, acute, glabrous inside, ⅛ by $\frac{1}{12}$ in. Capsules ellipsoid, ⅛—⅙ in. long. Seeds 3-quetrous, with a loose arillate lace-like covering. Fl. B. I. v. 3, p. 197 ; Bedd. For. Man. in Flor. Sylvat. p. cxxxiv—12, t. 17, f. 3 ; Talb. Trees, Bomb. ed. 2, p. 200 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Watt, Dict. Econ. Prod. v. 4, p. 200. *Hamiltonia mysorensis,* Wight & Arn. Prodr. p. 423 ; Grah. Cat. p. 91 ; Dalz. & Gibs. p. 115. —Flowers : Oct.—Feb. VERN. *Gidesa* ; *Gidas* ; *Gidasáwa.*

Hills throughout the Presidency. KONKAN : island of Karanja, *Dalzell & Gibson.* DECCAN : Mahableshwar, *Woodrow* ; Fitzgerald Ghát below Mahableshwar, *Cooke* ! ; Warra Ghát road and Falkland Point, Mahableshwar, *H. M. Birdwood* ; Kartriz Ghát, *Woodrow* ! ; Kamatki Ghát, *Cooke* ! ; Sinhagad hill near Poona, *Bhiva* ! KANARA : on the highest hills of the Supa taluka, N. Kanara, *Talbot.*—DISTRIB. India (tropical and subtropical Himalayas, Central India, W. Peninsula) ; China

31. HYDROPHYLAX, Linn. f.

Subsucculent herbs, creeping, glabrous ; branches terete. Leaves opposite, sessile, ovate or oblong ; stipules combined into an entire or toothed cup-like sheath, persistent. Flowers solitary, axillary, sessile or shortly pedicelled, lilac. Calyx-tube 4-angled ; limb 4-partite, the segments ovate-lanceolate, acute, persistent. Corolla subfleshy, between campanulate and infundibuliform ; tube with a ring of hairs inside ; lobes 4, ovate, valvate. Stamens 4, on the corolla-throat ; filaments filiform ; anthers linear. Ovary 2-celled ; ovules solitary, peltately attached to the septum in each cell ; style filiform, pubescent ; stigma obscurely 2-lobed. Fruit large, corky, oblong-ovoid, compressed, slightly curved, acutely 3—4-keeled between the acute margins, 1—2-celled, 2-seeded. Seeds linear-oblong, convex on the back, longitudinally grooved on the face ; testa minutely granulate ; albumen cartilaginous ; embryo straight ; radicle elongate, terete, inferior.—DISTRIB. Species 3, of which 1 is in India, 1 in Madagascar, and 1 in Natal.

1. **Hydrophylax maritima,** *Linn. f. Suppl.* (1781) p. 126. A perennial herb ; stems numerous, prostrate, rooting at the nodes, stout, glabrous, clothed with the cup-like persistent stipules of fallen leaves. Leaves ½—¾ by ¼—⅜ in., sessile, more or less recurved, ovate-

oblong or obovate-oblong, acute, fleshy, much wrinkled when dry, smooth or papillose ; stipules large, membranous, forming a cup round the stem, truncate or obscurely toothed, sometimes ciliate. *Flowers sessile, solitary, axillary. Calyx ¼ in. long, glabrous ; teeth* lanceolate or narrowly triangular, acute, ⅓ in. long. Corolla ½ in. long ; tube enlarged at the top and with a ring of hairs in the throat ; lobes ovate, acute, much shorter than the tube. Fruit ⅛—⅜ in. long, oblong, tapered at both ends, with acute margins and with about 3 prominent acute ribs on each face, crowned with the large calyx-teeth, smooth, glabrous and shining. Seeds ¼ in. long, linear-oblong, ⅓-terete, rounded on the back and with a groove on the ventral face. Fl. B. I. v. 3, p. 199 ; Grah. Cat. p. 93 ; Trim. Fl. Ceyl. v. 2, p. 370 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Wight, Icon. t. 760.

KONKAN : *Dalzell* ! ; Ooran, *Nimmo* ex *Graham*. GUJARAT : Porbander (coast of Kathiawar), *Bhiva* !—DISTRIB. India (shores of W. Peninsula) ; Ceylon.

32. SPERMACOCE, Linn.

Annual or perennial herbs or low undershrubs ; branches usually 4-gonous. Leaves opposite, sessile or petiolate ; stipules connate with the petioles into a broad truncate tube with unequal bristles. Flowers small or minute, solitary, or in axillary or terminal fascicles, heads, or cymes. Calyx-tube various ; limb 2—4 (rarely 5) -toothed, sometimes with interposed teeth or bristles. Corolla infundibuliform or hypocrateriform ; throat naked or hairy ; lobes 4, valvate. Stamens 4, on the throat or tube of the corolla ; filaments short or long ; anthers linear or oblong. Ovary 2-celled ; ovules solitary in each cell, attached to the middle of the septum, amphitropous ; style filiform, with 2 short arms or a capitate stigma. Fruit of 2 coriaceous or crustaceous mericarps which dehisce variously. Seeds oblong, ventrally grooved ; testa thin, often granulate ; cotyledons leafy ; radicle terete, inferior.—DISTRIB, Scattered throughout tropical and subtropical regions, abundant in America ; species about 150.

Stem erect; both mericarps ventrally dehiscent.....	1. *S. stricta.*
Stem procumbent; one mericarp only ventrally dehiscent.....	2. *S. hispida.*

1. **Spermacoce stricta,** *Linn. f. Suppl.* (1781) p. 120. Annual ; stem erect, 6-14 in. long, slender, thickened at the nodes, quadrangular, the angles scabrid with recurved prickles ; internodes long. Leaves subsessile, 1—2 by ⅛—½ in., linear-oblong or ovate-oblong, acute, mucronate, more or less scabrous on both sides, the margins often recurved, base much tapered ; stipules hairy and with numerous long filiform bristles which are much longer than the sheath. Flowers in globose dense-flowered heads, surrounded by a whorl of 2—6 linear, acute, spreading or at length reflexed leaves ; bracteoles filiform, hyaline, as long as or longer than the calyx. Calyx $\frac{1}{10}$—⅛ in. long ; tube densely pubescent in the upper part, glabrous near the base ; teeth about as long as the tube, linear-subulate, pubescent and with pointed hyaline tips. Corolla white, ⅛ in. long ; tube almost filiform ; lobes $\frac{1}{25}$ in. long, linear, acute. Stamens much

exserted ; filaments very long. Stigma subglobose or somewhat funnel-shaped. Capsules ⅛ in. long, membranous, narrowed, veined and glabrous at the base, densely pubescent towards the apex, crowned with the erect calyx-teeth, dehiscing from above, each mericarp ventrally dehiscent. Seeds $\frac{1}{10}$ in. long, ½-ellipsoid rounded at both ends, smooth, polished, with a deep groove on the ventral face, brown. Fl. B. I. v. 3, p. 200 ; Trim. Fl. Ceyl. v. 2, p. 371 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646.—Flowers : Oct.—Nov.

KONKAN : *Stocks* !, *Lambert* ! ; Worlee (Bombay), *Stocks* ! DECCAN : Poona, *Woodrow* ! ; Dongergaon near Ahmednagar, *Cooke* ! S. M. COUNTRY : Badami, *Woodrow* ; Belgaum, *Ritchie*, 1797 !—DISTRIB. Throughout India ; Ceylon, Tropical Asia and Africa.

2. **Spermacoce hispida,** *Linn. Sp. Pl.* (1753) p. 102. A procumbent herb ; stems quadrangular, hirsute, hispid, or subglabrous, usually with long internodes. Leaves subsessile, ½—2 by ⅓—¾ in., oblong or elliptic, acute, scabrid, pubescent, or nearly glabrous, with scabrid or ciliate margins ; stipules membranous, hispid, with few bristles which are usually longer than the sheath. Flowers 4—6, in a whorl within the stipular cup ; pedicels short ; bracts lanceolate-subulate, hyaline. Calyx hispid, ⅛ in. long ; tube narrowly campanulate ; teeth as long as the tube, linear-lanceolate, very acutely pointed, reflexed, hairy. Corolla pale-blue or white, ⅛—¼ in. long ; lobes $\frac{1}{12}$ in. long, oblong, acute, bristly on the back near the tip. Stigmas 2, very short. Capsules ⅛ in. long, hairy, ellipsoid, rounded at both ends, crowned with the calyx-teeth, one mericarp only ventrally dehiscent, the other closed by the septum which remains attached to it, finally separating as a membranous plate. Seeds ⅛—¼ in. long, ½-ellipsoid, one end rounded, the other truncate, finely granulate, rounded on the back, with a deep groove on the flat face, brown. Fl. B. I. v. 3, p. 200 ; Grah. Cat. p. 93 ; Dalz. & Gibs. p. 111 ; Trim. Fl. Ceyl. v. 2, p. 371 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 320.—Flowers : Sept.—Oct. VERN. *Madanghanti.*

KONKAN : *Law* ! ; Vingorla, *Kanitkar* ! S. M. COUNTRY : Castlerock, *Cooke* ! ; Londa, *Bhiva* ; Belgaum, *Ritchie*, 358 !

33. GAILLONIA, A Rich.

Low rigid branched shrubs. Leaves small, rigid, opposite, linear or subulate ; stipules usually connate with the petioles into a 2-setose or 2-spinous sheath, rarely remote from the petiole or obsolete. Flowers small, solitary, or in simple spicate cymes, white. Calyx-tube ovoid ; limb 2—7-toothed or -lobed, dilated after flowering into a scarious crenate wing or feathery bristles. Corolla infundibuliform ; throat naked ; lobes 4—5, valvate. Stamens 4—5, inserted on the throat or tube of the corolla ; filaments short ; anthers linear-oblong. Disk inconspicuous. Ovary 2-celled ; ovules solitary in each cell, attached to the middle of the septum, amphitropous ; style filiform, with 2 short linear branches. Fruit small, ovoid, of 2 terete indehiscent cocci, crowned with the enlarged calyx. Seeds oblong

ventrally grooved ; albumen horny ; cotyledons flat ; radicle slender, inferior.—DISTRIB. W. Asia and N. Africa ; species 10.

1. **Gaillonia hymenostephana,** *Jaub. & Spach, Ill. Pl. Or.* v. 1 (1842) p. 146, t. 79. A small shrub 6—12 in. high, fetid when fresh ; stem as thick as a goose-quill, irregularly branched ; branches numerous, terete, slender, hoary and scaberulous. Leaves ¼—⅝ by $\frac{1}{16}$—$\frac{1}{10}$ in., linear-oblong, sessile, subobtuse, attenuated at the base, scabrid, margins ciliate, sometimes recurved ; stipules of the lower leaves usually obsolete, those of the upper small, membranous, connate. Flowers terminal, solitary, or in 2—3-flowered fascicles. Calyx-tube $\frac{1}{12}$ in. long, hairy ; limb membranous, reticulately veined, subpellucid, pale-yellow, hairy, unequally 5—7-lobed, the lobes rounded or broadly ovate, apiculate or acuminate, small before flowering, afterwards enlarged to a diameter of about ½ in. when spread out. Corolla white, ⅛—⅙ in. long, infundibuliform ; lobes 5, hairy outside, glabrous inside, much shorter than the tube, linear, subobtuse. Fruit small, of 2 terete indehiscent cocci, crowned with the enlarged calyx. Fl. B. I. v. 3, p. 202 ; Boiss. Fl. Orient. v. 3, p. 15 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646.

A rare plant, confined (in the Bombay Presidency) to Sind. SIND : Thano-Bullo-Khan, *Woodrow.*

Woodrow reports this plant from Sind, but I have seen no specimens from there. The specimens in Herb. Kew. are from Waziristan, the Panjáb, Afghanistan, and Beluchistan.

34. **RUBIA,** Linn.

Scabrid hispid or prickly erect diffuse or climbing herbs ; stems long, 4-gonous. Leaves 4—8 in a whorl, exstipulate. Flowers small or minute, in axillary and terminal cymes ; pedicels articulate with the calyx. Calyx-tube ovoid or globose ; limb 0. Corolla rotate or subcampanulate ; lobes 4—5-valvate. Stamens 4—5, inserted on the corolla-tube ; filaments short ; anthers didymous, exserted. Ovary 2-celled ; ovules solitary in each cell, attached to the septum, amphitropous ; style 2-fid or styles 2 ; stigmas capitellate. Fruit small, fleshy, didymous or globose by the suppression of a carpel. Seeds suberect, adhering to the pericarp ; testa membranous ; cotyledons broad, thin ; radicle slender, inferior.—DISTRIB. Chiefly in the temperate regions of the world ; species about 30.

1. **Rubia cordifolia,** *Linn. Syst. Nat.* ed. 12, v. 3 (1768) p. 229.—Perennial, herbaceous, climbing ; roots very long, cylindric, flexuose, with a thin red bark ; stems often many yards long, rough, grooved, becoming slightly woody at the base ; bark white ; branches scandent by means of numerous divaricate or deflexed branchlets and petioles, quadrangular, sometimes prickly on the angles, glabrous, shining. Leaves 1½—3½ by ⅝—1⅜, in whorls of 4 (one pair of each whorl often larger and with longer petioles than the other), ovate, acute, the lower leaves larger than the upper, all scabrous above, on the nerves beneath, and on the margins with minute white prickles, base rounded or slightly cordate, the base of the upper leaves sometimes acute, all 5 (rarely 7)-nerved from the base ; petioles triangular, with many

sharp recurved prickles on the edges, often deflexed ; stipules 0. Flowers in terminal panicled glabrous cymes ; branches trichotomous, spreading ; bracts ovate acute, leafy. Calyx $\frac{1}{10}$ in. long ; tube globose, glabrous, limb 0. Corolla greenish, divided nearly to the base ; tube scarcely any ; lobes 5, ovate, acute, $\frac{1}{8}$ in. long. Styles 2 ; stigmas globose. Fruit $\frac{1}{8}$—$\frac{1}{4}$ in. in diam., didymous or globose, smooth, shining, purplish-black when ripe. Fl. B. I. v. 3, p. 202 ; Grah. Cat. p. 93 ; Dalz. & Gibs. p. 121 ; Wight, Ill. t. 128, *bis*, fig. 1 ; Trim. Fl. Ceyl. v. 2, p. 372 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 570.—Flowers : Oct.—Jan. VERN. *Manjishth* ; *Itta.*

On the higher Ghâts tolerably common. KONKAN : *Stocks* ! ; Amboli Ghât, *Kanitkar* ! DECCAN : Phunda Ghât, *Ritchie*, 361 ! ; hills at Bhor, *Kanitkar* ! ; hills at Pár, *Law* ! ; Mahableshwar, *Cooke* ! ; hills near Sinhagad (Poona districts), *Bhiva* ! S. M. COUNTRY : Belgaum, *Ritchie*, 361 !—DISTRIB. Throughout India in hilly districts ; Ceylon, Malacca, Japan, Java, Tropical Africa.

The roots furnish a valuable dye which is used largely by the natives of India. The plant is known as *Indian Madder*. A very full description of the dying process will be found in Watt's Dict. Econ. Prod. l. c.

Rubia tinctorum, Linn. Sp. Pl. (1753) p. 109. The European Madder plant, not indigenous in India, but, according to De Candolle, a native of western temperate Asia and the south-east of Europe. It is cultivated in Sind and is a scandent herb with lanceolate acuminate obscurely penninerved leaves 4—6 in a whorl, leafy cymes, and didymous or globose fruit $\frac{1}{8}$—$\frac{1}{6}$ in. diam. Fl. B. I. v. 3, p. 203 ; Boiss. Fl. Orient. v. 3, p. 17 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 578.

Under genera not included in the foregoing pages the most important plants grown in the Bombay Presidency are the following :—

Coffea arabica, Linn. Sp. Pl. (1753) p. 172. The Coffee Plant, a native of Abyssinia, the Soudan, and the coasts of Guinea and Mozambique, has been cultivated on the hills between Panchgani and Mahableshwar at an altitude of about 4000 ft., but not to any great extent.—Flowers : Jan.—Apr.

Serissa fœtida, Lamk. Tab. Encyc. v. 2 (1793) p. 211. A small shrub about 2 ft. high, a native of China and Japan, is often grown in gardens. It has ovate-lanceolate dark-green shining myrtle-like leaves and axillary solitary small sessile white flowers, which, as well as the leaves, are fetid when bruised. Grah. Cat. p. 93 ; Dalz. & Gibs. Suppl. p. 44 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 646 ; Firminger, Gard. ed. 3, p. 579.—Flowers : May.

Hamelia patens, Jacquin, Enum. Pl. Carib. (1760) p. 16. A shrub 4—6 ft. high with dense rich-green foliage, a native of Tropical America and the West Indies, is often cultivated in gardens. It has elliptic-lanceolate villous and strongly nerved petiolate leaves about 4 by 2 in. and scarlet and yellow flowers in terminal corymbose cymes ; the corolla with a long tube and short lobes. Dalz. & Gibs. Suppl. p. 44 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 645 ; Firminger, Gard. ed. 3, p. 586.

Pentas carnea, Benth. in Bot. Mag. v. 17 (1844) t. 4086. A plant about 1 ft. high, scarcely shrubby (the branches all herbaceous), is very commonly grown in gardens. It bears a constant succession of flowers of a delicate lavender-color in large corymbs. Dalz. & Gibs. Suppl. p. 44 ; Firminger, Gard. ed. 3, p. 586.

Rondeletia odorata, Jacq. Enum. Pl. Carib. (1760) p. 16. A hard-wooded shrub, a native of Cuba and Mexico, has been introduced into gardens in the Bombay Presidency. It has ovate, acute or acuminate leaves on very short petioles and scarlet or orange fragrant flowers. Dalz. & Gibs. Suppl. p. 45 ; Woodr. Gard. in Ind. ed. 5, p. 354.

ORDER LXXI. **COMPOSITÆ.**

Herbs or shrubs, rarely trees. Leaves usually alternate ; stipules 0. Inflorescence a centripetal head of usually many small flowers (less commonly few or very rarely 1) sessile on the dilated top of the peduncle (*receptacle*), enclosed in an involucre of whorled bracts. Receptacle sometimes furnished with bracteoles (*palcæ, scales, bristles, fimbrillæ*), sometimes naked and smooth or with small pits (*foveolate*) or deeply pitted (*alveolate*). Flowers either all 2-sexual or some or all 1-sexual, variously arranged. Calyx-tube wholly adherent to the ovary ; limb 0 or of scales, bristles or hairs (*pappus*). Corolla epigynous, gamopetalous, sometimes regular, tubular, 5—4-fid or -toothed with valvate æstivation ; sometimes irregular, and either ligulate or bilabiate (corolla wanting in the female flowers of *Xanthium*). Disk epigynous. Stamens 5—4, inserted on the corolla and alternate with its segments ; filaments usually free above ; anthers 2-celled, introrse, cohering into a tube which sheaths the style (very rarely free), the cells often tailed at the base. Ovary 1-celled ; ovule solitary, erect, anatropous ; style slender, usually 2-fid ; arms (sometimes connate) linear, ½-terete, acute, obtuse, truncate or penicillate, or tipped by pubescent cones, sometimes clavate, variously papillose, stigmatic near the margins. Fruit an achene, articulated to the common receptacle, generally sessile, provided with a basilar or lateral areole indicating its point of insertion, often prolonged into a beak at the top, naked above or crowned by the persistent sessile or stipitate pappus. Seed erect ; testa membranous ; albumen 0 ; embryo straight ; cotyledons plano-convex ; radicle short.—DISTRIB. Throughout the world ; genera about 1000 ; species about 8000.

SERIES I. TUBULIFLOREÆ. *Flowers all tubular or the outer only ligulate. Juice watery.*

TRIBE I. **VERNONIEÆ.** Heads homogamous ; flowers all ☿ , tubular. Anther-bases sagittate, rarely subcaudate. Style-arms subulate, hairy. Leaves usually alternate. Corollas never yellow.

Subtribe I. EUVERNONIEÆ. Heads distinct, many-flowered.

Pappus short, fugacious.	
Achenes 8—10-ribbed	1. CENTRATHERUM.
Achenes not ribbed	2. LAMPRACHENIUM.
Pappus 0; achenes 10-ribbed; anthers subcaudate	3. ADENOON.

Pappus long, copious, more or less persistent, usually girt with an outer row of short hairs or flattened bristles..... 4. VERNONIA.

Subtribe 2. LYCHNOPHOREÆ. Heads 1- or few-flowered, crowded into dense masses like single heads.

Corollas usually cleft laterally; pappus-hairs rigid, shining..... 5. ELEPHANTOPUS.

TRIBE II. **EUPATORIEÆ.** Heads homogamous; flowers all ☿, tubular. Anthers subentire at the base. Style-arms usually elongate, obtuse, minutely papillose. Leaves opposite or alternate. Corollas rarely orange, never truly yellow. Pappus usually setose.

Anthers truncate, minutely apiculate at the apex ..... 6. ADENOSTEMMA.
Anthers appendiculate at the apex..... 7. AGERATUM.

TRIBE III. **ASTEREÆ.** Heads heterogamous, rayed or discoid; or homogamous, rayless. Anther-bases subentire, not tailed. Style-arms flattened or plano-convex, all or those of the disk-flowers terminated by a cone. Leaves usually alternate. Disk-flowers usually yellow; ray-flowers variously colored.

Subtribe 1. GRANGEINEÆ. Corollas of ♀ flowers 2-∞-seriate not exceeding the disk, 2-toothed or campanulate at the apex. Invol.—bracts subequal or the exterior foliaceous. Pappus 0 or very short.

Top of receptacle flat; pappus 0 or of a few bristles; margins of achenes thickened. 8. DICHROCEPHALA.
Top of receptacle concave; pappus 0; margins of achenes not thickened..... 9. CYATHOCLINE.
Receptacle convex or conic, naked; pappus a short tube with fimbriate mouth..... 10. GRANGEA.

Subtribe 2. HETEROCHROMEÆ. Corollas of ♀ flowers ligulate, never yellow; pappus-hairs long, copious.

Invol.-bracts narrow ..... 11. ERIGERON.

Subtribe 3. CONYZEÆ. ♀ flowers when present filiform or scarcely minutely ligulate, yellow; pappus setose.

Invol.-bracts 2—∞-seriate..... 12. CONYZA.

TRIBE IV. **INULEÆ.** Heads heterogamous, discoid or rayed; or homogamous, rayless. Anther-bases tailed (except *Laggera*). Style-arms linear, obtuse, inappendiculate, or the style of the sterile flowers undivided. Leaves usually alternate. Disk- and ray-flowers usually yellow.

Subtribe 1. PLUCHEINEÆ. Heads androgynous. Invol.-bracts herbaceous or dry, or the inner scarious. Receptacle naked. Style-arms of ☿ flowers filiform (not truncate), or the style of the sterile flowers undivided.

Heads distinct, solitary, corymbose or paniculate (rarely in globose masses in some *Blumeas*).

Pappus-hairs slender, copious.
Herbs.
Invol.-bracts narrow, herbaceous or slender; styles of ☿ flowers 2-fid.
Anthers tailed ..... 13. BLUMEA.
Anthers not tailed ..... 14. LAGGERA.
Shrubs or undershrubs.
Invol.-bracts dry, usually broad; styles of ☿ flowers usually undivided ..... 15. PLUCHEA.
Pappus 0.
A low rigid herb; heads sessile, crowded; corollas of ☿ flowers 2-lipped ..... 16. NANOTHAMNUS.
Erect or diffuse herbs; corollas of ☿ flowers tubular..... 17. EPALTES.
Heads collected into dense globose or ovoid terminal masses; corollas of ♀ flowers filiform.
Pappus 0. Herbs with winged stems... 18. SPHÆRANTHUS.

Subtribe 2. FILAGINEÆ. Heads androgynous. ♀ flowers enclosed in the paleæ of the receptacle; ☿ flowers in the centre of the head, often naked. Invol.-bracts scarious or hyaline, rarely dry or radiating. Corollas of ♀ flowers filiform. Style of ☿ flowers undivided or with obtuse or subulate (not truncate) arms.

Glabrous shrubs or undershrubs; achenes large, 2—4-angled or many-ribbed, ciliate..... 19. BLEPHARISPERMUM.

Subtribe 3. GNAPHALIEÆ. Heads androgynous or homogamous, discoid. Invol.-bracts scarious, often hyaline. Receptacle without paleæ. Style-arms of ☿ flowers truncate. Herbs.

Achenes all papose; ☿ flowers all fertile; style bifid.
Pappus-hairs plumose ..... 20. LASIOPOGON.
Pappus-hairs not plumose ..... 21. GNAPHALIUM.

Subtribe 4. EUINULEÆ. Heterogamous, rayed (rarely subdiscoid); or homogamous, rayless. Flowers usually all fertile. Receptacle naked or with a few paleæ. Style-arms of ☿ flowers rounded or dilated at the apex.

Heads rayed; pappus-hairs few or many, subequal; achenes ribbed ..... 22. INULA.
Heads usually rayed; pappus-hairs slender, those of the ray few or 0; achenes not ribbed ..... 23. VICOA.
Heads rayed or discoid; outer pappus of scales forming a cup, inner pappus of hairs; achenes usually ribbed ..... 24. PULICARIA.
Heads homogamous; pappus of 2 ovate scales; achenes flat, winged ..... 25. CÆSULIA.

TRIBE V. **HELIANTHEÆ.** Heads heterogamous, usually rayed; or homogamous, rayless. Ray-flowers ♀, fertile or neuter; disk-flowers ☿, fertile or sterile. Receptacle

paleaceous. Anther-bases not tailed. Style-arms of ☿ flowers truncate or appendiculate, or style of sterile flowers undivided. Pappus of 2—5 bristles or shortly paleaceous or 0. Achenes various, usually compressed, angular. Leaves (at least the lower ones) usually opposite. Flowers usually yellow.

Subtribe 1. LAGASCEÆ. Heads 1-flowered, in globose clusters, Involucre-bracts forming a toothed or fimbriate cup or ring.

A villous or scabrid herb; lower or all the leaves opposite ..... 26. LAGASCA.

Subtribe 2. AMBROSIEÆ. Heads heterogamous or unisexual, monœcious. Receptacle paleaceous between the ☿ flowers. ♀ flowers apetalous, fertile; ☿ flowers sterile. Anthers nearly free, with inflexed appendages. Style of ☿ flowers undivided. Achenes smooth.

Involucre-bracts of ☿ flowers free, those of the ♀ flowers forming a 2-flowered 2-celled capsule armed with glochidiate spines..... 27. XANTHIUM.

Subtribe 3. VERBESINEÆ. Heads heterogamous, rayed or discoid; or homogamous and rayless; ray-flowers ♀, fertile or sterile; disk-flowers ☿, fertile or the innermost rarely sterile. Pappus cup-shaped or of 2—3 rigid paleaceous bristles or 0. Achenes all thick, or those of the ray triquetrous, those of the disk laterally compressed. Leaves usually opposite.

Inner involucre-bracts or outer paleæ of the receptacle embracing the fertile achenes of the ray-flowers.
Outer involucre-bracts 5, narrow, glandular..... 28. SIEGESBECKIA.
Inner involucre-bracts not embracing the achenes.
Paleæ of receptacle flat, narrow.
Outer involucre-bracts many ..... 29. ECLIPTA.
Paleæ of receptacle concave, embracing the achenes.
Flowers of the ray ligulate, sterile; pappus 0 or a short ring..... 30 SCLEROCARPUS.
Flowers of the ray fertile.
Achenes not ciliate.
Ligules small; pappus of 2—5 unequal persistent bristles..... 31. BLAINVILLEA.
Ligules large, conspicuous, spreading, yellow; pappus 0 or a toothed cup or ring, or short scales ..... 32. WEDELIA.
Achenes ciliate.
Ligules small, white or yellow; pappus 0 or of 2—3 bristles ..... 33. SPILANTHES.

Subtribe 4. COREOPSIDEÆ. Heads heterogamous, rayed; or homogamous, rayless; ray-flowers ♀, fertile or neuter;

disk-flowers ☿, fertile, or the inner rarely sterile. Receptacle paleaceous. Achenes more or less dorsally compressed, 2—4-awned or naked.

Invol.-bracts in two rows; outer bracts few, small; inner membranous, often connate below.
- Style-arms truncate, penicillate or with short appendages.
  - Leaves alternate ..... 34. GLOSSOCARDIA.
  - Leaves opposite ..... 35. BIDENS.
- Style-arms with long hairy appendages..... 36. GLOSSOGYNE.

Subtribe 5. GALINSOGEÆ. Heads heterogamous, rayed; or homogamous, rayless; ray-flowers ♀ (rarely neuter); disk-flowers ☿, fertile. Receptacle paleaceous. Pappus of many paleæ, awned or plumose.

- Heads rayed; paleæ of the pappus plumoso-ciliate..... 37. TRIDAX.

TRIBE VI. **ANTHEMIDEÆ.** Heads heterogamous, rayed or discoid; or homogamous, rayless. Invol.-bracts 2-∞-seriate, dry or with scarious tips. Receptacle paleaceous or naked. Anthers not tailed. Style-arms truncate. Pappus 0 or coroniform, rarely shortly paleaceous. Leaves usually alternate. Corollas of the disk yellow; those of the ray variously colored.

- Corollas of ☿ flowers 4-fid..... 38. CENTIPEDA.
- Corollas of ☿ flowers 5-fid..... 39. ARTEMISIA.

TRIBE VII. **SENECIONEÆ.** Heads heterogamous, rayed or discoid; or homogamous, rayless. Invol.-bracts usually 1-seriate and subequal, with a few short outer bracts at their base, rarely ∞-seriate. Receptacle usually naked. Anther-bases obtuse or with 2 short points, rarely tailed. Style-arms of ☿ flowers truncate or appendiculate. Pappus of fine hairs. Leaves usually alternate. Disk-flowers yellow; ray-flowers usually also yellow, rarely variously colored.

Subtribe 1. EUSENECIONEÆ. Invol.-bracts 1—2-seriate, free or soon becoming so, sometimes with few or many bracteoles. Style-arms of ☿ flowers truncate or obtuse, penicillate or with a hairy tip.

- Heads homogamous.
  - Heads bracteolate; style-arms ending in long hairy appendages..... 40. GYNURA.
  - Heads ebracteolate, discoid; flowers purple or red; style-arms appendiculate..... 41. EMILIA.
  - Heads bracteolate or not, discoid; style-arms with short ovoid tips; flowers yellow. Fleshy glabrous herbs..... 42. NOTONIA.
- Heads heterogamous, rayed (rarely homogamous and rayless), bracteolate or not; style-arms truncate..... 43. SENECIO.

TRIBE VIII. **CYNAREÆ.** Flowers all tubular. Invol.-bracts many-seriate, imbricate, tips often with a scarious spinous or leafy appendage. Receptacle often fleshy, densely bristly or paleaceous, rarely simply pitted. Corolla-limb narrow, deeply 5-fid. *Anthers tailed. Styles subentire, or the arms short,* hairy or thickened towards the base. Pappus setose or paleaceous, very rarely 0. Achenes often hard. Leaves alternate, often spinous.

Subtribe 1. ECHINOPSEÆ. Heads 1-flowered, crowded in dense globose balls.

Thistle-like herbs ..... 44. ECHINOPS.

Subtribe 2. CARDUINEÆ. Heads distinct, usually ∞-flowered. Pappus-hairs distinct or connate into a deciduous ring. Achenes glabrous, the areole horizontal.

Pappus-hairs paleaceous, many-seriate; filaments hairy ..... 45. GONIOCAULON.

Subtribe 3. CENTAUREÆ. Heads distinct, usually many-flowered. Pappus various. Achenes glabrous, the areole very oblique or lateral.

Heads homogamous; flowers all ☿, fertile; achenes smooth, faintly ribbed... 46. TRICHOLEPIS.
Heads heterogamous; outer flowers 1-seriate, neuter; achenes strongly and regularly 5—15-ribbed ..... 47. VOLUTARELLA.

TRIBE IX. **MUTISIEÆ.** Heads homogamous; flowers all tubular and ☿, or the outer bilabiate; or heterogamous, with the ray-flowers ♀ or neuter, sometimes bilabiate. Invol.-bracts usually ∞-seriate, unarmed or spinescent. Receptacle rarely paleaceous. Corollas 2-lipped or with a deeply 5-fid limb. Anthers usually tailed. Style-arms rounded or truncate, inappendiculate. Pappus setose or paleaceous, rarely 0. Leaves radical or alternate, rarely opposite.

Subtribe 1. GOCHNATIEÆ. Corollas tubular; segments of the limb narrow, equal or obscurely 2-lipped. Invol.-bracts rigid, straight, pungent.

Pappus-hairs copious, ∞-seriate..... 48. DICOMA.
Pappus 1-seriate of 10 paleæ, the margin hyaline below the middle, barbellate above..... 49. HOCHSTETTERIA.

SERIES II. LIGULIFLOREÆ. *Flowers all ligulate. Juice milky.*

TRIBE X. **CICHORIEÆ.** Heads homogamous. Corollas all ligulate; ligules truncate, 5-toothed. Anther-bases sagittate, rarely tailed. Style-arms slender. Pappus setose, paleaceous or 0. Leaves radical or alternate, never opposite. Herbs.

Subtribe 1. LACTUCEÆ. Herbs rarely shrubby below, glabrous or with simple hairs. Innermost invol.-bracts subequal, the outer shorter, often very short. Achenes usually more or less contracted at the base, attenuated or beaked at the apex, sometimes columnar and truncate at both ends, rarely winged.

Achenes compressed, beaked	50.	LACTUCA.
Achenes compressed, not beaked	51.	SONCHUS.
Achenes columnar, truncate at both ends.	52.	LAUNÆA.

1. CENTRATHERUM, Cass.

Erect or diffusely branched herbs. Leaves alternate, petiolate, usually toothed. Heads homogamous, pedunculate, many-flowered, solitary, terminal or leaf-opposed, rarely corymbose. Involucre subhemispheric; bracts ∞-seriate, imbricate, the inner dry or scarious, the outer herbaceous, often leafy. Receptacle flat, naked or pitted. Corollas purple, all tubular, equal; tube slender; limb narrowly 5-fid. Anthers sagittate at the base; auricles obtuse. Style-arms subulate, hairy. Pappus scanty or copious, short, fugacious. Achenes obtuse, with 8—10 more or less prominent ribs.—DISTRIB. Asia, America, and Australia; species 10.

Leaves white beneath; outer invol.-bracts large, often leafy.		
Outer invol.-bracts cordate at base; pappus equalling the corolla-tube	1.	*C. Ritchiei.*
Outer invol.-bracts not cordate at base; pappus shorter than the corolla-tube.		
Achenes $\frac{1}{8}$ in. long, deeply ribbed.....	2.	*C. phyllolænum.*
Achenes $\frac{1}{16}$—$\frac{1}{12}$ in. long, faintly ribbed.....	3.	*C. tenue.*
Leaves not white beneath; outer invol.-bracts shorter than the inner	4.	*C. Hookeri.*

1. **Centratherum Ritchiei,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 228. An erect herb 15—24 in. high; stem scarcely branched, grooved, glabrous or with a few minute bristles. Leaves $2\frac{3}{4}$—$3\frac{1}{2}$ by $1\frac{1}{4}$—2 in., elliptic or elliptic-lanceolate, acute or acuminate, sparsely clothed above with short thick hairs, white with a soft woolly tomentum beneath, the margins regularly spinous-toothed, base tapering; petioles $\frac{1}{2}$—$\frac{3}{4}$ in. long, with a few stout hairs. Heads solitary, axillary and terminal, $\frac{1}{3}$—$\frac{1}{2}$ in. in diam., on slender peduncles. Outer invol.-bracts 2—6, large, leafy, cordate at the base, tipped with a short spine, white-tomentose beneath; innermost bracts linear, subacute, usually tipped with purple, scarious. Pappus reddish, equalling the corolla-tube. Achenes $\frac{1}{16}$—$\frac{1}{12}$ in. long, oblong-obovoid, 10-ribbed, glabrous. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *C. courtallense*, C. B. Clarke, Comp. Ind. p. 3 (*not* of Benth. & Hook. f.).—Flowers: Nov.

Rare. S. M. COUNTRY: Londa, *Cooke*! KANARA: Jagalbet, *Ritchie*, 1845! GOA: *Woodrow*.—DISTRIB. Apparently endemic.

2. **Centratherum phyllolænum,** *Benth. ex Hook. f. Fl. B. I.* v. 3 (1881) p. 228. An erect branched variable annual; stems and branches glabrate or rough with minute bristles, often tomentose at the apex, frequently tinged with purple. Leaves 2—6 by 1—$2\frac{3}{4}$ in., elliptic, acute or acuminate, irregularly spinous-serrate or spinous-dentate, clothed with short setæ above, densely covered with white woolly tomentum beneath, base tapering into a short petiole. Heads $\frac{1}{2}$—$\frac{7}{8}$ in. in diam., solitary, axillary and terminal. Outer invol.-bracts 1—∞, spreading or deflexed, linear or lanceolate (rarely

oblong), sometimes much longer than the heads, white beneath ; intermediate bracts shorter than the inner, variable, obtuse, acute or rounded, erect or recurved, the margins often ciliate ; innermost bracts scarious, often purple, linear-oblong, acute. Pappus pale-red, stiff, shorter than the corolla-tube. Achenes oblong, $\frac{1}{8}$ in. long, deeply 10-ribbed, glabrous. C. B. Clarke, Comp. Ind. p. 4 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Decaneurum molle*, Dalz. & Gibs. p. 122 (*not* of DC.).—Flowers : Sept.—Oct.

KONKAN : *Law* ! Ooran, *Dalzell* ! ; Marmagao, *Cooke* ! ; Parel, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie*, [illegible] ! KANARA : Jagalbet (N. Kanara), *Ritchie*, [illegible]. GUJARAT : Páli, *Kanitkar* !—DISTRIB. India (W. Peninsula, Mt. Abu).

3. **Centratherum tenue,** *C. B. Clarke, Comp. Ind.* (1876) p. 4. Erect, dichotomously branched, 3—5 ft. high ; stem and branches glabrous, slender, often tinged with purple. Leaves : the upper sessile and smaller than the lower ; lower petioled, 4—6 by $1\frac{3}{4}$—$2\frac{1}{2}$ in., broadly elliptic-lanceolate, acute or acuminate, with short stiff hairs above, clothed beneath with a white woolly tomentum, the margins irregularly serrate, the serratures ending in a short stout bristle, base attenuated ; petioles of the upper leaves 0, those of the lower short with a few bristly hairs at the base. Heads $\frac{1}{3}$—$\frac{1}{2}$ in. in diam. ; peduncles slender, pubescent ; flowers purple. Outer invol.-bracts 1 or 2, large, leafy, usually longer than the head of flowers, oblong-lanceolate, acute, white-tomentose beneath, pointed with a bristle ; intermediate bracts smaller than the inner, linear, acute or rounded at the apex, bristle-pointed, white-tomentose ; the innermost bracts linear-oblong, subacute, scarious, white-tomentose, sometimes reflexed. Pappus pale-reddish (sometimes almost white), much shorter than the corolla-tube. Achenes $\frac{1}{10}$—$\frac{1}{12}$ in. long, oblong, faintly 10-ribbed, glabrous. Fl. B. I. v. 3, p. 228 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Decaneurum lilacinum*, Dalz. & Gibs. Bo. Fl. p. 314.—Flowers : Oct.—Nov.

KONKAN : *Law* !, *Lambert* ! DECCAN : Mahableshwar, *Cooke* ! ; Warra Ghát, *Cooke* ! ; Khandala, *Cooke* !—DISTRIB. India (W. Peninsula).

4. **Centratherum Hookeri,** *C. B. Clarke, Comp. Ind.* (1876) p. 3. Stem herbaceous, erect, 18—24 in. high, ashy-pubescent, angled and grooved. Leaves scattered, 2—3 by $\frac{1}{4}$—$\frac{1}{2}$ in., linear-lanceolate, acute, obscurely toothed, faintly pubescent on both sides, not white beneath ; petioles very short. Heads $\frac{1}{2}$—$\frac{3}{4}$ in. in diam., subcorymbose ; peduncles hoary-pubescent ; flowers red. Outer invol.-bracts shorter than the inner, ovate-oblong, subacute, densely pubescent ; intermediate bracts longer than the outer but shorter than the innermost, linear, with reflexed tips ; the innermost longest of all, linear, scarious, with reflexed tips. Pappus dirty-straw-colored, longer than the corolla-tube, rigid, deciduous. Achenes $\frac{1}{8}$ in. long, linear-oblong, 10-ribbed. Fl. B. I. v. 3, p. 228 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647.—Flowers : Nov.

Stocks without locality in Herb. Kew. ! KONKAN : *Law* ! DECCAN : Poona, *Woodrow* !—DISTRIB. India (W. Peninsula).

2. LAMPRACHENIUM, Benth.

An erect branched annual with crisped hairs. Leaves alternate, petiolate, toothed, clothed beneath with white tomentum. Heads small, laxly subcorymbosely paniculate, homogamous. Involucre subcampanulate ; bracts ∞-seriate, dry, the inner acute. Receptacle flat, naked. Corollas purple, all tubular, equal, regular ; tube slender ; limb narrowly 5-fid. Anthers obtusely auricled. Style-arms subulate, hairy. Pappus-hairs few, short, fugacious, red. Achenes obovoid, slightly compressed, shining, not ribbed, quite glabrous.—DISTRIB. Peninsular India ; species 1.

1. **Lamprachenium microcephalum,** *Benth. in Benth. & Hook. f. Gen. Pl.* v. 2 (1873) p. 226. An erect herb 1—2 ft. high ; stem simple or branched, glabrous, hairy or glandular, often tinged with purple. Leaves 2—3 by 1—1½ in., elliptic, acuminate, sparsely clothed with short bristly hairs above, densely covered with white woolly tomentum beneath, distantly bristle-serrate, tapering at the base ; petioles ⅜—¾ in. long. Heads small, 3/16—⅓ in. in diam., numerous, on slender hairy peduncles. Invol.-bracts elliptic-lanceolate, cuspidate, white-tomentose on the back ; the exterior foliaceous at the tip, erect or recurved, acute, with densely ciliate margins ; the interior a little longer, scarious, villous. Pappus reddish, equalling the corolla-tube, rigid. Achenes 1/12—1/16 in. long, obovoid, turgid, slightly compressed, smooth, shining. Fl. B. I. v. 3, p. 229 ; C. B. Clarke, Comp. Ind. p. 5 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647 ; Watt, Dict. Econ. Prod. v. 4, p. 586. *Decaneurum microcephalum,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 231 ; Dalz. & Gibs. p. 122.—Flowers : Oct.—Nov. VERN. *Brahmadandi.*

Stocks, Dalzell, without localities in Herb. Kew.! DECCAN : Mahableshwar, *Cooke!, Woodrow!* S. M. COUNTRY : *Dalzell & Gibson.*

The plant is abundant at Mahableshwar, where I have frequently gathered it ; but I have never noticed the odor of chamomile mentioned by Dalzell & Gibson.

3. ADENOON, Dalzell.

An erect rigid herb. Leaves alternate, sessile. Heads pale-purple with intensely colored anthers, in moderate-sized corymbosely paniculate homogamous heads. Involucre campanulate ; bracts many-seriate, imbricate, oblong-lanceolate, aristate, the outer gradually shorter. Receptacle flat, minutely fimbriate. Corollas all tubular, equal, slender ; limb narrowly 5-fid. Anther-bases sagittate, subcaudate. Style-arms subulate, hairy. Pappus 0. Achenes 10-ribbed, obovoid, obtuse, subcompressed.—DISTRIB. India (W. Peninsula) ; species 1.

1. **Adenoon indicum,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 344. An erect glandular herb 1½—2½ ft. high. Stem simple below, branched above, angled and grooved, leafy, the lower part smooth or nearly so often tinged with purple, the upper part scabrid and hispid. Leaves thick, 2—3½ by 1—2 in., alternate, sessile, broadly elliptic or obovate, acute at both ends, coarsely and irregularly serrate, rough

on both sides with short, usually bulbous hairs, light green above, paler beneath and with many prominent nerves. Heads ½—⅝ in. in diam., in corymbose panicles; flowers purple; peduncles hirsute; bracts at the forks and below the flower-heads linear-lanceolate, mucronate. Invol.-bracts elliptic-oblong, aristate, hairy on the back, 3-nerved, glandular. Pappus 0. Achenes 1/12—1/10 in. long, with 10 stout ribs, glandular between the ribs. Fl. B. I. v. 3, p. 229; Dalz. & Gibs. p. 121; C. B. Clarke, Comp. Ind. p. 5; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Ethulia* —— ?, Grah. Cat. p. 101.—Flowers: Sept.—Oct. VERN. *Motha-sunki.*

KONKAN: Amboli Ghát, *Cooke*! DECCAN: Phunda Ghát, *Dalzell*!; Mahableshwar, *Cooke*!, *Woodrow*! S. M. COUNTRY: Belgaum, *Law* ex *Graham*; Castlerock, *Cooke*!; Párva Ghát, *Ritchie*, 1805! KANARA: Tinai (N. Kanara), *Woodrow*.—DISTRIB. India (W. Peninsula).

4. VERNONIA, Schreb.

Herbs or shrubs. Leaves simple, alternate, entire or toothed. Heads terminal or axillary, homogamous, cymose or panicled. Involucre ovoid, globose or hemispheric, equalling or shorter than the flowers; bracts in many series, the inner longest. Receptacle naked or pitted, sometimes shortly hairy. Corollas all equal, regular tubular, slender; lobes 5, narrow. Anther-bases obtuse. Style-arms subulate, hairy. Pappus usually 2-seriate of many hairs, often girt with a row of outer short hairs or flattened bristles. Achenes striate, ribbed or angled, rarely terete.—DISTRIB. Chiefly tropical, mostly American; species about 280.

Achenes pubescent or silky.	
Achenes not ribbed.	
Herbaceous; achenes 1/10 in. long, appressedly pubescent	1. *V. cinerea.*
Shrubby; achenes 1/10 in. long, densely silky	2. *V. cinerascens.*
Achenes ribbed, 1/8—¼ in. long, pubescent	3. V. *anthelmintica.*
Achenes glabrous or glandular between the ribs, not pubescent nor silky.	
Leaves thin, membranous, scabrid or pubescent (not tomentose) beneath	4. *V. divergens.*
Leaves thick, coriaceous, densely woolly-tomentose beneath	5. *V. indica.*

1. **Vernonia cinerea,** *Less. in Linnæa*, v. 4 (1829) p. 291. Annual, erect, 6—30 in. high; stem stiff, cylindric, striate, more or less pubescent, slightly branched. Leaves petioled, 1—2 by ⅜—1½ in. (the upper leaves the smallest), variable in shape, broadly-elliptic or lanceolate, obtuse or acute, shortly mucronate, more or less pubescent on both sides, irregularly toothed or shallowly crenate-serrate; petioles variable, ¼—½ in. long. Heads small, about 20-flowered, ¼ in. in diam., in lax divaricate terminal corymbs, with a minute linear bract beneath each head of flowers and with small bracts in the forks of the peduncles; flowers pinkish-violet. Invol.-bracts linear-lanceolate, awned, silky on the back. Pappus white, the exterior row short, about 1/30 in. long. Achenes 1/10 in. long, oblong, terete (not ribbed), slightly narrowed at the base, clothed with appressed white hairs. Fl. B. I. v. 3, p. 233; Grah. Cat. p. 96; Dalz. & Gibs. p. 121; C. B.

Clarke, Comp. Ind. p. 20; Trim. Fl. Ceyl. v. 3, p. 7; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647; Watt, Dict. Econ. Prod. v. 6, part 4, p. 231.—Flowers: Jan.—Feb. VERN. *Sahadevi.*

KONKAN: *Stocks*!, *Lambert*!; Matheran, *Cooke*! DECCAN: Poona, *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 1091! KANARA: *Thomson*!; Kála naddi, *Ritchie*, 1091! SIND: Táta district, *Bhola Puran*!—DISTRIB. Throughout India; Tropical Asia, Africa, and Australia.

A common weed throughout the Presidency. Growing as it does in various situations and under varying conditions of moisture and soil, the plant is naturally a somewhat variable one.

2. **Vernonia cinerascens,** *Schultz-Bip in Schweinf. Fl. Aethiop.* (1867) p. 162. Shrubby, 1—3 ft. high, clothed with ashy pubescence; stems branched, terete, ashy-pubescent, rather slender, grooved. Leaves sessile, ¾—2 by $\frac{3}{16}$—⅜ in., oblong-spathulate, rounded or obtuse at the apex, apiculate, ashy-pubescent on both sides, entire or with a few teeth. Heads ¼ in. in diam., shortly stalked, or the uppermost sessile or nearly so on the branches of a corymbose panicle. Involbracts linear-oblong, obtuse or subacute, sometimes apiculate, pubescent, usually tinged with purple, the outer much the smallest. Corollas purple, glabrous. Pappus shorter than the corolla, about ⅛ in. long, white when mature, persistent; hairs of the outer row numerous, rigid. Achenes $\frac{1}{16}$ in. long, densely silky, slightly tapering at the base. Fl. B. I. v. 3, p. 237; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647; Oliver, Fl. Trop. Afr. v. 3, p. 275.—Flowers: Oct. —Dec.

SIND: *Dalzell*, 45!, *Bhola Puran*!; Karachi, *Woodrow*; Jemadar ka Landa, near Karachi, *Stocks*!—DISTRIB. India (Panjáb, Peshwar, Salt Range, Wazaristan); Beluchistan, Tropical Africa.

3. **Vernonia anthelmintica,** *Willd. Sp. Pl.* v. 3 (1800) p. 1634. Annual, robust, erect, leafy; stems 2—3 ft. high, branched, pubescent. Leaves 2—3½ by 1—1¼ in., lanceolate or elliptic-lanceolate, acute, coarsely serrate, more or less pubescent on both sides, base tapering into the petiole. Heads ½—¾ in. in diam., subcorymbose, many- (about 40-) flowered, with a linear bract near the top of the peduncle. Outer invol.-bracts linear, hairy, herbaceous, shorter than those of the inner rows; intermediate bracts with herbaceous hairy tips, linear, acute or subobtuse, ofter constricted at the base of the herbaceous part, equalling or shorter (rarely longer) than the innermost; innermost bracts usually the longest, linear, subacute, scarious, often tipped with purple. Pappus reddish, the exterior row very short, subpaleaceous, persistent, the inner hairs somewhat flattened, deciduous, much shorter than the glabrous corollas. Achenes $\frac{3}{16}$—¼ in. long, oblong-cylindric, 10-ribbed, pubescent. Fl. B. I. v. 3, p. 236; Grah. Cat. p. 96; Dalz. & Gibs. p. 313; C. B. Clarke, Comp. Ind. p. 10; Trim. Fl. Ceyl. v. 3, p. 9; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647; Watt, Dict. Econ. Prod. v. 6, part 4, p. 229.—Flowers: Dec.—Feb. VERN. *Kadu-kárlá*; *Kadu-jire.*

Common in the black soil of the Deccan. DECCAN: Poona, *Cooke*!, *Woodrow*! S. M. COUNTRY: Dharwar, *Ritchie*, 1806! KANARA: Yellur, *Ritchie*, 1806!—DISTRIB. Throughout India, often cultivated; Ceylon.

The achenes are largely used in native medicine. The plant roasted in a room or powdered and thrown about the room is supposed to expel fleas; hence it is known as the *Purple Flea-Bane*. See Watt, Dict. Econ. Prod. l. c.

4. **Vernonia divergens,** *Edgew. in Journ. As. Soc. Beng.* v. 21 (1853) p. 172 (incorrectly printed *Vemonia*). Shrubby, perennial, 4—6 or sometimes 8 ft. high ; branches diverging, pubescent. Leaves 2—6 by 1—3 in., elliptic, acute, serrate, scabrid above, pubescent or tomentose beneath, base tapering ; main nerves very prominent on the lower side, with reticulate veins between ; petioles $\frac{1}{8}$—$\frac{3}{8}$ in. long. Flowers purple, usually in dense much-branched rounded corymbs. Heads small, 8—12-flowered, usually clustered at the apices of the ultimate branches. Invol.-bracts few, in few series with greenish tips, oblong-obtuse (rarely subacute), sometimes apiculate, the outer ovate, smaller than the inner, all nearly glabrous or pubescent or sometimes clothed with white wool. Corolla glabrous. Pappus reddish or dirty-white, the outer ring of hairs consisting of very few, soon deciduous. Achenes $\frac{1}{8}$ in. long, strongly 10-ribbed, glabrous or glandular between the ribs (not pilose), truncate at the apex, tapering towards the base. Fl. B. I. v. 3, p. 234 ; C. B. Clarke, Comp. Ind. p. 14 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Eupatorium divergens*, Dalz. & Gibs. p. 123.—Flowers : Dec.—Feb. VERN. *Bundar.*

KONKAN : *Stocks* !, *Law* ! ; Matheran, *H. M. Birdwood.* DECCAN : Khandala, *Cooke* ! ; Párghát, *Graham* ; Mahableshwar, *H. M. Birdwood.* S. M. COUNTRY : hills east of Belgaum, *Ritchie*, 1800 ! KANARA : *Stocks* !, *Mrs. Ward* ! ; Kála naddi, *Ritchie*, 1800 ! ; Sirsi, *Woodrow*. GUJARAT : Dangs, *Woodrow*, 16 !—DISTRIB. India (Behar, Central India, W. Peninsula, Rangoon, Birma).

Some of the Bombay specimens have densely woolly invol.-bracts, but I find the character insufficiently constant to make a good variety. I have seen both woolly and glabrous bracts on the same specimen.

5. **Vernonia indica,** *C. B. Clarke, Comp. Ind.* (1876) p. 16. An undershrub 3—6 ft. high ; stem erect, not much branched, the stem, branches, underside of leaves, and inflorescence densely clothed with soft woolly whitish tomentum. Leaves 4—6 by $1\frac{1}{2}$—$3\frac{1}{4}$ in. (the upper smaller), subsessile, elliptic-oblong, acute, sharply serrate, scaberulous above, densely clothed with white tomentum beneath ; main nerves 8—10 pairs, prominent beneath ; petioles 0 or sometimes $\frac{1}{4}$ in. long, broad at the base. Heads $\frac{1}{4}$ in. in diam., 8—12-flowered, crowded at the ends of the stout branches of corymbose panicles, with linear-lanceolate tomentose bracts beneath the branches of the panicle. Invol.-bracts elliptic-oblong, obtuse, purple-tipped, mucronate with a short black point, densely tomentose on the back, the outer the smallest. Corollas glabrous, reddish-purple. Achenes 10-ribbed, glabrous, $\frac{1}{12}$—$\frac{1}{10}$ in. long, Pappus yellowish, as long as the corolla ; hairs of the outer row short, very deciduous, apparently 0 when the flowers are mature. Fl. B. I. v. 3, p. 238 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Decaneurum dendigulense*, DC. in Wight, Contrib. (1834) p. 7 ; Prodr. v. 5, p. 67.—Flowers : Oct.

DECCAN : Panchgani, *Woodrow* ! ; Mahableshwar, *Cooke* ! ; Máwal districts, *Woodrow*. S. M. COUNTRY : sandstone low open hills east of Belgaum, *Ritchie*, 369 ! KANARA : *Stocks* !—DISTRIB. India (hills of the W. Peninsula).

Vernonia arborea, Ham. in Trans. Linn. Soc. v. 14 (1825) p. 218. *A tree reaching 40 ft. high; branches* tomentose. Leaves 5—8 by 2—3 *in., densely woolly beneath. Flowers pale-violet or white.* Fl. B. I. v. 3, p. 239; Grah. Cat. p. 96; Trim. Fl. Ceyl. v. 3, p. 11; Talb. Trees Bomb. ed. 2, p. 200.

Occasionally grown in gardens, having been introduced probably from Bengal. It has not been found wild in the Bombay Presidency.

5. ELEPHANTOPUS, Linn.

Rigid usually perennial herbs. Leaves alternate. Flowers in homogamous heads of 2—5 flowers, collected into a head-like-cluster. Involucre oblong, compressed; bracts about 8 in 2 rows, the outer the shorter. Receptacle small, naked. Corollas equal, subregular or most commonly subpalmately spreading from the inner side, being deeply cleft; lobes 5, narrow. Anthers sagittate at the base, with obtuse auricles. Style-arms subulate, minutely hairy. Achenes truncate at the apex, 10-ribbed. Pappus-bristles 1—2-seriate, rigid, shining, slender and dilated below or chaff-like.—DISTRIB. Chiefly Tropical American; species 10—12.

1. **Elephantopus scaber,** *Linn. Sp. Pl.* (1753) p. 814. Erect, 6—15 in. high; rootstock short, giving off many stout fibrous roots; stem usually dichotomously branched, strigose, with appressed white hairs. Leaves mostly radical, 5—8 by 1½—2½ in., forming a spreading rosette on the ground, obovate-oblong, rounded or subacute, coarsely serrate-dentate, more or less hairy on both surfaces, base tapering into an obscure petiole; main nerves numerous, prominent beneath, with reticulate veins between; cauline leaves smaller than the radical, sessile or nearly so. Heads numerous, sessile, closely packed, forming a large flat-topped terminal inflorescence nearly 1 in. across and surrounded at the base by 3 large stiff broadly-ovate cordate conduplicate conspicuously-nerved leafy bracts. Invol.-bracts in 2 series enclosing 4 flowers; bracts of the outer row half as long as those of the inner, 1-nerved; bracts of the inner row usually 3- (rarely 5-) nerved, scarious, linear, cuspidate. Corolla violet, exserted; tube long, slender; limb deeply cleft on one side, causing the 5 linear lobes to present a palmate appearance. Style much exserted, the arms recurved. Pappus white, 1-seriate, consisting of 5 (rarely 4) rigid bristles dilated at the base. Achenes ⅛ in. long, truncate, finely 10-ribbed, slightly pubescent. The embryo sometimes germinates in the head (*C. B. Clarke*). Fl. B. I. v. 3, p. 242; Grah. Cat. p. 96; Wight, Icon. t. 1086; Dalz. & Gibs. p. 122; Clarke, Comp. Ind. p. 28; Trim. Fl. Ceyl. v. 3, p. 12; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647; Watt, Dict. Econ. Prodr. v. 3, p. 208.—Flowers: Sept.—Nov. VERN. *Hastipata.*

Common under the shade of trees in the Konkan and on the Ghâts. KONKAN: Mahim woods near Bombay, *Graham*; Parel and Malabar hill, *Graham*; Matheran, *H. M. Birdwood, Woodrow*! DECCAN: Lanoli, *Cooke*!; Koina valley, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 1097!; Londa, *Cooke*! GUJARAT: Bulsad, *Kanitkar*!—DISTRIB. Throughout India; Tropical Asia, Australia, and America.

6. ADENOSTEMMA, Forst.

Annual glabrous or glandular-pubescent herbs. Leaves usually opposite. Heads homogamous, paniculate or corymbose. Involucre campanulate ; bracts many, equal, in 2 rows, herbaceous, sometimes connate. Receptacle flat, pitted. Corollas all tubular, regular ; tube short ; limb 5-toothed. Anthers truncate, with a glandular tip, base obtuse. Style-arms large and long, clavate. Pappus-hairs 3—5, short, rigid, often clavate, inserted on a short ring. Achenes compressed, truncate, 5-angled, usually glandular.—DISTRIB. 5 or 6 American species ; 1 species cosmopolitan.

1. **Adenostemma viscosum,** *Forst. Char. Gen.* (1776) p. 90. An erect (rarely decumbent) branched annual 1—3 ft. high, glabrous below, glandular-pubescent above ; stems tinged with purple. Leaves very variable, the lower opposite, the upper often alternate, 3—7 in. long, from oblong or oblong-lanceolate to broadly ovate, subacute, coarsely serrate-dentate, usually cuneate and then narrowed into a long tapering base ; petioles obscure. Heads few or many, in lax or dense panicles, with linear bracts at the forks. Involucre hemispheric ; bracts linear-oblong, obtuse or subacute, glabrous, glandular or scabrid. Corolla-tube short, glandular-hairy and viscous outside ; lobes 5, small, acute. Style-arms twice as long as the corolla, much exserted. Achenes ⅛—¼ in. long, 5-angled, obtuse, compressed, glabrous or glandular-scabrid, blackish-brown, crowned with a narrow ring from which issue 4 or 5 glandular setæ (*pappus*). Fl. B. I. v. 3, p. 242 ; Grah. Cat. p. 98 ; C. B. Clarke, Comp. Ind. p. 28 ; Trim. Fl. Ceyl. v. 3, p. 13 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Adenostemma latifolium,* Don, Prodr. Nep. p. 181 ; Wight, Icon. t. 1087 ; Dalz. & Gibs. p. 122. *A. rivale,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 231 ; Dalz. & Gibs. p. 122.—Flowers : Sept.—Feb.

The leaves vary much with soil and situation, the variation being very marked when the plants grow near water. Mr. C. B. Clarke (*l. c.*) mentions a number of varieties, most of which were formerly classed as species, but says that he cannot separate any of them by good characters. Trimen, Fl. Ceyl. (*l. c.*), is of opinion that the numerous species proposed are not worth distinction even as varieties.

KONKAN : *Law* ! ; margins of rivulets near Rohe, *Dalzell & Gibson.* DECCAN : common at Mahableshwar in shady woods, *Cooke* ! S. M. COUNTRY : Castlerock, *Bhiva* ! KANARA : marshy ground near Jagalbet (N. Kanara), *Ritchie,* 1807 !—DISTRIB. Throughout India ; Ceylon.

7. AGERATUM, Linn.

Erect herbs or undershrubs. Leaves opposite or the upper alternate. Heads homogamous, in dense corymbs or lax panicles ; flowers blue, purple or white. Involucre campanulate ; bracts 2—3-seriate, linear, subequal. Receptacle flat, or nearly so, naked or with caducous scales between the flowers. Corollas all tubular, regular, the tube scarcely distinct from the shortly 5-fid limb. Anthers appendiculate at the apex, obtuse at the base. Style-arms elongate, obtuse.

Pappus of 5 short free or connate scales or of 10—20 narrow unequal scales. Achenes 5-angled.—DISTRIB. All probably American, but 1 species widely distributed throughout the Tropics ; species about 16.

1. **Ageratum conyzoides,** *Linn. Sp. Pl.* (1753) p. 839. Annual, 1—3 ft. high ; stem erect, branched, terete, more or less hairy. Leaves opposite or the upper alternate, 2—3 by 1—2 in., broadly ovate, subacute, crenate and with ciliate margins, more or less hairy on both sides, base cuneate ; petioles 1—1½ in. long, hairy. Heads small, in dense terminal corymbs ; flowers pale-blue or white, malodorous. Invol.-bracts linear, very acute, ribbed on the back, ciliolate and with scarious margins. Pappus of 5 scales, aristate, dilated at the base, serrulate, about equalling the corolla. Achenes $\frac{1}{12}$—$\frac{1}{10}$ in. long, sharply angled, sometimes glandular, attenuated at the base, black. Fl. B. I. v. 3, p. 243 ; Grah. Cat. p. 98 ; C. B. Clarke, Comp. Ind. p. 30 ; Trim. Fl. Ceyl. v. 3, p. 13 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647.—Flowers : Nov.—Mar. VERN. *Osádi* ; *Sahadevi.*

Naturalized in the Bombay Presidency, where it is common in the Deccan. It is abundant in Ceylon, where it has become a very troublesome weed, and is known among the planters as *Goat-Weed* from its peculiar odor. DECCAN : Poona, *Woodrow* !, *Cooke* ! ; Kirki, *J. Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie*, 393 !—DISTRIB. Throughout India : all hot countries.

8. DICHROCEPHALA, DC.

Annual branched glabrous or pubescent herbs. Leaves alternate, toothed, lyrate, or pinnatifid. Heads small, panicled, heterogamous, globose or hemispheric ; outer flowers ♀, slender, ∞ -seriate, fertile ; disk-flowers ☿, fertile. Involucre small ; bracts sub-2-seriate, slightly unequal and with dry margins. Receptacle slightly contracted within the margin, elevated, the top flat, naked. Corollas of the ♀ flowers slender, rigid, minutely 2—3-toothed, or expanded into a 3—4-fid limb ; corollas of ☿ flowers regular, tubular, with a narrowly campanulate 4—5-toothed limb. Anther-bases truncate. Style-arms of ☿ flowers short, flattened, tips lanceolate. Pappus 0 or in ☿ flowers rarely of 2 or 3 minute bristles. Achenes compressed, with a thickened margin.—DISTRIB. Asia and Africa ; species 5.

1. **Dichrocephala latifolia,** *DC. in Wight, Contrib.* (1834) p. 11. An annual weed 6 in. to 2 ft. high ; stem usually divaricately branched, pubescent. Leaves very variable, 2—3 by 1—1½ in., alternate, obovate or broadly ovate, subacute, often pinnatifid with a large ovate terminal lobe and 1 or 2 pairs of small lateral ones, all coarsely crenate-serrate, sparsely hairy on both sides ; nerves prominent beneath ; petioles ¼—⅝ in. long, hairy. Heads ⅛—¼ in. in diam., few, globose, panicled ; pedicels long, each often with a linear acute bract above or below the middle. Invol.-bracts minute, linear, with scarious margins. Corollas of inner or disk-flowers yellow, 4- (less commonly 5-) toothed ; those of the outer flowers filiform, curved, pink or purplish, usually obscurely 2-toothed. Pappus of ♀ flowers 0, of ☿ flowers of 2 or 3 bristles. Achenes $\frac{1}{20}$—$\frac{1}{16}$ in. long, compressed, smooth. Fl. B. I. v. 3, p. 245 ; Dalz. & Gibs. p. 124 ;

Wight, Icon. t. 1096 ; C. B. Clarke, Comp. Ind. p. 36 ; Trim. Fl. Ceyl. v. 3, p. 14 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647.—Flowers : Aug.—Oct.

DECCAN : Máwal, *Woodrow* ! ; Mahableshwar, *Cooke* ! ; Panchgani, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Rámghát, *Dalzell & Gibson, Stocks* ! ; Belgaum, *Ritchie*, 389 !—DISTRIB. India (N.W. Himalayas, Sikkim, Khasia, Cachar, Birma, W. Peninsula) ; Ceylon, Malaya, Persia, China, Africa.

9. CYATHOCLINE, Cass.

Erect annual branched herbs. Leaves alternate, pinnatisect. Heads small, heterogamous, in small panicles at the apices of the branches. Outer flowers ♀, fertile, ∞-seriate ; inner or disk-flowers ☿, usually sterile, regular, 5-cleft. Involucre hemispheric ; bracts sub-2-seriate, lanceolate, acute, with scarious margins, slightly unequal. Receptacle with a contracted base, elevated, top concave, naked. Corollas of ♀ flowers filiform, usually 2-toothed. Corollas of ☿ flowers regular, tubular, the limb narrowly campanulate, 5-fid. Anther-bases truncate. Style exserted, that of the ☿ flowers simple or cleft. Pappus 0. Achenes very small, oblong, smooth.—DISTRIB. East Indies ; species 2.

1—2 ft. high ; flowers purple	1. *C. lyrata.*
4—9 in. high ; flowers yellow	2. *C. lutea.*

1. **Cyathocline lyrata,** *Cass. in Ann. Sc. Nat.* sér. 1, v. 17 (1829) p. 420. A slender delicate erect herb 1—2 ft. high ; stems branched, grooved, more or less pubescent. Leaves sessile, 1—5 in. long, pinnatifid, the segments toothed, more or less pubescent. Flowers both of ray and disk rose-purple, in heads ⅛ in. in diam., arranged in small rounded corymbose panicles. Invol.-bracts linear, acute, ½—⅒ in. long, with scarious and densely ciliate margins. Corollas of ☿ flowers with 5 short ciliate teeth. Pappus 0. Achenes minute, oblong, smooth. Fl. B. I. v. 3, p. 246 ; Wight, Icon. t. 1098 ; C. B. Clarke, Comp. Ind. p. 37 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647. *Cyathocline Lawii,* Wight, in Calc. Journ. Nat. Hist. v. 7 (1847) p. 159 (*not* of Dalz. & Gibs.). *C. stricta,* DC. Prodr. v. 5 (1836) p. 374 ; Dalz. & Gibs. p. 124.—Flowers : Nov.—Mar.

Usually met with on the banks of streams and in moist localities. KONKAN : *Law* !, *Stocks* ! ; Banda *Ritchie*, 386 ! ; banks of streams, *Dalzell & Gibson*. DECCAN : Mahableshwar, *Cooke* ! ; river bank, Kirkee, *J. G. Woodrow* ! ; river bank, Poona, *Cooke* ! ; Sholapur, bank of Ekruk tank, *G. M. Woodrow* ! ; Máwal taluka, *G. M. Woodrow*. S. M. COUNTRY : Dharwar, *Cooke* ! KANARA : Kála naddi, *Ritchie*, [illegible] !—DISTRIB. India (N. W. Himalayas, Oude, Behar, Central India, Chota Nagpur, Assam, Chittagong, Rangoon, Birma, W. Peninsula).

2. **Cyathocline lutea,** *Law ex Wight, in Calc. Journ. Nat. Hist.* v. 7 (1847) p. 158. A small herb 4—9 in. high ; stem scape-like, very slender. Leaves sessile, glandular, ¾—1½ by ⅒—⅛ in., bipinnatifid, mostly radical, forming a stellately spreading rosette ; cauline leaves few, alternate. Heads ⅛—¼ in. in diam., few, in branched corymbose panicles ; flowers bright yellow. Invol.-bracts ⅒ in. long, linear-oblong, subobtuse, hairy on the back. Pappus 0. Achenes about ⅒ in. long, smooth. Fl. B. I. v. 3, p. 246 ; Wight, Icon. t. 1150.

Cyathocline flava, C. B. Clarke, Comp. Ind. p. 37. *C. Lawii*, Dalz. & Gibs. Bo. Fl. p. 124 (*not* of Wight).—Flowers: Oct.—Jan.

KONKAN: *Law*! DECCAN: Máwal, *Woodrow*; Karli in rice-fields, *Woodrow*!; Lanoli, very abundant in a marshy place near the roadside, *Cooke*!—DISTRIB. Apparently endemic.

10. **GRANGEA**, Adans.

Prostrate or suberect villous herbs. Leaves alternate, pinnatifid. Heads subglobose, terminal or leaf-opposed, shortly peduncled, heterogamous; outer flowers ♀, fertile, 1—∞-seriate; those of the disk ☿, fertile. Involucre broadly campanulate; bracts few-seriate, slightly unequal, the exterior herbaceous. Receptacle convex or conical, naked. Corollas of ♀ flowers filiform, shorter than the styles, the exterior 2-fid at the apex, the interior sometimes 3—4-fid; corollas of ☿ flowers regular, with a slender tube and a campanulate limb 4—5-fid at the apex. Anther-bases obtuse. Style-arms of ☿ flowers flattened, cuneate, obtuse or with triangular points. Pappus a short tube with fimbriate mouth. Achenes somewhat compressed or subterete, produced at the apex into a cartilaginous ring.—DISTRIB. Tropical Asia and Africa; species 3 or 4.

1. **Grangea maderaspatana**, *Poir. Encyc. Méthod. Suppl.* v. 2 (1811) p. 825. Annual; stems many, prostrate, spreading from the centre, 4—12 in. long, hairy with soft white hairs. Leaves numerous, sessile, 1—2½ in. long, sinuately pinnatifid with 2—4 pairs of opposite or subopposite lobes smaller towards the base, the terminal lobe the largest, all coarsely serrate-dentate, pubescent on both surfaces. Heads globose, ¼—⅓ in. in diam., solitary or 2-nate, on short leaf-opposed peduncles; flowers yellow. Involucre-bracts elliptic, obtuse, rigid, densely pubescent. Pappus a short tube with fimbriate mouth. Achenes glandular, 1/16 in. long including the pappus-tube. Fl. B. I. v. 3, p. 247; Dalz. & Gibs. p. 124; Wight, Icon. t. 1097; Aitch. Pb. & Sind Pl. p. 73; C. B. Clarke, Comp. Ind. p. 37; Trim. Fl. Ceyl. v. 3, p. 14; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647; Watt, Dict. Econ. Prod. v. 4, p. 175.—Flowers: Dec.—May.

KONKAN: Bombay, *Law*!; rice-fields, *Kanitkar*!; Panvel, *Kanitkar*! S. M. COUNTRY: Dharwar, *Bhiva*!; Belgaum, *Ritchie*, 412! KANARA: Kála naddi, *Ritchie*, 412! SIND: *Stocks*; Sukkur, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Tropical and Subtropical Asia and Africa.

11. **ERIGERON**, Linn.

Perennial or annual herbs. Leaves alternate. Heads of flowers solitary or variously corymbose or panicled, heterogamous; ray-flowers ♀, usually 2—many-seriate, fertile; disk-flowers ☿, fertile (rarely sterile). Involucre hemispheric or campanulate; bracts sub-2-seriate, narrow, usually numerous, slightly unequal. Receptacle flat or scarcely convex, naked or rarely foveolate. Corollas of the ♀ flowers violet-purple or white, the exterior narrowly ligulate, the interior sometimes tubular, filiform, scarcely dentate; corollas of ☿ flowers yellow, regular, tubular, the limb slightly enlarged, with 5 (rarely 4) short teeth. Anther-bases obtuse. Style-arms of ☿ flowers

more or less flattened, the tips lanceolate. Pappus 1-seriate, of many long hairs, or sometimes 2-seriate, the outer row of a few short hairs or bristles. Achenes compressed, often narrow, the margins usually nerviform, the faces without nerves or with 1—2 nerves.—DISTRIB. Chiefly in the temperate regions of the world ; species about 100.

1. **Erigeron asteroides,** *Roxb. Fl. Ind.* v. 3 (1832) p. 432. A coarse annual 1—2 ft. high ; stem much-branched, clothed with spreading hairs. Leaves sessile (or the radical shortly petiolate), 1—2 in. long, oblong or obovate-oblong, those of the stem auriculate, ½-amplexicaul, obtuse, all toothed or lobulate, hairy on both sides. Heads ¼—½ in. in diam., few, on long peduncles. Involucre-bracts 1—2-seriate, subequal, very narrow, much shorter than the pappus, bristle-pointed and with scarious margins. Ray of 1—2 rows of ligulate bluish-violet spreading flowers, longer than the involucre-bracts, then several rows of filiform ♀ flowers appearing white in the fresh plant (*C. B. Clarke*); disk composed of yellow ☿ perfect flowers with tailless anthers. Pappus pinkish-white. Achenes much flattened, ellipsoid or slightly obovoid, $\frac{1}{30}$ in. long, glabrous or nearly so, yellowish. Fl. B. I. v. 3, p. 254 ; Trim. Fl. Ceyl. v. 3, p. 16 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 647 ; Watt, Dict. Econ. Prod. v. 3, p. 256. *Erigeron hispidum,* DC. in Wight, Contrib. (1834) p. 9 ; C. B. Clarke, Comp. Ind. p. 54.—Flowers : Sept.—Nov. VERN. *Sonasali* ; *Maredi.*

KONKAN : *Stocks* ! DECCAN : Nasik, *Dalzell* ! ; Ahmednagar, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie,* 394 !—DISTRIB. Throughout India ; Ceylon.

12. CONYZA, Less.

Annual or perennial herbs. Leaves alternate, entire, toothed or cut. Heads corymbose or panicled (rarely solitary), heterogamous, discoid. Outer flowers ♀, fertile, 2—∞ -seriate, filiform (rarely ligulate), yellow ; disk-flowers ☿ , all or most of them fertile, yellow, tubular, the limb 5-toothed. Involucre campanulate ; bracts 2— ∞ -seriate, imbricate, lanceolate or linear, sometimes very narrow, the outer smaller. Receptacle flat or somewhat convex, naked, or pitted and fimbriate. Anther-bases obtuse, entire. Style-arms of ☿ flowers flattened, usually narrow, with lanceolate tips. Pappus 1- (rarely 2-) seriate. Achenes small, compressed.—DISTRIB. Tropical and subtropical regions ; species 50.

1. **Conyza stricta,** *Willd. Sp. Pl.* v. 3 (1800) p. 1922. Herbaceous, 1—2½ ft. high ; stem erect, leafy, pubescent, often simple in the lower part, corymbosely branched near the apex, sometimes, though less commonly, branched from the base. Leaves numerous, subsessile, various, obovate, cuneate, spathulate or linear, irregularly toothed, hairy. Heads small, ⅛ in. in diam., very numerous, in dense terminal corymbs ; flowers yellow ; peduncles hairy, bracts below the heads and at the forks linear, acute, aristate. Involucre-bracts narrowly lanceolate, aristate, sub-2-seriate, subequal, pubescent on the back. Pappus 1-seriate, at length reddish (*C. B. Clarke*). Achenes ovoid-oblong, compressed, $\frac{1}{16}$ in. long, with a few microscopical hairs

or sometimes microscopically papillose. Fl. B. I. v. 3, p. 258; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Conyza absinthifolia*, DC. in Wight, Contrib. (1834) p. 16; Grah. Cat. p. 97; Dalz. & Gibs. p. 124; C. B. Clarke, Comp. Ind. p. 64. *Conyza adenocarpa*, Dalz. in Dalz. & Gibs. Bo. Fl. p. 125.—Flowers: Oct.—Nov.

KONKAN: *Law*!, *Stocks*!, *Lambert*! DECCAN: Sinhagad hill, *Gangaram*!; Mahableshwar, *Cooke*!; Wada, below Mahableshwar, *Kanitkar*! S. M. COUNTRY: near Belgaum, *Law* ex *Graham*; Belgaum hills, *Ritchie*, 404!

I am unable by any distinctive characters to separate *Conyza adenocarpa*, Dalz., from the above. There is only 1 sheet of this plant in Herb. Kew., the specimens on which were apparently collected by Dalzell himself. It does not appear to have been found by any other collector, and Woodrow does not include it in his list of Bombay plants. I cannot find that the achenes are covered with waxy glands, as described by Dalzell and Gibson.

13. **BLUMEA**, DC.

Annual or perennial, glandular, pubescent or woolly herbs. Leaves alternate, usually toothed or lobed, sessile or petiolate, rarely decurrent. Heads of moderate size, solitary, panicled or fascicled, rarely racemose, heterogamous, disciform, purple, rosy or yellow. Outer flowers ∞-seriate, ♀, fertile; disk-flowers ☿, few, fertile (rarely sterile). Involucre ovoid or campanulate; bracts ∞-seriate, imbricate, narrow, acute, herbaceous or soft, the outer gradually smaller. Receptacle flat, naked. Corollas of ♀ flowers filiform, minutely 2—3-toothed, those of the ☿ flowers regular, tubular, slender, with a slightly enlarged 5-toothed limb. Anther-bases sagittate; tails usually slender. Style-arms of the ☿ flowers flattened or almost filiform, somewhat acute, papillose on the back, rarely connate so as to form one undivided style. Pappus slender, 1-seriate, usually caducous. Achenes small, subterete or angled, often ribbed, glabrous or pilose.—DISTRIB. Tropical and subtropical Asia, Africa, and Australia; species about 60.

Herbs. Leaves not reaching 6 in. long.
- Heads few, solitary, peduncled at the ends of the branches.
  - Invol.-bracts tipped with a long white bristle; pappus pink ..... 1. *B. amplectens.*
  - Invol.-bracts not tipped with a long bristle; pappus white ..... 2. *B. bifoliata.*
- Heads many, villous, small, in spiciform cymes or panicles.
  - Corollas purple ..... 3. *B. Wightiana.*
  - Corollas yellow.
    - Receptacle pubescent; achenes ribbed..... 4. *B. glomerata.*
    - Receptacle glabrous; achenes not ribbed (the plants smell strongly of turpentine)..... 5. *B. lacera.*
- Heads many, small, in peduncled open corymbs. Tall slender herbs.
  - Quite glabrous ..... 6. *B. virens.*
  - Pubescent ..... 7. *B. membranacea.*
- Heads few, ¼—½ in. in diam., in axillary and terminal corymbs, often clustered.
  - Prostrate herb with branches radiating from the root ..... 8. *B. oxoydonta.*
  - Erect herb; heads ¼—½ in., in peduncled cymes... 9. *B. eriantha.*

Erect herb; heads ¼ in., axillary, sessile, solitary or clustered ..... 10. *B. Belangeriana.*
Heads ½—¾ in. in diam.
Leaves thick, obovate, densely woolly; receptacle glabrous ..... 11. *B. Malcolmii.*
Leaves membranous, lanceolate-oblong, pubescent or glabrous; receptacle pubescent..... 12. *B. malabarica.*
A shrub 4—6 ft. high; leaves 6—10 in. long..... 13. *B. spectabilis.*

1. **Blumea amplectens,** *DC. in Wight, Contrib.* (1834) p. 13. Annual, 10—15 in. high (except the var. *maritima* which is much higher); stems terete, divaricately branched, more or less hairy. Leaves ¾—2 by ¼—⅝ in., sessile, elliptic-oblong, acute, the young leaves villous, the older nearly glabrous, auricled at the base, ½-amplexicaul, regularly and sharply toothed, the upper teeth the smaller. Heads small, ¼—⅓ in. in diam., solitary, few, terminal; flowers yellow; peduncles hairy, often longer than the leaves. Corolla-lobes of ♀ flowers hairy. Invol.-bracts linear-subulate, densely pubescent, the inner row tipped with a long white bristle. Receptacle glabrous. Pappus pink. Achenes minute, about $\frac{1}{10}$ in. long, oblong, compressed, microscopically hairy. Fl. B. I. v. 3, p. 260; Dalz. & Gibs. p. 125; C. B. Clarke, Comp. Ind. p. 71; Trim. Fl. Ceyl. v. 3, p. 19; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers: Dec. VERN. *Burambi.*

KONKAN: Bombay, *Woodrow.* GUJARAT: Vankanea (Kathiawar), *Cooke!*—DISTRIB. More or less throughout India; Ceylon.

VAR. 1. *tenella,* Hook. f. Fl. B. I. v. 3, p. 260 (not *Blumea tenella* of DC.). Nearly glabrous. Scarcely separable as a variety.

KONKAN: *Law!* DECCAN: Khandala, *Stocks!* GUJARAT: Surat, *Dalzell!*

VAR. 2. *maritima,* Hook. f. Fl. B. I. v. 3, p. 260. A dense bush 3—5 ft. high, glabrous, glandular. Leaves small. Heads large.

A littoral species. SIND: *Stocks,* 554!

2. **Blumea bifoliata,** *DC. in Wight, Contrib.* (1834) p. 14. Stem terete, branched from the base, erect or decumbent, more or less hairy. Leaves 1—3 by ½—1¼ in., elliptic or oblong, acute, sessile, slightly serrate, pubescent or pilose on both sides, the uppermost pair of leaves subopposite. Heads ¼—⅓ in. in diam., solitary; flowers yellow; peduncles rather long. Corolla-lobes of ♀ flowers hairy. Invol.-bracts hairy, linear, acute, the interior not caudate. Receptacle glabrous. Pappus white. Achenes narrowly oblong, with 4—5 slightly hairy angles. Fl. B. I. v. 3, p. 261; Dalz. & Gibs. p. 125; C. B. Clarke, Comp. Ind. p. 72; Trim. Fl. Ceyl. v. 3, p. 19.—Flowers: Dec.—Feb.

DECCAN: *Woodrow.* S. M. COUNTRY: Belgaum (north), *Ritchie,* 1815! GUJARAT: Surat, *Dalzell & Gibson.*—DISTRIB. India (Bengal, Birma, W. Peninsula); Ceylon, Malay Peninsula.

3. **Blumea Wightiana,** *DC. in Wight, Contrib.* (1834) p. 14. Stem erect, branched, 6—30 in. high; branches terete, villous. Leaves 1¼—4 by ⅝—2 in., elliptic, elliptic-lanceolate, or obovate, the lower petioled, the upper nearly sessile, irregularly toothed or serrate. Heads ¼ in. in diam., collected into terminal spiciform dense (rarely

open) often interrupted cymes or panicles ; flowers purple. Involbracts narrowly linear, acuminate, the outer hairy. Receptacle glabrous. Anthers subincluded, caudate at the base. Corollas of ♀ flowers with glandular lobes. Pappus shorter than the involbracts. *Achenes minute, oblong, 4—5-angled, not ribbed.* Fl. B. I. v. 3, p. 261 ; C. B. Clarke, Comp. Ind. p. 74 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *B. holoserícea* ?, Dalz. & Gibs. p. 125 (*not* of DC.).—Flowers : Dec.—Jan.

Dalzell without locality in Herb. Kew.! KONKAN : Matheran, *Woodrow*. DECCAN : Poona, *Woodrow*.—DISTRIB. Throughout the plains of India.

4. **Blumea glomerata,** *DC. in Wight, Contrib.* (1834) p. 15. Pubescent or villous ; stem herbaceous, erect, 1—4 ft. high, ashy-pubescent, especially in the upper part. Lower leaves petioled, obovate, often lyrate-pinnatifid, 4—5 in. long, coarsely serrate or sometimes entire ; the upper leaves much smaller, sessile, oblong, inciso-serrate, all more or less hairy or pubescent on both sides. Heads ¼ in. in diam., in sessile fascicles along the branches often forming interrupted spikes ; flowers yellow. Corolla-lobes of ♀ flowers pubescent. Receptacle pubescent. Involbracts ashy-pubescent, the outer very small, the inner large, exceeding the flowers, very often purple. Achenes ribbed, sparingly hairy. Fl. B. I. v. 3, p. 262 ; Dalz. & Gibs. p. 125 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Blumea fasciculata,* DC. Prodr. v. 5, p. 442 ; C. B. Clarke, Comp. Ind. p. 81.—VERN. *Bhámbhurda.*

KONKAN : *Dalzell & Gibson.*

This plant is included on the authority of Dalzell & Gibson. I have seen no specimens from the Bombay Presidency. There are none in Herb. Kew., and Woodrow in his list quotes Dalzell as the authority for its occurrence in the Konkan.

5. **Blumea lacera,** *DC. in Wight, Contrib.* (1834) p. 14. Annual, with a strong odor of turpentine ; stem erect, 1—3 ft. high, ash-colored, usually densely glandular-pubescent. Leaves 1½—5 by ⅞—2½ in., the lower petioled, often incised or lyrate, the upper subsessile, elliptic-oblong or obovate, obtuse or subacute, finely silky-pubescent on both sides, sharply serrate-dentate, base much tapered. Heads ¼—⅓ in. in diam., numerous, in short axillary cymes and terminal spiciform panicles ; flowers yellow. Corolla-lobes of ♀ flowers nearly glabrous. Involbracts densely silky-villous, the outer bracts somewhat herbaceous, linear-lanceolate, the inner linear, scarious, with a green midrib. Receptacle glabrous. Pappus white. Achenes not ribbed, small, oblong, sub-4-gonous. Distinguished, when living, from *B. Wightiana* by its yellow flowers and by its odor. Fl. B. I. v. 3, p. 263 ; Grah. Cat. p. 97 ; C. B. Clarke, Comp. Ind. p. 76 ; Trim. Fl. Ceyl. v. 3, p. 19 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648 ; Watt, Dict. Econ. Prod. v. 1, p. 459. *Blumea leptocladea,* Dalz. & Gibs. p. 126 (*not* of DC.).—Flowers : Jan.—Apr. VERN. *Burando.*

KONKAN : *Stocks* !, *Nimmo* ex *Graham.* DECCAN : Poona, *Cooke* !, *G. M. Woodrow* !; Kirki, *J. G. Woodrow* !; Khandala, *Stocks* ! KANARA : *Woodrow* ; on the Kála naddi, *Ritchie,* 1816 !—DISTRIB. Throughout the plains of India; Ceylon, China, Malaya, Tropical Africa.

VAR. *glandulosa*, Hook. f. Fl. B. I. v. 3, p. 263. Whole plant more or less glandular. *B. glandulosa* (sp.), DC. in Wight, Contrib. p. 14.

S. M. COUNTRY: Rámghát, *Ritchie*, 402!

6. **Blumea virens**, *DC. in Wight, Contrib.* (1834) p. 14. Erect, slender, 1—4 ft. high, much branched, glabrous; stem grooved, glabrous. Lower leaves sometimes reaching 5—5½ in. long, petioled, obovate, or often lyrate or runcinate, irregularly or sinuate-toothed, the upper leaves much smaller, elliptic-oblong, serrate, all glabrous or nearly so. Heads ¼ in. in diam., glabrous, on capillary glabrous peduncles, in open much-branched panicles with small leaves on the ascending branches; flowers yellow. Corolla-lobes of ♀ flowers glabrous or glandular. Involucre-bracts slender, almost glabrous, the outer very much smaller than the inner, linear-lanceolate, acute, spreading, the inner bracts linear, subacute, pubescent at the tips. Anthers all fertile. Receptacle glabrous. Pappus shorter than the inner bracts. Achenes about $\frac{1}{10}$ in. long, oblong, hairy, ribbed. Fl. B. I. v. 3, p. 264; C. B. Clarke, Comp. Ind. p. 79 (*partly*); Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers: Dec.-Jan.

KONKAN: *Law*!, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, [illegible]! KANARA: *Thomson*!—DISTRIB. India (Assam, Birma, W. Peninsula).

7. **Blumea membranacea**, *DC. Prodr.* v. 5 (1836) p. 440. Annual; stems 2—4 ft. high, stout, striate, more or less glandular-pubescent. Leaves thinly membranous, the lower petioled, sometimes reaching 5½ by 1¾ in. (including the somewhat obscure petiole), obovate, or often lyrate or runcinate, acute or obtuse, coarsely and deeply serrate, finely pubescent on both sides, base running down like a wing into the petiole. Heads numerous, small, about ¼ in. in diam., on slender glandular-hairy peduncles, in much-branched open panicles. Involucre-bracts glandular-pubescent, the outer much the shorter, lanceolate, spreading, the inner linear, acute. Pappus white. Achenes ribbed.

Scarcely separable from *B. virens*, of which it seems to be a pubescent and glandular form. Fl. B. I. v. 3, p. 265; Trim. Fl. Ceyl. v. 3, p. 22; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers: May. VERN. *Mharbir*.

KONKAN: *Woodrow*. DECCAN: Khandala, *Cooke*!, *Woodrow*!; **Poona**, *Woodrow*! S. M. COUNTRY: Dharwar, *Woodrow*!—DISTRIB. Throughout India; Ceylon, Malay Islands.

VAR. *muralis*, Hook. f. Fl. B. I. v. 3, p. 265. Glandular-hairy. Leaves very tender, elliptic, ovate or lanceolate, the lower often lyrate or pinnatifid, toothed or serrulate, very membranous. Involucre-bracts rigid, pink-colored. *B. muralis* (sp.), DC. Prodr. v. 5, p. 440; Dalz. & Gibs. p. 125.

Common on old walls, *Dalzell & Gibson*. KONKAN: *Stocks*!, *Law*!; Bassein Fort, *Dalzell & Gibson*. KANARA: Kála naddi, *Ritchie*, 395!

8. **Blumea oxyodonta**, *DC. in Wight, Contrib.* (1834) p. 15. Herbaceous, prostrate or decumbent, branched from the base; branches slender, leafy, 3—10 in. long, simple or dichotomously

forked, pubescent or glabrous, the young ones often sericeo-canescent. Leaves membranous, spinous-toothed, those near the base of the stem reaching sometimes 4—5 by 1½—2½ in., obovate-oblong or elliptic-oblong, petioled, upper stem-leaves much smaller, ½—1½ by ¼—⅞ in., subsessile, obovate or elliptic, pubescent on both sides, the young ones often sericeo-villous. Heads ¼ in. in diam., solitary or corymbose, on slender peduncles; flowers yellow. Corolla-lobes of ♀ flowers glabrous. Involucral-bracts linear, acute, more or less densely pubescent. Receptacle glabrous. Achenes slightly hairy. Fl. B. I. v. 3, p. 266; C. B. Clarke, Comp. Ind. p. 85; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers: Jan.—Mar.

Mr. C. B. Clarke (*l. c.*) says that all the tailless anther-cells he has examined were destitute of pollen, and that Kurz suspected the species *oxyodonta* to be a hybrid or a polygamous form of some other species.

KONKAN: *Law!*, *Ritchie*, 399!; near Ratnagiri, *Kanitkar!*; Vingorla, *Kanitkar!* DECCAN: Lanoli, *Woodrow*. S. M. COUNTRY: Rámghát, *Ritchie*, 401! KANARA: *Thomson!*—DISTRIB. Throughout India; China, Philippines.

9. **Blumea eriantha,** *DC. in Wight, Contrib.* (1834) p. 15. Herbaceous; stem erect, terete, slender, 12—18 in. high, more or less pubescent, dichotomously branched. Leaves 1—3 by ½—1½ in., irregularly apiculately toothed, the teeth sometimes alternately long and short especially in the upper leaves, the lower leaves petioled, obovate, subobtuse, the upper sessile or nearly so, elliptic-oblong, acute, all pubescent or sometimes silky-villous. Heads ¼—⅓ in. in diam., on the long slender silky-hairy peduncles of dichotomous cymes. Corolla-lobes of ♀ flowers hairy. Receptacle glabrous. Involucral-bracts linear, clothed with long silky hairs. Achenes minute, angled, with a few hairs on the angles. Fl. B. I. v. 3, p. 266; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648; Watt, Dict. Econ. Prod. v. 1, p. 458.—Flowers: Dec.—Feb. VERN. *Nimurdi.*

KONKAN: *Law!*; Panvel, *Kanitkar!*; Uran Island, *Kanitkar!* DECCAN: Khandala, *Cooke!*; between Nasik and Igatpuri, *Edgeworth!*; Lanoli, *Cooke!*; Poona, *Woodrow!* S. M. COUNTRY: Belgaum, *Ritchie*, 400!—DISTRIB. India (W. Peninsula, Banda).

10. **Blumea Belangeriana,** *DC. Prod.* v. 5 (1836) p. 444. Herbaceous; stem erect, terete, much branched from and sparingly hispid at the base, softly villous at the apex, the stem and branches usually red-brown. Lower leaves 2—3 by 1—1¾ in., obovate, attenuated into a short petiole, the upper leaves subsessile, elliptic-oblong, all closely dentate, sparsely hairy above, densely sericeo-villous beneath. Heads ⅓ in. in diam., axillary, sessile, solitary or clustered. Corolla-lobes of ♀ flowers hairy. Receptacle glabrous. Involucral-bracts linear, woolly. Achenes terete, nearly glabrous. Fl. B. I. v. 3, p. 266.—Flowers: Dec.—Mar.

KONKAN: *Stocks!*, *Law!*; S. Konkan and Ghâts, *Ritchie*, 398!; Matheran, *Cooke!*; Vingorla, *Kanitkar!* KANARA: *Law!*; Sirsi (N. Kanara). *Hohenhacker*, 777!—DISTRIB. Apparently endemic in the Konkans and Malabar.

11. **Blumea Malcolmii,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 266. A rather stout plant, densely clothed with soft white silky wool; stem

leafy, usually ascending, but sometimes decumbent and branched from the root as in *B. oxyodonta*. Leaves 1—5 by ½—2½ in., sessile, rather thick, obovate, obtuse, acutely and closely irregularly toothed (the margins of the larger leaves sometimes crenate, the crenatures closely set with small spinous teeth), densely clothed with white silky wool, base tapering. Heads ½—¾ in. in diam., in leafy panicles at the ends of the stem or branches, all woolly with long white silky hairs. Corollas yellow; lobes hairy. Invol.-bracts linear, acute, densely clothed with long white silky hairs, the outer bracts smaller. Achenes obscurely angled, silky. The buds at the crown of the root form globose woolly bodies often clustered together. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Blumea lanuginosa*, Law, MS. in Herb. Kew. *Pluchea Malcolmii*, C. B. Clarke, Comp. Ind. p. 95.—Flowers: Nov.—Feb.

KONKAN: *Lambert*!; hills of the North and South Konkan, *Law*!; Matheran, *Cooke*! DECCAN: Khandala, *Cooke*!; Mahableshwar, *Cooke*! S. M. COUNTRY: Yellur on the Fort walls, *Ritchie*, 400!

This would seem to have been the plant sent for identification to Sir G. Watt by Dr. Dymock, and noted by the former in Dict. Econ. Prod. v. 1, p. 458, under *B. eriantha*.—DISTRIB. Apparently endemic in the Bombay Presidency.

12. **Blumea malabarica,** *Hook. f. Fl. B. I.* v. 3, p. 267. More or less pubescent, 3 ft. high (*Ritchie*); stem and branches terete, grooved. Leaves membranous, fragrant when bruised, subsessile, 1½—5½ by ⅜—1 in., lanceolate-oblong, acute, distantly serrate, more or less pubescent on both surfaces though often nearly glabrous above, base acute; petioles short, distinct, not merely formed of the narrowed bases of the leaves. Heads pubescent, ½ in. in diam., in small axillary sessile or peduncled clusters. Receptacle broad, pubescent. Invol.-bracts linear, acute, pubescent, the outer much shorter than the inner. Achenes $\frac{1}{20}$—$\frac{1}{16}$ in. long, ribbed, with a few scattered hairs, chiefly towards the apex. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. —Flowers: Feb.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*! KANARA: *Law*!, *Stocks*!; Sirsi, *Woodrow*; Uskeli, *Ritchie*, 1817!—DISTRIB. India (W. Peninsula).

13. **Blumea spectabilis,** *DC. Prodr.* v. 5 (1836) p. 445. Shrubby, 4—6 ft. high; stem stout, glabrous or puberulous. Leaves 6—10 by 1¾—2½ in., lanceolate or oblanceolate, acute, shallowly serrate, glabrous on both sides, much tapered at the base into a long winged petiole which is often furnished with 2—3 small divaricate appendages. Heads ¼—½ in. in diam., on pubescent peduncles, very numerous, forming a large elongated pyramidal lax panicle with narrow leafy bracts beneath the branches; flowers yellow. Corolla-lobes of ♀ flowers glandular. Invol.-bracts slender, pubescent, the outer rows short and slightly spreading. Pappus at first tawny, ultimately red. Achenes silky, scarcely ribbed. Fl. B. I. v. 3, p. 269; Trim. Fl. Ceyl. v. 3, p. 22. *Blumea myriocephala*, Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648 (*not* of DC.). *B. Wallichii*, C. B. Clarke, Comp. Ind. p. 87. *B. longifolia*, DC. Prodr. v. 5, p. 446; Dalz. & Gibs. p. 125.—Flowers: Feb.

KONKAN: *Stocks*!, *Dalzell*! KANARA: Pardana, *Ritchie*, 1818!; Divimana, *Woodrow*; Ghâts of N. Kanara, *Talbot*, 250!—DISTRIB. India (W. Peninsula); Ceylon.

Blumea laciniata, DC. Prodr. v. 5 (1836) p. 436, which differs from *B. lacera* chiefly in having a pubescent receptacle, is given in Fl. B. I. v. 3, p. 264, as occurring (though rarely) in the Konkan. I cannot find any authentic specimens of the plant from that region. Dalzell has 2 specimens in his Herbarium which was presented to Kew., but no locality has been assigned to them. Dalzell does not include the plant in his 'Bombay Flora', nor has Woodrow got it in his list.

14. **LAGGERA**, Sch.-Bip.

Annual or perennial herbs. Leaves alternate, often rigid and decurrent. Heads paniculate, or subsessile in the uppermost axils, heterogamous, disciform, the outer flowers ♀, fertile, ∞-seriate, those of the disk ☿, fertile; corollas of the ♀ flowers filiform, shorter than their styles, minutely toothed, those of the ☿ flowers regular, tubular, the limb slightly enlarged, shortly 5-fid. Involucre campanulate; bracts ∞-seriate, imbricate, narrow, often rigid, the outer the shorter. Receptacle flat, naked. Anther-bases shortly 2-lobed or sagittate, not tailed. Style-arms of ☿ flowers linear-subulate, papillose. Pappus-hairs slender, 1-seriate, free, or very shortly connate at the base. Achenes small, glabrous, or sparingly pilose.—DISTRIB. Tropical Africa and India; species 2.

Stem winged	1. *L. alata.*
Stem not winged	2. *L. aurita.*

1. **Laggera alata,** *Schultz-Bip. ex Oliver, in Trans. Linn. Soc.* v. 29 (1875) p. 94. Herbaceous; stem erect, branched, winged, clothed with fuscous or rufous (often glandular) pubescence. Leaves sessile, decurrent so as to form the quite entire wings on the stem, 1—4 by ⅜—1¼ in., narrowly oblong, obtuse or subacute, toothed or rarely entire, pubescent or subvillous on both sides. Heads 1 or few, ⅜—⅝ in. in diam.; peduncles axillary, solitary, often drooping, bracteate; flowers purple. Involucre campanulate; bracts many-seriate, the outer lanceolate, acute, much shorter than the inner, pubescent outside, the innermost scarious, subglabrous, linear, acuminate. Anthers ecaudate. Pappus white. Achenes cylindric, slightly ribbed, appressedly pilose. Fl. B. I. v. 3, p. 271; C. B. Clarke, Comp. Ind. p. 91; Trim. Fl. Ceyl. v. 3, p. 23. *Blumea alata*, DC. Prodr. v. 5, p. 448; Grah. Cat. p. 97; Dalz. & Gibs. p. 125; Wight, Icon. t. 1101.—Flowers: Nov.—Jan.

KONKAN: *Law*!, *Dalzell*!; on the Ghâts, *Dalzell & Gibson*. S. M. COUNTRY: Belgaum (east hills), *Ritchie*, 1820! KANARA: Kâla naddi, *Ritchie*, 1820!—DISTRIB. India (Tropical Himalayas, hills of the W. Peninsula); Ceylon, Java, China, Philippines, Tropical Africa.

2. **Laggera aurita,** *Schultz-Bip. in Schweinf. Beitr. Flor. Aethiop.* (1867) p. 151. A perennial herb 1—3 ft. high; stem erect, slender, cylindric, with many ascending branches, viscous-hairy, not winged. Leaves numerous, sessile or petiolate, membranous, shortly decurrent, obovate or oblanceolate, toothed, lobed or ½-pinnatifid, the

lower 2—4 in. long, the upper much smaller often bract-like on the branches, all viscous-hairy on both sides. Heads peduncled, ¼—½ in. in diam., in corymbose or diffuse terminal panicles ; flowers pink. Invol.-bracts linear, very acute, the outer very short, silky-hairy, herbaceous, the inner much longer, scarious. Pappus white. Achenes thinly hairy, obscurely ribbed. Fl. B. I. v. 3, p. 271 ; C. B. Clarke, Comp. Ind. p. 92 ; Trim. Fl. Ceyl. v. 3, p. 24 ; Watt, Dict. Econ. Prod. v. 4, p. 584. *Blumea aurita*, DC. Prod. v. 5, p. 449 ; Grah. Cat. p. 97 ; Aitch. Pb. & Sind Pl. p. 74.—Flowers : Dec.—Feb.

KONKAN : *Law* ! SIND : *Stocks* !

15. **PLUCHEA**, Cass.

Shrubs or undershrubs (rarely herbs) tomentose or glutinous. Leaves alternate. Heads small, in terminal leafless corymbs, or large and subsolitary, heterogamous, disciform, white, yellow or lilac ; outer flowers ♀, fertile, ∞ -seriate ; disk-flowers ☿, few, sterile. Involucre ovoid or broadly campanulate ; bracts ovate or lanceolate, usually broad, dry, rigid. Receptacle flat, naked. Corollas of ♀ flowers filiform, shorter than their styles, 3-fid or minutely toothed at the apex, those of ☿ flowers regular, tubular, with a slightly enlarged limb, 5-fid at the apex. Style-arms of ☿ flowers filiform, entire or 2-fid. Anther-bases sagittate, the cells tailed. Pappus-hairs slender, 1-seriate, free, or in the sterile achenes very many, more or less connate at the base.—DISTRIB. Tropical and subtropical countries ; species about 30.

Heads in compound corymbs.		
Outer invol.-bracts ovate, acute.		
Leaves acutely serrate-dentate	1.	*P. tomentosa.*
Leaves entire or nearly so	2.	*P. Wallichiana.*
Outer invol.-bracts oblong, rounded, very obtuse....	3.	*P. lanceolata.*
Heads subsolitary.		
Outer invol.-bracts very small, lanceolate-subulate...	4.	*P. arguta.*

1. **Pluchea tomentosa,** *DC. in Wight, Contrib.* (1834) p. 16. A shrub 4—10 ft. high ; stems and branches terete, not winged, striate, more or less pubescent below, glandular-pubescent in the upper parts. Leaves sessile, sub-amplexicaul, often auricled at the base, 1—3 by ⅜—1⅜ in., broadly obovate, obtuse or subacute, acutely serrate-dentate, more or less pilose above, softly pubescent beneath. Flowers in compound many-headed corymbs which are terminal or from the upper axils. Involucre campanulate ; outer bracts short, ovate, acute, slightly pubescent ; the innermost linear-oblong, acute, ciliate near the apex. Receptacle glabrous. Pappus minutely barbellate. Achenes obscurely angled.

Ritchie gives 4 ft. as the height of the shrub, while Dalzell in a note attached to a specimen in Herb. Kew. gives it as 10 ft. Fl. B. I. v. 3, p. 272 ; C. B. Clarke, Comp. Ind. p. 94 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers : Dec.—Feb.

KONKAN : N. & S. Konkan, *Law* ! ; Thal Ghát, *Edgeworth* ! DECCAN : Bijapur, *Woodrow* ; Chákan, *Dalzell* ! S. M. COUNTRY : Fort ditch, Belgaum,

Ritchie, 1822! KANARA: *Law*!; Haliyal, *Ritchie*, 1822! SIND: *Stocks*!—DISTRIB. India (Bengal, Central India, W. Peninsula).

2. **Pluchea Wallichiana,** *DC. Prodr.* v. 5 (1836) p. 451. A tall shrub; stem and branches not winged, terete, striate, the upper portions viscous-pubescent. Leaves sessile, 1—2¾ by ⅜—1⅛ in., rigid, elliptic-oblong or obovate, obtuse or subacute, often apiculate, usually entire, or sometimes faintly toothed, pubescent on both surfaces; nerves prominent. Heads numerous, ½—¾ in. in diam., in compound corymbs; pedicels glandular-hairy. Involucre campanulate; outer bracts short, ovate-oblong, acute, pubescent; the innermost bracts linear, acute, pubescent at the apex. Achenes obscurely angled, the angles silvery-white, scarcely pilose. Fl. B. I. v. 3, p. 272; Dalz. & Gibs. p. 126; C. B. Clarke, Comp. Ind. p. 94. *P. Wallichii*, Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers: Feb.

GUJARAT: Dhej, *Dalzell*, 52!; Dangs, *Woodrow*. SIND: *Vicary*!; Sind hills, *Dalzell*!—DISTRIB. India (Panjáb); Beluchistan.

3. **Pluchea lanceolata,** *C. B. Clarke, Comp. Ind.* (1876) p. 94. An erect undershrub; stem and branches terete, slender, softly ashy-pubescent. Leaves sessile, very coriaceous, 1—2¼ by ¼—½ in., oblong or oblanceolate, obtuse, apiculate, narrowed at the base, finely ashy-pubescent on both sides, entire; main nerves prominent. Heads in compound corymbs. Involucre contracted at the mouth; outer bracts 2—3-seriate, oblong, very obtuse, pubescent, usually tinged with purple; the innermost bracts linear, subacute, few. Pappus-hairs distinctly connate at the base. Fl. B. I. v. 3, p. 272; Oliver & Hiern, Fl. Trop. Afr. v. 3 (1877) p. 329; Watt, Dict. Econ. Prod. v. 6, part 1, p. 291. *Berthelotia lanceolata*, DC. Prodr. v. 5, p. 376; Aitch. Pb. & Sind Pl. p. 73.—Flowers: Dec.

SIND: *Vicary* ex *Aitchison, Dalzell*, 43!, *Stocks*, 451!; Ruk Junction near the Railway Station, *Cooke*!—DISTRIB. India (Panjáb, Gangetic plain as far as Cawnpore); Afghanistan, N. Africa.

4. **Pluchea arguta,** *Boiss. Diag.* ser. ii. fasc. 3 (1856) p. 5. A stout branched shrub, thick soft and fleshy when near the sea, shrubby and with thin leaves when inland (*Dalzell*, MS. in Herb. Kew.), the upper parts glandular-pubescent. Leaves sessile, 1—2 in. long, varying much in breadth (from ⅛—⅞ in.), obovate-oblong or oblanceolate, sometimes inciso-pinnatifid, glandular-pubescent, acutely serrate or dentate, narrowed at the base. Heads pedunculed, subsolitary, ⅜—½ in. in diam. Invol.-bracts rigid, ∞ -seriate, the outer very small, narrowly lanceolate-subulate, pubescent and ciliate, those of the intermediate rows similar but longer, the innermost elongate, linear, acute, pubescent and ciliate at the tip. Receptacle naked. Pappus-hairs slender, shortly barbellate. Achenes with a few appressed hairs, cylindric, slightly ribbed. Fl. B. I. v. 3, p. 273; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Pluchea frutescens*, Benth. in Hook. Icon. Pl. v. 12, t. 1157. *Laggera arida*, C. B. Clarke, Comp. Ind. p. 92.—Flowers: Jan.—Feb.

In the Bombay Presidency confined to Sind. SIND: *Dalzell*, 8!, *Stocks*, 553!; Boogta hills, *Vicary*!; Mulir district, *Bhola Puran*!; Karachi, *Vicary*!—DISTRIB. India (Panjáb); Beluchistan.

16. NANOTHAMNUS, T. Thoms.

A rigid woolly often decumbent herb. Leaves alternate, acutely serrate-dentate. Heads small, subsessile, subterminal and axillary, heterogamous, disciform ; outer flowers 1—4 (rarely 0) ♀, fertile ; disk flowers ☿, few, fertile. Involucre ovoid ; bracts ∞-seriate, imbricate, lanceolate, dry, the interior subscarious, the exterior gradually shorter, hispid on the back. Receptacle flat, naked. Corollas of the ♀ flowers filiform, 2—3-toothed, those of the ☿ flowers with a slender tube, the limb campanulate, sub-2-lipped, the outer lip 4-lobed, the inner free to the base of the limb. Anther-bases sagittate, the auricles mucronate or shortly tailed. Style-arms of ☿ flowers filiform. Pappus 0 or a minutely 5-toothed crown. Achenes obovoid, with 5—8 slender ribs, the tip rounded.—DISTRIB. Apparently endemic in the Bombay Presidency ; species 1.

1. **Nanothamnus sericeus,** *Thoms. in Journ. Linn. Soc.* v. 9 (1867) p. 342, t. 3. A prostrate or suberect and ascending herb ; branches many from the root, 6—12 in. long, pubescent. Leaves 1—3½ by ¼—¾ in. (the uppermost cauline leaves often smaller), subsessile, the lower leaves usually oblanceolate, the upper lanceolate, all acutely and irregularly toothed, densely woolly on both sides, strongly nerved. Heads ¼ in. in diam., in dense clusters.

The buds at the crown of the root often form globose woolly bodies as in *Blumea Malcolmii*. In habit and general appearance the plant bears some resemblance to *Blumea oxyodonta*. Fl. B. I. v. 3, p. 273 ; C. B. Clarke, Comp. Ind. p. 96 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers : Feb.—Apr.

KONKAN : on the hills, *Dalzell* !, *Law* ! DECCAN : Lanoli, *Woodrow* ; Igatpuri, *Kanitkar* !, *Cooke* !—DISTRIB. Apparently endemic.

17. EPALTES, Cass.

Erect or diffuse herbs. Leaves alternate, usually decurrent. Heads small, solitary or corymbose, heterogamous, disciform ; outer flowers ∞ -seriate, ♀, fertile ; disk-flowers few, ☿, usually sterile. Involucre ovoid, campanulate or hemispheric ; bracts ∞-seriate, imbricate, dry, rigid, usually broad. Receptacle flat, convex or raised, naked. Corollas of ♀ flowers shorter than their styles, filiform, 2—3-toothed, those of the ☿ flowers regular, tubular, with a 3—5-fid limb. Anther-bases sagittate, the auricles small, connate, minutely caudate-acuminate. Style of ☿ flowers subulate, entire or 2-fid. Achenes of ♀ flowers subterete, 5—10-ribbed, without pappus, the achenes of ☿ flowers usually abortive, with a pappus of 2—3 hairs caducous, or 0.—DISTRIB. Tropical Asia, Africa, America, and Australia ; species about 9.

1. **Epaltes divaricata,** *Cass. in Bull. Soc. Philom.* (1818) p. 139. A small nearly glabrous annual, 3—8 in. high ; main stem usually short, erect, with numerous long divaricate straggling winged branches. Leaves sessile, ¾—2½ by ⅛—¼ in., linear-oblong, obtuse, glabrous, entire or distantly toothed, narrowed at the base, decurrent. Heads solitary, ¼—⅓ in. in diam., terminating short winged branchlets

(peduncles ?); flowers purple. Involucre-bracts lanceolate, rigid, sharply acuminate, the outer short, somewhat spreading. The ☿ disk-flowers barren. Pappus 0. Achenes scarcely $\frac{1}{16}$ in. long, pale, obovoid-oblong. Fl. B. I. v. 3, p. 274; Dalz. & Gibs. p. 126; C. B. Clarke, Comp. Ind. p. 96 (exclud. syn. *E. pygmæa*); Trim. Fl. Ceyl. v. 3, p. 24; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.—Flowers: Oct.—Jan.

A common weed in damp places. KONKAN: *Law*!; S. Konkan, *Ritchie*, !; Malwân, *Woodrow*; Mazgaon, near Savantvadi in rice-fields, *Cooke*!; Sanganeshvar, *Kanitkar*! S. M. COUNTRY: Gunji, S. of Belgaum, *Ritchie*, !; KANARA: *Thomson*!; Kála naddi(*Ritchie*, 411!—DISTRIB. India (Birma, W. Peninsula); Ceylon, Java, China.

18. SPHÆRANTHUS, Linn.

Divaricately-branched herbs. Leaves alternate, toothed, decurrent along the stem. Heads small, very numerous, sessile, crowded on a large common receptacle into more or less globose terminal compound heads with or without a general involucre of empty bracts at base: outer flowers, ♀, few or many, fertile; disk-flowers ☿, solitary or few, fertile or sterile. Involucre narrow; bracts few or many, acute, subpaleaceous, slightly unequal. Receptacle small, naked. Corollas of ♀ flowers slender, tubular, minutely 2—3-toothed, those of the ☿ flowers regular, the tube thickened, the limb 4—5-toothed. Anther-bases sagittate; auricles acute or tailed. Style-arms of ☿ flowers filiform or connate. Pappus 0. Achenes oblong, compressed.—DISTRIB. Tropics; species 8.

Wings of stem toothed; invol.-bracts linear, acuminate, pubescent at the apex	1. *S. indicus*.
Wings of stem entire; invol.-bracts obovate-spathulate, rounded and glabrous at the apex	2. *S. africanus*.

1. **Sphæranthus indicus,** *Linn. Sp. Pl.* (1753) p. 927. A much-branched herb about 1 ft. high; stem and branches cylindric, with toothed wings, more or less glandular-hairy. Leaves sessile, decurrent, $\frac{3}{8}$—2 by $\frac{3}{16}$—$\frac{7}{8}$ in., obovate-oblong, rounded or subacute, glandular-hairy, spinous-serrate or dentate, narrowed at the base. Heads $\frac{3}{8}$—$\frac{5}{8}$ in. in diam., compound, globose-ovoid, ebracteate, on solitary glandular peduncles with toothed wings; flowers purple. Invol.-bracts linear, acuminate, pubescent and ciliate near the ends. Achenes glabrous, stalked. Fl. B. I. v. 3, p. 275; Trim. Fl. Ceyl. v. 3, p. 26; Watt, Dict. Econ. Prod. v. 6, part 3, p. 320. *Sphæranthus mollis,* Roxb. Hort. Beng. p. 62; Grah. Cat. p. 96; Dalz. & Gibs. p. 123. *S. hirtus,* Willd. Sp. Pl. v. 3, p. 2395; C. B. Clarke, Comp. Ind. p. 97.—Flowers: Nov.—Jan. VERN. *Mundi; Gorakh-mundi.*

KONKAN: *Law*!; Kalyan, *Cooke*!; Bassein, *Raoji*!; Vingorla, *Kanitkar*!; Dasgaon, *Kanitkar*! DECCAN: Gogve, west of Kolapur, *Kanitkar*! S. M. COUNTRY: Dharwar, *Cooke*!; Belgaum in rice-fields, *Ritchie*, 410! GUJARAT: *Woodrow*, 12!—DISTRIB. Throughout India; Ceylon, Africa, Malay Islands, Australia.

2. **Sphæranthus africanus,** *Linn. Sp. Pl.* ed. 2, v. 2 (1763) p. 1314. A fragrant plant 8—24 in. high; stem compressed, glabrous,

with entire wings; branches numerous, divaricate. **Leaves sessile,** decurrent, 1½—2½ by ½—1 in., obovate, obtuse, more or less glandular-pubescent, finely toothed, narrowed at the base. **Heads** ¼—½ in. in diam., globose, ebracteate; flowers purple. Invol.-bracts obovate-spathulate, rounded at the apex, glabrous. Fl. B. I. v. 3, p. 275; Trim. Fl. Ceyl. v. 3, p. 26; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Sphœranthus microcephalus,* Willd. Sp. Pl. v. 3, p. 2395; C. B. Clarke, Comp. Ind. p. 97.—Flowers: Oct.

KONKAN: *Law*!, *Stocks*!, *Dalzell*; Vingorla, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Persia, Africa, Malay Islands, China, Philippines, Australia.

19. **BLEPHARISPERMUM,** Wight.

Glabrous shrubs. Leaves alternate. Heads small, compressed, in solitary or crowded globose clusters which are sessile on an oblong or cylindric common receptacle, heterogamous, discoid; outer flowers ♀, few, fertile; disk-flowers ☿, 2—8, fertile or sterile. Invol.-bracts 1—2, like the paleæ of the receptacle, but shorter. Receptacle minute or cylindric with broad dry or rigidly scarious paleæ enclosing the flowers. Corollas of ♀ flowers filiform, 3—4-toothed, those of the ☿ flowers regular, tubular, with a slightly enlarged or campanulate 5-fid limb. Anther-bases sagittate; auricles subcaudate. Style-arms of ☿ flowers linear, stout, obtuse. Fertile achenes compressed, black, the outer or both faces with a ciliate rib, the margins ciliate. Pappus, paleæ or bristles unequal or with 2—3 stronger ones at the angles, or 0 in the sterile achenes.—DISTRIB. Species 3, of which 2 are Indian, the third African.

1. **Blepharispermum subsessile,** *DC. in Wight, Contrib.* (1834) p. 12. Shrubby, erect, 3 ft. high; rootstock woody; branches terete, striate, glabrous. Leaves subsessile, 2—5 by 1—2¼ in., ovate or elliptic, obtuse or subacute, coriaceous, entire (rarely toothed), reticulately veined, glabrous. Heads 5—10-flowered, in large terminal globose clusters 1—1½ in. in diam., with broad leafy bracts at the base; ♀ flowers in each head 2, with a few bristles as pappus and compressed obovoid achenes which are almost villous with long hairs; ☿ flowers in each head 3—8, with similar pappus and smaller achenes. Fl. B. I. v. 3, p. 276; Grah. Cat. p. 96; Wight, Icon. t. 1093; C. B. Clarke, Comp. Ind. p. 98; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Leucoblepharis subsessile,* Arn. in Mag. Zool. & Bot. v. 2 (1838) p. 422; Dalz. & Gibs. p. 123.—Flowers: Aug.—Sept.

DECCAN: Kartriz Ghát near Poona, *Bhiva*! S. M. COUNTRY: common about Dharwar, *Law* ex *Graham*; Dharwar, *Woodrow*; Belgaum, *Stocks*!, *Ritchie*, 415! KANARA: *Law*!, *Stocks*!—DISTRIB. India, W. Peninsula.

Anaphalis cutchica, C. B. Clarke, Comp. Ind. (1876) p. 111, is given by Woodrow in his list as occurring at Barda, Kathiawar. I have not seen any specimens from that locality. Mr. C. B. Clarke, in a recent MS. note to his original description of the species (Comp. Ind. l. c.), expresses a doubt as to the correctness of his identification of the plant as an *Anaphalis,* while a similar doubt is expressed by Sir Joseph Hooker (Fl. B. I. v. 3, p. 284) There is but a single sheet of the species in Herb. Kew., the specimens on

which are insufficient to accurately determine the point. They were collected by Dr. Stoliczka in Kutch.

20. **LASIOPOGON,** Cass.

Small annual much-branched densely woolly herbs. Leaves alternate, small, quite entire. Heads small, in crowded clusters, heterogamous, disciform; outer flowers ♀, fertile, 2—∞-seriate; disk flowers ☿, few or many, fertile. Involucre campanulate; bracts few-seriate, the inner narrow, scarious, subhyaline, the outer shorter, subherbaceous, woolly on the back. Receptacle small, naked. Corollas of ♀ flowers filiform, minutely dentate, those of ☿ flowers regular, slender, tubular, the limb slightly enlarged, 3-toothed. Anther-bases sagittate, with slender tails. Style-arms of ☿ flowers slender, truncate. Pappus-hairs separately caducous, feathery. Achenes subfusiform.—DISTRIB. Africa and Orient; species 2.

1. **Lasiopogon lanatum,** *Cass. in Dict. Sc. Nat.* v. 25 (1822) p. 302. A small plant 1—2 in. in diam., looking like a cluster of cottony balls on the ground, the leaves and flowers being hidden by the woolly covering; branches many from the root, terete, filiform, prostrate. Leaves $\frac{1}{10}$—$\frac{1}{4}$ in. long, linear-oblong or spathulate, woolly. Heads about $\frac{1}{8}$ in. long, in globose villous clusters subtended by floral leaves. Involucre-bracts linear, obtuse, scarious. Fl. B. I. v. 3, p. 287; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648.

Rare. SIND: Kirthar mountains, *Woodrow*.

21. **GNAPHALIUM,** Linn.

Hoary or woolly herbs. Leaves alternate, usually quite entire. Heads small, in terminal or axillary corymbs or fascicles, heterogamous, disciform; outer flowers ♀, fertile, 2—∞-seriate; disk-flowers ☿, fewer, fertile. Involucre ovoid or campanulate; bracts ∞-seriate, imbricate, all scarious, or with a white, yellow, or brown, more or less scarious blade. Receptacle naked or pitted. Corollas of ♀ flowers filiform, minutely dentate or shortly 3—4-fid at the apex, those of the ☿ flowers regular, tubular, slender, the limb slightly enlarged, shortly 5-fid. Anther-bases sagittate, finely tailed. Style-arms of ☿ flowers slender, truncate. Achenes oblong or obovate, subterete or slightly compressed. Pappus-hairs 1-seriate, slender or thickened towards the tip, separately caducous or more or less connate at the base into a ring.—DISTRIB. Cosmopolitan; species about 100.

Heads in corymbose leafless clusters	1. *G. luteo-album.*
Heads in leafy spikes	2. *G. indicum.*
Heads in rounded leafy axillary or terminal clusters	3. *G. pulvinatum.*

1. **Gnaphalium luteo-album,** *Linn. Sp. Pl.* (1753) p. 851. Herbaceous, 6—18 in. high, sometimes woody at the base, erect, ascending or decumbent; stem simple or branched and as well as the branches softly woolly. Leaves sessile, 1—2½ by $\frac{1}{3}$—$\frac{1}{2}$ in., spathulate-oblong or linear-oblong, usually obtuse, sometimes mucronate, the upper ½-amplexicaul, smaller than the lower, all woolly on both surfaces,

especially the lower one (the upper surface sometimes glabrate), entire or very rarely obscurely toothed. Flowers in dense leafless corymbose clusters of yellow glistening heads. Involucre-bracts shining, straw-colored, the outer ovate, subobtuse, the innermost linear, acute or subobtuse, all with a subherbaceous nucleus near the base, thinly scarious and transparent in the upper part. Pappus shorter than the involucre. Achenes oblong, papillose. Fl. B. I. v. 3, 288; C. B. Clarke, Comp. Ind. p. 114; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648; Watt, Dict. Econ. Prod. v. 3, p. 517.—Flowers: Mar.

KONKAN: Matheran, *Woodrow*! DECCAN: Dehu (Poona districts), *Woodrow*!; Wadgaon, *Woodrow*! SIND: *Cooke*!—DISTRIB. Throughout India; most hot and warm temperate countries.

2. **Gnaphalium indicum,** *Linn. Sp. Pl.* (1753) p. 852. Herbaceous, 4—12 in. high; stem usually much-branched from near the base, erect or decumbent, more or less white-woolly. Leaves ½—1½ by ⅛—⅜ in., narrowly linear-obovate or spathulate, obtuse, apiculate, the upper leaves sessile, the lower usually shortly petioled, woolly, especially on the margins and beneath, sometimes glabrate above, particularly when grown in shady places. Heads small, ⅛ in. in diam., sessile, in small dense terminal and subterminal spiciform clusters. Involucre-bracts usually straw-colored, linear-oblong, subacute, the outer woolly, the inner nearly glabrous. Achenes oblong, slightly papillose. Fl. B. I. v. 3, p. 289; Grah. Cat. p. 97; Dalz. & Gibs. p. 130; C. B. Clarke, Comp. Ind. p. 114.—Flowers: Dec.—Mar.

KONKAN: *Law*!, *Lambert*!; Pen, *Woodrow*; Matheran, *Cooke*! DECCAN: *Woodrow*! S. M. COUNTRY: Belgaum hill (north), *Ritchie*, 408! SIND: near the Manchar lake, *Kanitkar*!; Hyderabad, *Cooke*!—DISTRIB. Throughout India and Birma; Africa, China, Japan, Australia.

3. **Gnaphalium pulvinatum,** *Delile, Descript. de l'Egypte* (1812) p. 266, t. 44. A small prostrate woolly herb; stems 1—6 in. long, numerous, spreading from the root. Leaves ¼—⅜ by ⅛—⅛ in., spathulate, more or less obtuse, mucronate, woolly, attenuated at the base into a short petiole. Heads ⅛—¼ in. in diam., immersed in white wool, crowded in subglobose leafy or involucrate terminal clusters about ½ in. in diam. Involucre-bracts linear-lanceolate, acute, scarious. Achenes oblong, minutely papillose. Fl. B. I. v. 3, p. 289; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Gnaphalium crispatulum,* C. B. Clarke, Comp. Ind. p. 115 (*not* of Delile).—Flowers: Jan.—Feb.

DECCAN: Sinhagad hill near Poona, *Woodrow*; Mâwal taluka (Poona districts), in rice-fields, *Kanitkar*! SIND: *Stocks*!—DISTRIB. Sparingly throughout the plains of India; Egypt.

22. **INULA,** Linn.

Herbs, rarely shrubs. Leaves radical and alternate. Heads at the ends of the branches, solitary, corymbose, or panicled, heterogamous, rayed (rarely disciform); ray-flowers ♀, fertile, ∞—seriate; disk-flowers ☿, tubular. Involucre hemispheric or campanulate (rarely ovoid); bracts ∞-seriate, imbricate, the inner usually rigid and narrow, the outer herbaceous, the outermost often foliaceous.

Receptacle flat or tumid, pitted or areolate. Corollas of ♀ flowers ligulate, the ligules long, short, or minute, yellow or white, 3-toothed; corollas of the ☿ flowers regular, tubular, yellow, the limb elongate slightly enlarged, 5-toothed. Anther-bases sagittate, with rather small auricles; tails long, simple or branched. Style-arms of ☿ flowers linear, slightly flattened, broader upwards, obtuse. Achenes subterete, ribbed. Pappus-hairs few or many, 1—2-seriate, rather short, smooth, scabrid or bearded.—DISTRIB. Europe, Asia, and Africa; species about 56.

1. **Inula grantioides,** *Boiss. Diag.* ser. ii. fasc. 3 (1856) p. 14. Shrubby, perennial, 6—24 in. high, glandular-hairy, much branched; stem stout, woody; branches leafy. Leaves 1—2 in. long, variably lobed, the lower leaves petioled, cuneate, shortly 3-lobed, the upper sessile, linear, entire or 2—3-toothed at the apex, all fleshy, glandular and hairy. Heads numerous, ¾—1¼ in. in diam., solitary, often furnished with 1 or 2 leafy bracts; peduncles stout, hairy. Involucre-bracts narrowly linear-oblong, subacute, hairy and glandular, the outer the smaller. Ray-flowers ligulate, few, yellow, 1-seriate. Disk-flowers tubular, acutely toothed. Pappus rigid, scabrid, much longer than the achenes, yellowish at first, then reddish. Achenes $\frac{1}{10}$—$\frac{1}{8}$ in. long, oblong, strongly ribbed, hispid. Fl. B. I. v. 3, p. 296; Boiss. Fl. Orient. v. 3, p. 195; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. *Inula cutchica,* C. B. Clarke, Comp. Ind. p. 126. *Calliste-phus cuneatus,* Dalz. MS. in Herb. Kew.—Flowers: Nov.-Dec.

SIND: *Stocks,* 519!, *Woodrow*; common on rocks, *Dalzell*!; Karachi, *Dalzell*!; Moach near Karachi, *Cooke*!; Hyderabad, *Cooke*!; Garral (Lower Sind), *Stocks,* 437!—DISTRIB. Kutch, Beluchistan, Wazaristan, S.E. Arabia

23. VICOA, Cass.

Annual or perennial herbs. Leaves alternate, entire or toothed. Heads solitary, terminal or on leaf-opposed peduncles, heterogamous, rayed. Ray-flowers ♀, fertile, 1—2-seriate, 2—3-toothed; disk-flowers ☿, fertile, slender, the limb hardly dilated, 5-toothed. Involucre campanulate; bracts many-seriate, narrow, with scarious margins, the outer shorter. Receptacle flat or subconvex, naked. Anther-bases sagittate; tails slender. Style-arms of ☿ flowers flattened, broader upwards, obtuse or truncate. Achenes small, hardly ribbed, tip rounded. Pappus-hairs of ray-flowers few or 0, of disk-flowers few or many.—DISTRIB. Tropical and Western Asia and Africa; species 6.

Leaves sessile; invol.-bracts erect; ray-flowers epappose. 1. *V. auriculata.*
Leaves petioled; invol.-bracts squarrose; ray-flowers pappose..... 2. *V. cernua.*

1. **Vicoa auriculata,** *Cass. in Ann. Sc. Nat.* sér. 1, v. 17 (1829) p. 418. A slender, erect, rigid, leafy herb 1—3 ft. high; stems terete, striate, glabrous or pubescent; branches often numerous in the upper part, ascending, terete, more or less pubescent. Leaves very variable in size, sessile, usually 1—3 by ⅛—½ in. (sometimes much larger, reaching 6—7 in. long), oblong-lanceolate, acute, entire or serrulate, rough or scabrid with short appressed hairs on both sides, pale

beneath, dilated and with rounded auricles at the base. Heads $\frac{1}{2}$—$\frac{3}{4}$ in. in diam., on long slender peduncles. Involucre-bracts slender, erect, linear, acute, more or less hairy and with membranous margins, the outer much the shorter. Ray-flowers 12—24, much longer than the involucre; ligules yellow, narrow, 3-toothed at the apex, revolute. Pappus of ray-flowers 0, of disk-flowers scanty. Achenes $\frac{1}{30}$—$\frac{1}{25}$ in. long, pale, terete, sparsely hairy. Fl. B. I. v. 3, p. 297; Trim. Fl. Ceyl. v. 3, p. 33; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. *Vicoa indica*, DC. in Wight, Contrib. p. 10; Grah. Cat. p. 97; Dalz. & Gibs. p. 126; Wight, Icon. t. 1148; C. B. Clarke, Comp. Ind. p. 127. *Vicoa appendiculata*, DC. Prodr. v. 5, p. 474; C. B. Clarke, Comp. Ind. p. 127. *Doronicum calcaratum*, Roxb. Hort. Beng. p. 61; Fl. Ind. v. 3, p. 434.—Flowers: Nov.-Feb. VERN. *Sonkadi*.

I have examined many of the ligulate flowers of the species, including some from Wight's type-specimens, and have always found them destitute of pappus. Wight in his figure (Icon. t. 1148) shews several pappus-hairs on the achenes of the female flowers, but Roxburgh, Fl. Ind. l. c., says that the female florets have no pappus, while Dalzell & Gibson give as a distinguishing character of the next species the presence of a few pappus-hairs, thus implying their absence in this species.

KONKAN: *Lambert*!, *Law*! DECCAN: *Woodrow*, Poona, *Cooke*!; Kamatki Ghát, *Cooke*!; Alandi, *Bhiva*!; Kartriz, *Kanitkar*!; Dongergaon near Ahmednagar, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 403!; Hubli, *Hohenhacker*, 764!—DISTRIB. Throughout the drier parts of India; Ceylon.

2. **Vicoa cernua,** *Dalz. & Gibs. Bo. Fl.* (1861) p. 126 & p. 314. Annual, slender, 10—20 in. high; stem terete, striate, more or less pubescent, often with many filiform branches in the upper part. Leaves 2—3 by $\frac{3}{4}$—1 in., petioled, elliptic-lanceolate, acute or acuminate, crenate-serrate (rarely entire), sparsely clothed on both sides (especially the upper) with short appressed hairs, base acute, not auricled; petioles short. Heads $\frac{1}{2}$—$\frac{3}{4}$ in. in diam., drooping; peduncles filiform, often with a small foliaceous bract above the middle. Involucre-bracts very slender, setaceous, with long filiform tips, more or less hairy, the outer squarrose. Ray-flowers 20—40, linear, spreading, yellow, shortly 3-toothed at the apex, longer than the involucre. Pappus of ray-flowers of few bristles. Achenes $\frac{1}{16}$ in. long, oblong, sparsely hairy. Fl. B. I. v. 3, p. 297; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649.—Flowers: Nov.—Feb.

Elevated parts of the Konkan and Deccan. KONKAN: Matheran, *Cooke*!; Amboli Ghát, *Kanitkar*! DECCAN: Mahableshwar, *Cooke*!, *Woodrow*.—DISTRIB. Apparently endemic in the Bombay Presidency.

24. **PULICARIA,** Gærtn.

Annual or perennial usually woolly or villous herbs. Leaves alternate, sessile, often cordate-amplexicaul. Heads yellow, solitary, rayed and heterogamous, or disciform and homogamous; ray-flowers ♀, 1—2-seriate; disk-flowers slender, ☿, fertile. Involucre hemispheric or obconic; bracts few-seriate, subequal or the outer shorter, linear, acute or subobtuse. Receptacle flat or subconvex, pitted.

Corollas of ♀ flowers ligulate or tubular, those of the ☿ flowers regular, tubular, slender, the limb elongate, slightly enlarged, shortly 5-fid. Anther-bases sagittate, with minute auricles; tails capillary, simple or branched. Style-arms of ☿ flowers linear, obtuse, slightly flattened, a little broader upwards. Pappus double, the outer row of short jagged teeth or a fimbriate cup; inner of smooth, scabrid or bearded, filiform or flattened hairs, often caducous. Achenes terete or ribbed.—DISTRIB. Europe, Africa, and Asia, abundant in the Mediterranean region; species about 24.

Invol.-bracts subequal; achenes sparsely hairy.	
Ray-flowers ligulate.	
1—2 ft. high; peduncles thickened upwards	1. *P. Wightiana.*
Less than 1 ft. high; peduncles not thickened upwards	2. *P. angustifolia.*
Ray-flowers tubular	3. *P. foliolosa.*
Inner invol.-bracts much longer than the outer; ligules 0; achenes densely silky.	
Heads peduncled.	
Leaves 1—2 in. long, glabrous or nearly so; heads ⅓ in. in diam.	4. *P. glaucescens.*
Leaves ½—1 in. long, woolly; heads ¼ in. in diam.	5. *P. Boissieri.*
Heads subsessile, ¼ in. in diam.; leaves ¼—½ in. long.	6. *P. Stocksii.*

1. **Pulicaria Wightiana,** *C. B. Clarke, Comp. Ind.* (1876) p. 128. Annual, 1—2 ft. high, branched from about the middle of the stem; branches ascending, straight, slender, sometimes angled, pubescent, leafy, the leaves on the branches nearly erect, smaller upwards. Leaves 1—3 by ¼—⅝ in., sessile, oblong, usually serrate, more or less puberulous or pubescent on both sides. Heads solitary, ½—¾ in. in diam., on pubescent leafy peduncles which are thickened upwards. Outer invol.-bracts subherbaceous, linear-oblong, subacute, pubescent, inner bracts scarious, linear-lanceolate, acute, usually slightly longer than the outer. Ray-flowers ligulate, the ligules longer than the bracts, 1/16 in. broad, yellow, spreading, at length recurved, shortly 3-toothed at the apex. Outer row of pappus a setuloso-laciniate cup, inner row of barbellate hairs which are ultimately reddish. Achenes 1/16 in. long, oblong, terete or scarcely quadrangular, brown, shining, nearly glabrous. Fl. B. I. v. 3, p. 298; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. *Callistephus Wightianus,* DC. Prodr. v. 5 (1836) p. 275; Wight, Icon. t. 1089; Dalz. & Gibs. p. 123.—Flowers: Sept.

KONKAN: *Stocks*!, *Lambert*! DECCAN: common, *Dalzell & Gibson*, widely, *Woodrow*; Poona, *Cooke*!, *Kanitkar*!—DISTRIB. India (W. Peninsula).

2. **Pulicaria angustifolia,** *DC. Prodr.* v. 5 (1836) p. 479. A glaucous variable annual, 3—9 in. high (rarely higher), branched from the base; branches ascending, pubescent. Leaves sessile, linear-oblong or obovate, entire or serrulate, ¾—2 by ⅛—½ in., pubescent or the lower almost glabrous. Heads ⅜—½ in. in diam.; peduncles pubescent, not thickened upwards. Outer invol.-bracts subfoliaceous, linear-oblong, subobtuse, pubescent, inner bracts scarious, acute, usually slightly longer than the outer. Ray-flowers ligulate, yellow, the ligules longer than the bracts. Outer row of pappus a setuloso-laciniate cup; inner row of barbellate hairs reddish in fruit. Achenes

terete, scarcely quadrangular, with a few minute scattered hairs. Fl. B. I. v. 3, p. 299 ; C. B. Clarke, Comp. Ind. p. 129 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. *Callistephus concolor*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 344 ; Dalz. & Gibs. p. 123.—Flowers : Nov.—Dec.

KONKAN : *Law* ! ; Malwan, *Dalzell* ! GUJARAT : Porbandar, *Woodrow* ; Veráwal, *Cooke* ! SIND : *Bhola Puran* !, *Stocks* !, *Dalzell*, 51 ! ; near Karachi, *Cooke* ! ; Jemadar ka Landa near Karachi, *Stocks*, 1193 !—DISTRIB. India (Bengal, Chota Nagpore, W. Peninsula) ; Beluchistan.

3. **Pulicaria foliolosa**, *DC. Prodr.* v. 5 (1836) p. 480. Annual, erect, much-branched, 1—2 ft. high ; stem and branches pubescent. Leaves sessile, 1—3½ by ¼—¾ in., linear-oblong or oblanceolate, viscidly hairy, base ½-amplexicaul. Heads small, woolly and glandular ; peduncles slender, hairy. Involucral-bracts very narrow, almost setaceous, subequal, hairy, very acute. Ray-flowers filiform, tubular, 3-toothed. Outer row of pappus a minute toothed membranous cup, the inner row of few white hairs about twice as long as the achenes. Achenes minute, oblong, terete, sparsely appressedly hairy. Fl. B. I. v. 3, p. 298 ; C. B. Clarke, Comp. Ind. p. 128 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 364.—Flowers : Nov.—Jan. VERN. *Kakro*.

KONKAN : *Law* ! DECCAN : Dehu (Poona districts), *Raoji* ! ; 14 miles N. of Poona, *Woodrow* ! SIND : Hyderabad, *Kanitkar* !—DISTRIB. India (Bengal, Oude, the Gangetic plain, Central India).

4. **Pulicaria glaucescens**, *Jaub. & Spach, Ill. Pl. Orient* v. 4 (1853) t. 349. A dwarf shrub 6—12 in. high ; stem woody, branched ; branches ash-colored, sparsely hairy or glabrous. Leaves 1—2 in. long, fleshy, straight or slightly curved, scattered, sessile, glabrous or nearly so, linear or linear-spathulate, margins flat or involute, quite entire. Heads ⅓ in. in diam. ; peduncles short, glabrous, or pubescent near the top. Involucral-bracts glabrous, lanceolate, acute, rigid, the outer much the shorter. Ligules 0. Pappus white or straw-colored, shining, the outer scarcely distinguishable from the hairs on the achenes with which it appears continuous, the inner row of flattened hairs longer than the flowers. Achenes short, oblong, silky. Fl. B. I. v. 3, p. 300 ; C. B. Clarke, Comp. Ind. p. 130 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649.

Rare. SIND : *Cooke* !, *Woodrow* !, *Dalzell* !—DISTRIB. India (Panjáb) ; S. Persia, Beluchistan.

5. **Pulicaria Boissieri**, *Hook. f. Fl. B. I.* v. 3 (1881) p. 300. Dwarf, shrubby, villous with long white hairs. Leaves sessile, fleshy, ½—1 in. long, linear-spathulate, woolly, entire or sparsely toothed, margins flat or involute. Heads ½ in. in diam. ; peduncles short. Involucral-bracts lanceolate, acute, rigid, the outer much the shorter. Ligules 0. Pappus white or yellowish, the outer coroniform, the inner much longer than the achenes, slightly flattened. Achenes short, oblong, silky. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. *Platychæte villosa*, Boiss. Fl. Orient. v. 3, p. 208.

SIND : *Stocks*, 437 !, *Dalzell* !, *Woodrow*.

6. Pulicaria Stocksii, *Hook, f. Fl. B. I.* v. 3 (1881) p. 300. Dwarf, shrubby, pubescent, blackish when dry. Leaves sessile, ¼—½ in. long, linear-spathulate, very fleshy, entire. Heads subsessile, ¼ in. in diam. Involucre-bracts rigid, lanceolate, puberulous, the outer obtuse, much shorter than the inner, the inner acute. Ligules 0. Pappus white, the outer row short, coroniform, the inner much longer than the achenes. Achenes narrowed at the base, densely silky, 1/16 in. long. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649.—Flowers: Oct.

SIND: *Stocks!*, *Woodrow*. A rare plant.

I have seen but one specimen, which was collected in Sind by Stocks.—DISTRIB. Apparently endemic.

25. CÆSULIA, Roxb.

A glabrous marsh herb. Leaves alternate, remotely serrulate. Heads axillary, sessile; flowers all ♀, fertile, pale-blue or white, the outer often subracemosely stipitate or sessile, the inner sessile. Involucre large, membranous; bracts 2, orbicular or ovate. Receptacle with a few paleæ to the outer flowers, naked in the centre, glabrous. Corollas tubular; the limb narrowly campanulate, deeply 5-fid. Anther-bases sagittate; tails slender, consisting of a small bundle of fine hairs which cling together. Style-arms short, clavate. Pappus of 2 ovate scales. Achenes flat, obovoid, notched, winged on each side, sparsely hairy.—DISTRIB. East Indies; species 1.

1. Cæsulia axillaris, *Roxb. Hort. Beng.* (1814) p. 62. A succulent prostrate or suberect herb, 6—18 in. high; stem stout, more or less branched, striate, glabrous. Leaves sessile, 1½—6 by 3/16—1 in., lanceolate, acute, distantly serrulate, narrowed at the base, glabrous. Heads axillary, sessile; flowers pale-blue or white; outer flowers often sub-racemosely stipitate or sessile, irregularly intermixed with linear, acute bracteoles (*paleæ*); inner flowers sessile, without interspersed paleæ. Receptacle glabrous, sparsely paleaceous. Involucre large, membranous; bracts 2, orbicular or broadly ovate, crenulate or dentate, with a dorsal apiculus near the apex. Corollas tubular, the limb slightly enlarged with 5 linear lobes 1/16 in. long. Anthers black (*Ritchie*); bases sagittate; tails slender, consisting of a small bundle of fine hairs which cling together. Pappus-scales 2, ovate, ribbed at the back, the rib produced into an apiculus. Achenes 1/10—⅛ in. long by about 1/12 in. broad at the apex (including the wing), flat, obovoid, notched and with a few small teeth at either side of the notch, broadly winged on each of the sides and sometimes with a rib on each of the flat faces which are sparsely studded with short stout white hairs. Fl. B. I. v. 3, p. 291; Grah. Cat. p. 96; Dalz. & Gibs. p. 126; Roxb. Cor. Pl. v. 1, p. 64, t. 93; Wight, Icon. t. 1102; C. B. Clarke, Comp. Ind. p. 116; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 648. —Flowers: Sept.—Jan. VERN. *Máká.*

Roxburgh has apparently taken the pappus-scales to be a partial involucre, but they are inserted at the top of the achene. Roxburgh's drawing is incorrect as to the style-arms also. Wight shews these correctly.

KONKAN: *Lambert*! DECCAN: Poona, *Woodrow*!; Kirkee, *J. G. Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 409!; Hubli, *Hohenhacker*, 744!—DISTRIB. Throughout the greater part of India in rice-fields.

26. **LAGASCA,** Cav.

Rigid villous or subglabrous herbs. Leaves opposite or the upper alternate, entire or toothed. Heads 1-flowered, in leafy balls which are solitary terminal and peduncled, or in corymbose panicles. Flowers all ☿, fertile, white, red or yellow. Involucre tubular; bracts 5, connate. Receptacle small. Corolla regular; tube short; limb elongate, cylindric or dilated above, 5-fid. Anther-bases sagittate; auricles obtuse. Style-arms elongate, subacute, hairy. Pappus a toothed or fimbriate cup or ring. Achenes cuneate, compressed or 3-angled, tip rounded.—DISTRIB. Mexico and Central America; species 7.

The genus was named *Lagasca* by Cavanilles, not *Lagascea*.

1. **Lagasca mollis,** *Cav. in Anal. Cienc. Nat.* v. 6 (1803) p. 332, t. 44. A tall slender herb; stem and branches pale, slender, striate, terete, pubescent. Leaves 1—2 by ½—1¼ in., ovate, acute or acuminate, crenate, silky beneath and with somewhat coarser hairs above, base shortly cuneate; petioles ⅜—1 in. long, densely pubescent. Heads in clusters (resembling simple heads), ¾—1 in. in diam., silky-villous, with an involucre of elliptic acute or acuminate very silky leaves; flowers white; peduncles long, slender, pubescent. Involucre-bracts ¼—$\frac{5}{16}$ in. long, connate for about ½-way up into a tube, lanceolate, very acute, ciliate. Corolla-tube short; limb 5-fid, the segments linear, acute, about as long as the tube, pubescent outside near the tip. Style-arms long, hairy. Pappus a short fimbriate cup. Achenes cuneate, $\frac{1}{12}$ in. long. Fl. B. I. v. 3, p. 302; Grah. Cat. p. 96; Dalz. & Gibs. Suppl. p. 46; C. B. Clarke, Comp. Ind. p. 131; Trim. Fl. Ceyl. v. 3, p. 34; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. Flowers nearly all the year. VERN. *Jharvad*.

A native of Central America, but completely naturalized in the Bombay Presidency, especially in the Deccan, where it has, in the Poona districts, become a most troublesome weed, spreading rapidly and seriously interfering with the growth of the grass in some talukas.

27. **XANTHIUM,** Linn.

Annual coarse rough herbs unarmed, or with 3-fid spines. Leaves alternate, toothed or lobed. Heads monœcious (♀ and ☿), axillary, the ☿ in the upper axils, globose, many-flowered, sterile, tubular, 5-toothed, the ♀ 2-flowered, apetalous, fertile. HEADS OF ☿ FLOWERS: Involucre short; bracts few, 1—2-seriate, narrow. Receptacle cylindric, with hyaline cuneate or linear-spathulate paleæ enclosing the flowers. Corollas tubular, enlarged into a 5-toothed limb. Anthers distinct, bases obtuse, tips mucronate, inflexed; filaments monadelphous. Style undivided, slender, slightly dilated at the apex. Achenes rudimentary. HEADS OF ♀ FLOWERS: Involucre-bracts united into an ovoid 2-beaked herbaceous 2-celled utricle (with 1 flower in each cell), enlarging in fruit, with hooked bristles and with

sometimes a few small free outer bracts. Corollas 0. Style-arms exserted from the beaks of the involucre. Pappus 0. Achenes completely enclosed in the indurated cells of the enlarged involucre (like seeds in a capsule), compressed, obovoid, thick.—DISTRIB. Species 4 of uncertain origin, but probably all American.

1. **Xanthium strumarium,** *Linn. Sp. Pl.* (1753) p. 987. Annual, unarmed ; stem short, stout, slightly branched, rough with short hairs. Leaves numerous, 2—3 in. long and almost as broad as long, broadly triangular-ovate or suborbicular, acute, often 3-lobed, rough with appressed hairs on both sides, irregularly inciso-serrate, somewhat cordate and shortly cuneate at the base ; petioles 1—3 in. long, hairy. Heads in terminal and axillary racemes, the barren heads rather numerous, crowded at the top of the stem, the fertile heads fewer, axillary. Involucre of fertile heads ovoid in fruit, about ⅝ in. long, with 2 erect mucronate beaks, pubescent, thickly clothed with usually hooked prickles, 2-celled, hard and tough. Achenes ½ in. long, oblong-ovoid, compressed, glabrous. Fl. B. I. v. 3, p. 303 ; C. B. Clarke, Comp. Ind. p. 132 ; Oliver, Fl. Trop. Afr. v. 3, p. 371 ; Trim. Fl. Ceyl. v. 3, p. 35 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 318. *Xanthium indicum,* DC. in Wight, Contrib. p. 17 ; Grah. Cat. p. 101 ; Dalz. & Gibs. p. 127.—Flowers: Jan.—Feb. VERN. *Shankeshvar.*

KONKAN : *Stocks* !, *Law* ! ; Bombay below Parel flagstaff, *Graham.* DECCAN : Poona, *Cooke* !, *Woodrow* ! ; banks of Moola river, Kirkee, *J. G. Woodrow* ! ; Gokak Falls, *Ritchie,* 1812 !—DISTRIB. Throughout India ; Ceylon and warmer parts of the world.

The fruit is employed in native medicine. See Watt, Dict. Econ. Prod. l. c.

28. SIEGESBECKIA, Linn.

Herbs, usually annual, more or less glandular-pubescent. Leaves opposite, toothed. Heads small, in leafy lax panicles, heterogamous, subradiate, yellow or white ; ray-flowers ♀, fertile, 1-seriate ; disk-flowers ☿, fertile or the inner sterile. Involucre campanulate or hemispheric ; bracts few, herbaceous, glandular, the exterior (usually 5) linear-cuneate, spreading, the inner enclosing the ray-flowers. Receptacle small ; paleæ membranous, concave, often enclosing the flowers. Corollas of ♀ flowers with a short tube and 2—3-fid limb, those of the ☿ flowers tubular, the limb campanulate and 5-fid, or narrow and 3—4-toothed. Anther-bases entire. Style-arms of ☿ flowers short, flattened, subacute. Pappus 0. Achenes obovoid-oblong, not compressed, often incurved, obtuse.—DISTRIB. Species 2, one widely spread throughout tropical and subtropical regions, the other Peruvian.

1. **Siegesbeckia orientalis,** *Linn. Sp. Pl.* (1753) p. 900. A large annual herb 2—4 ft. high ; stem stiff, erect, with horizontal branches below and dichotomously branched ones above ; stem and branches tinged with purple, terete, pubescent. Leaves opposite, 2—5 by 1¼—2¾ in., triangular-ovate, acute or acuminate, deeply and irregularly toothed, the uppermost leaves much smaller and nearly entire, all

finely pubescent on both sides, base cuneate, running down wing-like into a somewhat obscure petiole. Heads small, peduncled, in leafy panicles ; flowers yellow, those of the ray red beneath. Involucre-bracts in 2 rows, very dissimilar ; the 5 outer exceeding ½ in. long, linear-spathulate or clavate, horizontally spreading with recurved margins, the upper surface covered with large viscous glandular hairs ; the 5 inner bracts short, boat-shaped, obtuse, glandular-hairy on the back, each bract enclosing one of the ray-flowers. Ray-flowers usually 5, ligulate, the ligules recurved, 3-toothed at the apex. Pappus 0. Achenes each enclosed in a boat-shaped bract, glabrous, slightly rough, black. Fl. B. I. v. 3, p. 304 ; Grah. Cat. p. 100 ; Dalz. & Gibs. p. 127 ; Wight, Icon. t. 1103 ; Trim. Fl. Ceyl. v. 3, p. 36 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649.—Flowers : Nov.—Dec. VERN. *Katampu.*

DECCAN : common, *Graham* ; Poona, *Cooke* ! ; island in the Poona river, *Woodrow* ! ; Panchgani, near the caves, *Woodrow* ! S. M. COUNTRY : Belgaum, *Dalzell & Gibson, Ritchie*, 1095 !—DISTRIB. Throughout India ; Ceylon, most tropical and subtropical regions of both hemispheres.

29. **ECLIPTA,** Linn.

Annual or perennial herbs, diffuse or erect, branched, more or less strigose. Leaves opposite. Heads small, axillary or terminal, peduncled, heterogamous, rayed ; ray-flowers ♀, sub-2-seriate, fertile or sterile, white or yellow ; disk-flowers ☿, fertile. Involucre hemispheric or broadly campanulate ; bracts sub-2-seriate, herbaceous, subequal or the inner shorter. Receptacle flat or somewhat convex, the paleæ narrow, enclosing several flowers, the innermost very narrow, or 0. Corollas of ♀ flowers ligulate, spreading, ligules small narrow, entire or 2-toothed ; the corollas of the ☿ flowers regular, tubular, the limb shortly 4—5-fid. Anther-bases obtuse, subentire. Style-arms flattened, terminated by short or triangular obtuse appendages. Achenes of the ray narrow, triquetrous, often empty, those of the disk laterally subcompressed, top entire, toothed or 2-aristate.—DISTRIB. Species 3 or 4, one common throughout the warmer regions of the globe, another Australian, and a third S. American.

1. **Eclipta erecta,** *Linn. Mantiss.* v. 2 (1771) p. 286. Annual, erect or prostrate, branched, often rooting at the nodes ; stem and branches strigose with appressed white hairs. Leaves sessile, 1—3 in. long, variable in breadth, usually oblong-lanceolate, subentire, acute or subacute, sparsely strigose with appressed hairs on both sides, base tapering. Heads ¼—½ in. in diam., solitary or 2 together on unequal axillary peduncles. Involucre-bracts about 8, ovate, obtuse or acute, herbaceous, strigose with appressed white hairs. Ray-flowers ligulate, the ligule small, spreading, scarcely as long as the bracts, not toothed, white. Disk-flowers tubular, the corollas often 4-toothed. Pappus 0, except occasionally very minute teeth on the top of the achene. Achenes cuneate, compressed and with a narrow wing, covered with warty excrescences. Jackson, in Index Kewen. v. 2, p. 821 ; Dalz. & Gibs. p. 127 ; Aitch. Pb. & Sind Pl. p. 75. *Eclipta prostrata,* Linn. Mantiss. v. 2, p. 286 ; Grah. Cat. p. 99 ; Dalz. & Gibs. p. 127.

Eclipta alba, Haask. Pl. Jav. Rar. (1848) p. 528 ; Hook. f. Fl. B. I. v. 3, p. 304 ; C. B. Clarke, Comp. Ind. p. 134 ; Trim. Fl. Ceyl. v. 3, p. 37 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Watt, Dict. Econ. Prod. v. 3, p. 201.—Flowers : Oct.—Dec. VERN. *Maká* ; ***Bhángrá.***

There are two forms of the plant, one erect and the other prostrate, but otherwise not differing. Both are pretty common in the Bombay Presidency. KONKAN : Kalyan, *Woodrow*. DECCAN : Poona, *Cooke* ! SIND : *Stocks* !, *Bhola Puran* ! ; Karachi, *Woodrow*.

The plant is of considerable repute in native medicine. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. India (Bengal, Birma, Central India, Panjáb, W. Peninsula) ; Ceylon, Malaya, cosmopolitan in warm climates.

30. **SCLEROCARPUS,** Jacq.

Annual or perennial branched herbs, strigose or villous. Leaves alternate or the lower (rarely all) opposite. Heads terminal, or in the forks or leaf-opposed, heterogamous, rayed, yellow ; ray-flowers neuter, 1-seriate ; disk-flowers ☿ , fertile. Involucre campanulate ; bracts few, 2-seriate, all or the tips herbaceous, the outer spreading. Receptacle convex or conic, the paleæ enfolding the base of the ☿ flowers, at length closed above the achenes, indurated and deciduous with them. Corollas of the ray-flowers ligulate, the ligules spreading, entire or scarcely toothed ; corollas of the ☿ flowers regular, tubular, the limb slightly enlarged, 3—5-fid. Anther-bases subentire. Style-arms of ☿ flowers elongate, acute, obtuse or subclavate. Pappus 0 or a short ring. Achenes obovoid, subcompressed, glabrous, narrowed below, enclosed in the rugose often beaked paleæ.—DISTRIB. Tropical America, Africa, and Asia ; species about 11.

1. **Sclerocarpus africanus,** *Jacq. Icon. Pl. Rar.* v. 1 (1782) p. 17, t. 176. Annual, erect, 1—3 ft. high ; stem and branches terete, striate, more or less hispid. Leaves 1—3½ by ½—1¾ in., mostly alternate, ovate, acute, clothed on both sides with appressed hairs remotely serrate, 3—5-nerved, base shortly cuneate ; petioles up to ½ in. long. Heads ⅓—½ in. in diam., sessile or peduncled, terminal or leaf-opposed, supported usually by 2 or 3 floral leaves. Invol.-bracts foliaceous, linear-oblong, obtuse, hairy. Ray-flowers few, ligulate, neuter. Corollas of disk-flowers elongate ; lobes lanceolate, acute. Paleæ of the receptacle boat-shaped, enclosing the curved gibbous ribbed achenes. Fl. B. I. v. 3, p. 305 ; Dalz. & Gibs. p. 129 ; Oliver, Fl. Trop. Afr. v. 3, p. 374 ; C. B. Clarke, Comp. Ind. p. 134 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649.—Flowers ; July-Aug.

KONKAN : *Stocks* ! DECCAN : highest hills round Junnar, *Dalzell & Gibson* ; Kadakvasla, *Woodrow* ! ; hill 14 miles W. of Poona, *Krishna* ! ; Nasik, *Woodrow*. GUJARAT : Porbandar (Kathiawar), *Cooke* !—DISTRIB. India (W Himalaya, Panjáb, W. Peninsula) ; Tropical Africa.

31. **BLAINVILLEA,** Cass.

Erect branched scabrid or villous herbs. Leaves opposite or the upper alternate, petiolate. Heads small, subsessile or peduncled, terminal or axillary, heterogamous, rayed or subdisciform, yellow ;

ray-flowers ♀, fertile, 1—2-seriate ; disk-flowers ☿, fertile. Involucre ovoid-campanulate or at length subglobose ; bracts few, slightly unequal, the exterior herbaceous, the inner passing into the paleæ of the receptacle. Receptacle small, subconvex, furnished with rigidly membranous folded or concave paleæ. Corollas of ♀ flowers either ligulate with small spreading ligules 2—3-toothed, or slender with a short irregularly or subregularly 2—3-fid limb ; corollas of ☿ flowers regular, tubular, with an enlarged or campanulate shortly 5-fid limb. Anther-bases obtuse, entire. Style-arms of ☿ flowers narrow, flattened, with acute or subobtuse appendages. Pappus of 2—5 unequal (sometimes subpaleaceous) bristles connate at the base. Achenes truncate, those of the ray triquetrous or dorsally compressed, those of the disk laterally compressed or obtusely 3—4-angled.—DISTRIB. Tropical regions of the whole world ; species about 10.

1. **Blainvillea rhomboidea,** *Cass. in Dict. Sc. Nat.* v. 29 (1823) p. 494. Annual, 1—2 ft. high, hispidly hairy. Stem striate, subterete ; branches numerous, ascending, scabrous. Leaves 1½—3 by 1—2 in., ovate or ovate-lanceolate, alternate or opposite, acute, crenate-serrate, hispidly hairy, 3-nerved, base cuneate ; petioles ½—¾ in. long, hairy. Heads ⅓—½ in. in diam., in erect terminal cymes ; peduncles variable in length, slender, hairy. Outer invol.-bracts herbaceous, ovate-oblong, subacute, pubescent ; inner slightly larger, passing into the paleæ of the receptacle, subscarious, rigid, broadly oblong, pectinate at the truncate apex, longitudinally striate with green nerves, pubescent, persistent after the fall of the fruit. Ray-flowers very short and inconspicuous ; ligules yellow or whitish, bifid. Pappus of a few unequal acute scales, rarely short bristles. Achenes of the ray cuneiform, triquetrous, slightly curved, ⅛ in. long ; achenes of the disk triquetrous or compressed, cuneiform, pubescent, nearly straight, ⅛ in. long. Jackson, in Index Kewen. v. 1, p. 310. *Blainvillea latifolia*, DC. in Wight, Contrib. (1834) p. 17 ; Dalz. & Gibs. p. 127 ; Hook. f. Fl. B. I. v. 3, p. 305 ; C. B. Clarke, Comp. Ind. p. 135 ; Trim. Fl. Ceyl. v. 3, p. 37 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Aitch. Pb. & Sind Pl. p. 75.—Flowers: Aug.-Sept.

DECCAN : Poona, *Cooke*!, *Woodrow*! ; Bowdhán jungles 10 miles W. of Poona, *Kanitkar*! SIND : *Stocks* ex *Aitch.*—DISTRIB. Throughout the greater part of India ; Ceylon, Java, Africa, America, and Australia.

32. **WEDELIA,** Jacq.

Herbs or undershrubs, scabrid-pubescent or hirsute. Leaves opposite, usually toothed. Heads axillary or terminal, heterogamous, rayed, yellow ; ray-flowers ♀, fertile ; disk-flowers ☿, fertile or the inner sterile. Involucre ovoid, campanulate, or subhemispheric ; bracts sub-2-seriate, the exterior 3—5, usually herbaceous or foliaceous, the inner dry or rigidly membranous. Receptacle flat or convex, furnished with folded or concave paleæ embracing the ☿ flowers. Corollas of ♀ flowers ligulate, the ligules spreading, entire or 2—3-toothed ; corollas of ☿ flowers regular, tubular, with an elongate 5-toothed limb. Anther-bases entire or sagittate, with small blunt

auricles. Style-arms of ♀ flowers short or elongate, with subacute hairy tips. Pappus 0 or a toothed cup or ring, or of short scales. Achenes cuneate-oblong or obovoid, thick, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened.—DISTRIB. Warmer regions of both hemispheres; species about 45.

Invol.-bracts much longer than the disk flowers; leaves subsessile, lanceolate-oblong	1. *W. calendulacea.*
Invol.-bracts about equalling the disk-flowers; leaves petioled, ovate.	
An erect herb; achenes ⅛ in. long	2. *W. urticæfolia.*
A climbing shrub; achenes ⅛ in. long	3. *W. biflora.*

1. **Wedelia calendulacea,** *Less. Syn. Comp.* (1832) p. 222. A perennial herb 1—3 ft. high; stem procumbent at the base and rooting at the lower nodes, terete, more or less appressedly hairy. Leaves opposite, subsessile, 1—3 by ⅜—1⅛ in., lanceolate-oblong, entire or irregularly crenate-serrate, scabrous with short white hairs or at length more or less glabrate, base tapering. Heads ¾—1¼ in. in diam., solitary; peduncles 1—6 in. long, erect, slender, slightly thickened beneath the heads. Invol.-bracts herbaceous, oblong or slightly obovate, hairy, subobtuse, much longer than the disk-flowers. Ray-flowers ligulate, ligules yellow, 2—3-toothed. Style-arms of ♀ flowers long, acute, recurved. Pappus a toothed membranous cup. Achenes of the ray tapering, slightly pubescent. Fl. B. I. v. 3, p. 306; Dalz. & Gibs. p. 128; Wight, Icon. t. 1107; Arn. in Hook. Comp. Bot. Mag. v. 1, p. 81, t. 5; C. B. Clarke, Comp. Ind. p. 136; Trim. Fl. Ceyl. v. 3, p. 38; Watt, Dict. Econ. Prod. v. 6, part 4, p. 301. *Verbesina calendulacea,* Linn. Sp. Pl. (1753) p. 902; Grah. Cat. p. 100.—Flowers: Feb.—May. VERN. *Pivala-bhángrá.*

This plant has been included on the authority of *Graham* l. c. and *Dalzell & Gibson* l. c. I have seen no specimens from Bombay, and the plant does not appear to have been found by any recent collectors in that Presidency. It is not included in *Woodrow's* list, and there are no specimens from the Bombay Presidency in Herb. Kew.

KONKAN: in moist places, ex *Graham* l. c.—DISTRIB. India Bengal, Assam, Birma, W. Peninsula); Ceylon, Malay Islands, China, Japan.

2. **Wedelia urticæfolia,** *DC. in Wight, Contrib.* p. 18, Var. *β. Wightii.* A weak erect herb; branches light-colored, terete, slightly grooved, pubescent or scabrid. Leaves opposite, 3—6 by ¾—2 in., ovate, acute or acuminate, closely and sharply serrate, strigosely hispid on both sides, base rounded or subacute; petioles ¼—¾ in. long. Heads ¾—1 in. in diam., solitary or 2—3 together; peduncles densely hairy. Outer invol.-bracts ovate-oblong, acuminate, hairy, about equalling the disk-flowers. Ray-flowers ligulate, the ligules sometimes exceeding ½ in. long by ⅛ in. wide, 2-fid at the apex. Pappus a small toothed ciliolate cup. Achenes elongate, cuneate, 3-quetrous, truncate at the apex, nearly glabrous, ⅛ in. long. Fl. B. I. v. 3, p. 306; Wight, Icon. t. 1106; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. *Wollastonia biflora,* Dalz. & Gibs. p. 128, exclud. syn. (*not* of DC.). *Verbesina biflora,* Wall. Cat. 3207, B, in part; Grah. Cat. p. 100.—Flowers: Aug.—Sept.

KONKAN: *Law*!, *Dalzell*!; near Marmagao, *Cooke*! DECCAN: Junnar, *Woodrow*!; Poona, *Woodrow*. S. M. COUNTRY: Cheeta hill 4 miles S. of Belgaum, *Ritchie*, 380! KANARA: Kulgi (N. Kanara), *Talbot*, 2416!—DISTRIB. India (W. Peninsula); Malayan Archipelago.

3. **Wedelia biflora,** *DC. in Wight Contrib.* (1834) p. 18 (*not* of C. B. Clarke). A rambling climbing shrub growing near the sea; stem semi-woody below, with opposite horizontal striate glabrous or pubescent branches. Leaves opposite, 2½—5½ by 1—3 in., ovate, acute or acuminate, rather distantly serrate, rough with appressed hairs on both sides, base usually cuneate; petioles ⅛—2 in. long, pubescent. Heads ½—¾ in. in diam., usually 3 together at the ends of the branches; peduncles long, unequal, glabrous or pubescent. Invol.-bracts oblong-lanceolate, about equalling the disk-flowers, pubescent. Ray-flowers ligulate, ligules yellow, 2—3-toothed at the apex. Pappus usually 0. Achenes 3 (sometimes 4) -angled, ⅛ in. long, cuneate, more or less tubercled, glabrous except at the truncate apex where they are minutely pubescent. Fl. B. I. v. 3, p. 306; Trim. Fl. Ceyl. v. 3, p. 39; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649. *Wedelia scandens*, C. B. Clarke, Comp. Ind. p. 136 (exclud. syn. *W. Horsfieldiana*). *Wollastonia biflora* and *scabriuscula*, DC. Prodr. v. 5, pp. 546 & 547; Wight, Icon. t. 1108.—Flowers: Dec. VERN. *Sonki.*

Very close to the last species, from which it differs in its climbing habit, in being much less hairy, and in its shorter and broader achenes.

On the sea-coast. KONKAN: near Marmagao, *Woodrow*.—DISTRIB. Tropical shores of Eastern Asia.

33. SPILANTHES, Linn.

Annual herbs. Leaves opposite, usually toothed. Heads usually on long peduncles, axillary or terminal, heterogamous and rayed or homogamous and disciform; ray-flowers ♀, fertile, 1-seriate; disk-flowers ☿, fertile. Involucre short, ovoid or campanulate; bracts sub-2-seriate, slightly unequal. Receptacle convex, elongate; paleæ folded, enclosing the ☿ flowers, often contracted with the ovary into a stalk. Corollas of ♀ flowers ligulate, ligules small, white or yellow, spreading, entire or 2—3-toothed; corollas of ☿ flowers regular, tubular, the limb enlarged or narrowly campanulate, 4—5-fid. Anther-bases truncate, entire or rarely minutely 2-toothed. Style-arms of ☿ flowers rather long, truncate. Pappus 0 or of 2—3 bristles. Achenes of the ray 3-quetrous or dorsally compressed, those of the disk laterally compressed, usually ciliate at the margins or angles.—DISTRIB. Chiefly Tropical American; species about 20.

1. **Spilanthes Acmella,** *Murr. Syst. Veg.* ed. 13 (1774) p. 610. Annual, erect or ascending; stem and branches more or less hairy. Leaves opposite, 1—2 by ½—1½ in., ovate, acute or subobtuse, irregularly crenate-serrate or sometimes entire, glabrous or nearly so, base usually acute; petioles ¼—⅝ in. long, pubescent. Heads ¼—½ in. long, ovoid, solitary or subpanicled; peduncles sometimes reaching or even exceeding 4 in. long. Invol.-bracts oblong-lanceolate, sub-

acute, pubescent, less than half as long as the head of flowers. Ray-flowers and ligules very often absent, the latter when present minute. Pappus 0. Achenes oblong or slightly obovoid, truncate, much compressed, nearly glabrous. Fl. B. I. v. 3, p. 307 ; Grah. Cat. p. 99 ; Dalz. & Gibs. p. 129 ; C. B. Clarke, Comp. Ind. p. 138 ; Trim. Fl. Ceyl. v. 3, p. 40 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 329. *Spilanthes calva*, DC. Prodr. v. 5, p. 625 ; Wight, Icon. t. 1109.—Flowers : Nov. VERN. *Akkalkára.*

KONKAN : *Stocks* !, *Law* ! DECCAN : Mahableshwar, *Cooke* ! ; Kolhapur, *Cooke* ! S. M. COUNTRY : Belgaum, *Cooke* !, *Ritchie*, 1809 ! ; Chorla Ghát, *Dalzell & Gibson*. KANARA : Yellur, *Ritchie*, 1809 !—DISTRIB. Throughout India ; Ceylon, all warm countries.

The flower-heads when chewed have a hot burning taste and cause profuse salivation.

34. GLOSSOCARDIA, Cass.

An annual diffuse branched glabrous herb. Leaves alternate, slender, 1—2-pinnatisect. Heads small, terminal or axillary, often numerous, pedunculate, heterogamous, rayed, yellow ; ray-flowers ♀, usually solitary, fertile ; disk-flowers ☿ , few, fertile, tubular. Involucre oblong ; bracts few ; the exterior 1—3, small ; the inner 3—5, with membranous margins. Receptacle flat, with a few flat paleæ inter-spersed among the flowers. Corollas of ♀ flowers ligulate, the ligules 2-fid ; corollas of ☿ flowers regular, tubular, with a slightly enlarged or narrowly campanulate 4-fid limb. Anther-bases obtuse, entire. Style-arms of ☿ flowers with short linear acute hispid tips. Pappus of 2 small stiff awns. Achenes narrowly oblong, dorsally much compressed, ciliate and with bearded faces.—DISTRIB. East Indies ; species 1.

1. Glossocardia linearifolia, *Cass. in Dict. Sc. Nat.* v. 19 (1821) p. 62. A small prostrate or erect annual, much branched from the base ; stems and branches deeply grooved. Leaves ½—2 in. long, 2-pinnatisect ; segments linear, apiculate ; petioles variable in length, slender. Heads ⅜ in. long ; paleæ of receptacle linear, acute, flat. Outer invol.-bracts usually 3, ovate-lanceolate, acute, about ⅛ in. long with membranous and slightly ciliate margins and a green midrib ; inner invol.-bracts ¼—⅓ in. long, oblong, subobtuse, striate, glabrous and with pale membranous margins. Pappus of 2 stiff slightly divaricate awns. Achenes ¼ in. long, brown, narrowly oblong, much flattened, densely hairy on the edges and somewhat less densely so on the flat faces. Fl. B. I. v. 3, p. 308 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 3, p. 508. *Glossocardia Bosvallia*, DC. in Wight, Contrib. (1834) p. 19. *G. Bosvallea*, DC. Prodr. v. 5, p. 631 ; Dalz. & Gibs. p. 129 ; Wight, Icon. t. 1110 ; C. B. Clarke, Comp. Ind. p. 139. *G. Boswellia*, Grah. Cat. p. 100.—Flowers : Aug.-Oct. VERN. *Pitpápda ; Phattarsuva.*

KONKAN : *Law* ! DECCAN : Poona, *Cooke* !, *Woodrow* ! ; Kaladghi, *Law* ex *Graham*. S. M. COUNTRY : hills N. of Belgaum, *Ritchie*, 387 ! KANARA : *Law* ! —DISTRIB. India (W. Peninsula, Central India).

35. **BIDENS,** Linn.

Annual or perennial herbs, sometimes scandent. Leaves opposite, toothed, incised, or 1—2-pinnate. Heads corymbosely panicled or subsolitary, heterogamous and rayed, or homogamous and disciform; ray-flowers when present 1-seriate, neuter or more rarely ♀; disk-flowers ☿, fertile. Involucre campanulate or subhemispheric; bracts sub-2-seriate, often shortly connate at the base; outer herbaceous, short or expanded into elongate leaves; inner membranous, often with white margins. Receptacle flat or somewhat convex; paleæ narrow, nearly flat, subtending the ☿ flowers. Corollas of ray-flowers ligulate, the ligules spreading, yellow or white; corollas of disk-flowers usually yellow, regular, tubular, with a 5-fid cylindric limb. Anther-cells entire at the base, or sagittate with blunt auricles. Style-arms of ☿ flowers hairy above; tips short, acute or subulate. Pappus of 2—4 rigid retrorsely hispid bristles, or 0. Achenes dorsally compressed or sub-4-gonous, obovoid-oblong or linear, often narrowed but not beaked above.—DISTRIB. Chiefly American; species about 50.

1. **Bidens pilosa,** *Linn. Sp. Pl.* (1753) p. 832. Annual, erect, glabrous or more or less pubescent, 2—3 ft. high; stems quadrangular, grooved; branches opposite. Leaves very variable, sometimes 3-foliolate, but (in the Bombay Presidency) usually consisting of 2 subopposite pairs of leaflets and a deeply 3-lobed terminal leaflet which is larger than the lateral ones, the lowest pair of leaflets sometimes again pinnately divided; ultimate leaflets subsessile, ovate, acute, serrate, glabrous; common petioles somewhat dilated and sheathing at the base. Heads reaching ½ in. in diam., elongating in fruit. Outer invol.-bracts herbaceous, oblong, subacute, shorter than the inner, ciliate and with scarious margins. Ray-flowers ligulate, white or yellow, ligules narrow, strap-shaped. Pappus of 2—4 rigid retrorsely hispid slightly spreading awns. Achenes ⅛—⅜ in. long, linear, quadrangular, slightly tapering towards the apex, glabrous. Fl. B. I. v. 3, p. 309; C. B. Clarke, Comp. Ind. p. 140; Trim. Fl. Ceyl. v. 3, p. 40; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650. *Bidens Wallichii,* DC. Prodr. v. 5, p. 598; Grah. Cat. p. 101; Dalz. & Gibs. p. 128.—Flowers nearly all the year.

I have not attempted to keep the var. *bipinnata,* Hook. f. Fl. B. I. l. c. (*B. Wallichii,* DC), distinct from *B. pilosa.* The most common, indeed almost the only, form in the Bombay Presidency is this variety, but the leaves of the plant are so variable and so variously cut that I agree with Trimen (*l. c.*) that the variety is scarcely worth distinction.

Tolerably common in the Deccan plains and gardens. DECCAN: Poona, *Ranade*!; Bowdhán jungles near Poona, *Kanitkar*!—DISTRIB. Throughout India; Ceylon and most warm countries.

36. **GLOSSOGYNE,** Cass.

Perennial glabrous herbs with almost naked stems and branches. Leaves mostly radical, crowded, pinnatifid, or cuneate and 3-toothed, the cauline leaves alternate, or the lower opposite or 0. Heads small,

peduncled, few, corymbose, heterogamous and rayed or homogamous and disciform ; ray-flowers ♀, fertile ; disk-flowers ☿, fertile. Involucre small ; bracts 2—3-seriate, narrow, shortly connate at the base; the inner often larger and margined. Receptacle flat , paleæ scarious, flat or concave. Corollas of ♀ flowers ligulate, yellow (or white ?), the ligules spreading, entire or coarsely 2—3-toothed ; corollas of ☿ flowers yellow. Anther-bases obtuse. Style-arms of ☿ flowers with long hairy appendages. Pappus of 2 retrorsely scabrid bristles. Achenes dorsally compressed, linear or ovoid, sometimes almost winged, truncate at the apex, glabrous.—DISTRIB. Tropical Asia and Australia ; species 5.

1. **Glossogyne pinnatifida,** *DC. in Wight, Contrib.* (1834) p. 19. Perennial, with a woody fusiform root ; stems numerous from the root ; branches chiefly from near the top, slender, forked. Leaves chiefly radical, erect, coriaceous, 1—2 in. long (including the petiole), pinnatifid ; segments few, linear-oblong, subacute, entire, glabrous. Flowering branches 6—12 in. long, almost leafless, grooved, glabrous. Heads ¼—$\frac{5}{16}$ in. in diam., elongating in fruit. Invol.-bracts connate at the base, linear-oblong, obtuse. Ray-flowers ligulate, yellow, ligules 3-toothed. Pappus of 2 retrorsely scabrid spreading awns. Achenes ¼—⅓ in. long, linear-oblong, grooved, glabrous, dark-brown. Fl. B. I. v. 3, p. 310 ; Dalz. & Gibs. p. 129 ; C. B. Clarke, Comp. Ind. p. 141 ; Trim. Fl. Ceyl. v. 3, p. 41 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 3, p. 508.—Flowers : Sept.-Oct.

Rare in the Bombay Presidency. S. M. COUNTRY : *Dalzell & Gibson*; north of Dharwar, *Ritchie*, 1096!—DISTRIB. India (Western Bengal, Gangetic plain, Kumaon, W. Peninsula); Ceylon.

A preparation of the root has been used as a remedy in the case of snake-bite and scorpion-stings. See Watt, Dict. Econ. Prod. l. c.

37. TRIDAX, Linn.

Perennial herbs branched at the base. Leaves opposite, inciso-dentate or pinnatisect ; segments few, narrow. Heads on very long peduncles, heterogamous, rayed ; ray-flowers ♀, fertile ; disk-flowers ☿, fertile. Involucre ovoid, campanulate or subhemispheric ; bracts few-seriate, slightly unequal, the outer broad, herbaceous. Receptacle flat or convex ; paleæ membranous. Corollas of ♀ flowers ligulate or sub-bilabiate, the outer lip large, 3-fid or 3-partite, the inner small, 2-lobed or 2-partite, or 0 ; corollas of ☿ flowers regular, tubular, the limb elongate, slightly enlarged at the apex, shortly 5-fid. Anthers sagittate, with short acute auricles at the base. Style-arms of ♀ flowers hairy above ; tips subulate. Pappus paleaceous, the bristles numerous, aristato-acuminate, plumoso-ciliate, long or short. Achenes turbinate or oblong, more or less sericeo-villous.—DISTRIB. Tropical America ; species 7, of which 1 species (the following) has been naturalized in India.

1. **Tridax procumbens,** *Linn. Sp. Pl.* (1753) p. 900. A straggling herb 1—2 ft. high ; stem and branches hairy. Leaves 1—1¾ by ¾—1 in., ovate-elliptic, acute, deeply inciso-dentate or pinnatisect,

clothed on both sides with short hairs from glandular bases, base acute ; petioles $\frac{1}{8}$—$\frac{1}{2}$ in. long, densely hairy. Heads $\frac{1}{2}$—$\frac{5}{8}$ in. in diam., solitary ; peduncles very long, sometimes exceeding 12—14 in. long, slender, sparsely clothed with weak spreading white hairs. Outer invol.-bracts very hairy, ovate, acuminate ; inner bracts membranous, oblong, slightly longer than the outer, pubescent on the back. Ray-flowers ligulate, the ligules yellow, deeply 3-partite, the middle lobe the smallest ; the upper lip obsolete ; tube of the corolla hairy. Pappus of numerous slightly unequal aristate feathery bristles. Achenes $\frac{1}{12}$ in. long, oblong, densely silky-hairy, black. Fl. B. I. v. 3, p. 311 ; C. B. Clarke, Comp. Ind. p. 142 ; Trim. Fl. Ceyl. v. 3, p. 42 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650.—Flowers more or less throughout the year.

A native of Central America. It has become completely naturalized in the Bombay Presidency, especially in the Deccan, where it is very abundant.

38. **CENTIPEDA,** Lour.

Annual or perennial herbs. Leaves alternate, often spathulate, entire or coarsely toothed. Heads small, sessile on the branches or racemose, heterogamous, disciform, yellow ; outer flowers ♀, many-seriate, fertile ; disk-flowers ☿, few, fertile. Involucre hemispheric ; bracts 2-seriate, subequal and with scarious margins. Receptacle flat or slightly convex, naked. Corollas all regular, tubular ; tube very short ; limb in ♀ flowers narrow, 2—3-lobed, in the ☿ flowers broader, campanulate, 4-fid. Anther-bases obtuse, entire. Style-arms of ☿ flowers short, truncate. Pappus 0. Achenes 4-angled ; tip obtuse ; angles hairy.—DISTRIB. Asia, Australia, and Tropical S. America ; species 3.

1. **Centipeda orbicularis,** *Lour. Fl. Cochinch.* (1790) p. 493. A small annual ; stems numerous, 4—8 in. long, spreading from the root, prostrate, slender, leafy, usually glabrous. Leaves numerous, subsessile, $\frac{1}{4}$—$\frac{3}{8}$ by $\frac{1}{8}$—$\frac{3}{16}$ in., oblong-spathulate, with few teeth (usually 2 on each side), base tapering. Heads $\frac{1}{16}$—$\frac{1}{8}$ in. in diam., globose, solitary, axillary, subsessile. Invol.-bracts (in flower) small, oblong, obtuse, with membranous margins. Pappus 0. Achenes minute, 4-angled, bristly on the angles. Fl. B. I. v. 3, p. 317 ; C. B. Clarke, Comp. Ind. p. 151 ; Trim. Fl. Ceyl. v. 3, p. 42. *Myrogyne minuta,* Less. in DC. Prodr. v. 6, p. 139. *Dichrocephala Schmidii,* Wight, Icon. t. 1610.—Flowers : Dec.-Feb.

S. M. COUNTRY : Londa, *Raoji* ! KANARA : Gonje, *Ritchie,* 1184 ! Kála naddi, *Ritchie,* 1184 !—DISTRIB. Throughout India in moist places ; Ceylon, Afghanistan, Malaya, China, Australia, and the Pacific Islands.

39. **ARTEMISIA,** Linn.

Herbs or shrubs usually strongly scented. Leaves alternate, entire, incised or 1—3-pinnatisect. Heads small, solitary or fascicled, racemose or panicled, never corymbose, heterogamous with the outer flowers ♀, fertile, 1-seriate, or homogamous, the ♀ flowers wanting ; inner or disk-flowers ☿, fertile or sterile. Involucre ovoid or broadly

campanulate ; bracts few-seriate with scarious margins, the outer shorter. Receptacle flat, convex or hemispheric, naked or hirsute. Corollas of ♀ flowers slender, tubular, shortly 2—3-fid at the apex ; corollas of ☿ flowers regular, tubular, the limb slightly enlarged or campanulate, 5-fid. Anther-bases obtuse, entire. Style-arms of ☿ flowers truncate, usually penicillate ; tips often connate in the sterile flowers. Pappus 0. Achenes very small, ellipsoid, oblong or sub-obovoid, faintly striate, glabrous or pilose.—DISTRIB. Chiefly in N. temperate regions, a few in S. America ; species about 150.

Disk-flowers sterile.		
Lower leaves sessile, simple, cuneate	1.	*A. parviflora.*
Lower leaves petioled, 1—3-pinnatisect	2.	*A. scoparia.*
Disk-flowers fertile.		
Outer invol.-bracts smaller than the inner	3.	*A. vulgaris.*
Outer invol.-bracts larger than the inner	4.	*A. pallens.*

1. **Artemisia parviflora,** *Buch.-Ham. ex Roxb. Hort. Beng.* (1814) p. 61. Shrubby, inodorous ; stem obliquely ascending, paniculately branched ; branches numerous, slender. Leaves 1—2 by ½—¾ in., sessile ; the lower usually simple, cuneate, with a variously toothed or lobed apex and with some linear stipuliform segments at the base, deep green on both sides, glabrous or slightly pubescent, not hoary-tomentose ; the uppermost floral leaves minute, entire. Heads pedicelled, very numerous, $\frac{1}{10}$—$\frac{1}{8}$ in. in diam., globose, in panicled racemes, drooping, greenish ; outer flowers ♀, fertile ; inner flowers ☿, sterile. Invol.-bracts glabrous or nearly so, ovate, acute, with scarious margins, the outer much smaller than the inner. Achenes minute, ellipsoid, smooth, brown. Fl. B. I. v. 3, p. 322 ; Dalz. & Gibs. p. 314 ; Wight, Contrib. p. 20 ; C. B. Clarke, Comp. Ind. p. 159 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 1, p. 326. *Artemisia glabrata,* DC. in Wight, Contrib. (1834) p. 20 ; Wight, Icon. t. 1111.—Flowers : Oct.-Dec. VERN. *Tel-Davaná.*

DECCAN : common on the eastern side of the Mahableshwar hills and on the road to Sattara, *Dalzell & Gibson* ; Panchgani Ghát, abundant, *Cooke !, Woodrow.*—DISTRIB. Throughout the greater part of India at altitudes from 3000 to 10,000 feet.

2. **Artemisia scoparia,** *Waldst. & Kit. Descr. et Icon. Pl. Rar. Hung.* v. 1 (1802) p. 66, t. 65. Annual or biennial, 1—3 ft. high, faintly odorous ; stem very slender, scarcely as thick as a quill, erect, grooved, purplish, glabrous or more or less pubescent, simple at the base, paniculately branched above ; branches sometimes almost capillary, purplish. Leaves deep green ; the radical ones petioled, ovate in outline, 1—3-pinnatisect, the segments linear ; cauline leaves filiform. Heads $\frac{1}{12}$—$\frac{1}{10}$ in. in diam., sessile or on short capillary pedicels, secund, in slender panicled racemes ; ♀ flowers in each head fertile, with very minute corollas ; ☿ flowers sterile, with much larger corollas. Invol.-bracts glistening, ovate-oblong, obtuse, with broad scarious margins, the inner bracts about twice as large as the outer. Achenes very minute, ellipsoid, about $\frac{1}{20}$ in. long. Fl. B. I. v. 3, p. 323 ; C. B. Clarke, Comp. Ind. p. 158 ; Woodr. in Journ.

Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 1, p. 326.—Flowers : Mar. VERN. *Gájará.*

Rare. SIND : *Dalzell* ! ; Mulir, *Woodrow.*—DISTRIB. India (Upper Gangetic plain, Panjáb, W. Himalaya) ; Japan, Afghanistan, Central Europe.

3. **Artemisia vulgaris,** *Linn. Sp. Pl.* (1753) p. 848. Perennial, shrubby, aromatic, 2—8 ft. high, pubescent or villous ; stems leafy, paniculately branched. Lower leaves 2—4 by 1—2 in., petioled, ovate in outline, with stipule-like lobes at the base, deeply pinnatisect, the lobes entire, toothed or again pinnatisect, all finely pubescent above, white-tomentose beneath. Upper leaves smaller, 3-fid or entire, lanceolate. Heads $\frac{1}{8}$—$\frac{1}{6}$ in. long, ovoid or subglobose, solitary or 2 or 3 together, sessile or very shortly pedicelled, subsecund, in spicate suberect or horizontal panicled racemes ; outer flowers ♀, very slender ; inner ☿, fertile. Invol.-bracts villous and with scarious margins ; the outer ovate, acute ; the inner oblong, obtuse, much larger than the outer, sometimes almost wholly membranous. Achenes oblong-ellipsoid, minute. Fl. B. I. v. 3, p. 325 (exclud. syn. *A. paniculata,* Roxb.) ; C. B. Clarke, Comp. Ind. p. 161 ; Trim. Fl. Ceyl. v. 3, p. 43 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 1, p. 327. *Artemisia indica,* Willd. Sp. Pl. v. 3, p. 1846 ; Grah. Cat. p. 102 ; Dalz. & Gibs. p. 129 ; Wight, Icon. t. 1112.—Flowers : Sept.—Jan. VERN. *Dhor-davaná.*

DECCAN : Purandhar Fort, abundant, *Graham* ; Ghâts, *Law* ! ; Panchgani, *Cooke* ! ; Mahableshwar hills, *Dalzell* ! ; along the Railway line between Talegaon and Shelarvadi Stations, G. I. P. Railway, *Bhiva* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1813 !—DISTRIB. Throughout the hilly districts of India ; Ceylon, temperate Europe and Asia, Siam, Java.

A plant having tonic and stomachic properties and used as a febrifuge. It is known as the *Indian Wormwood* and is often employed to prevent moths from infesting clothes. See Watt, Dict. Econ. Prod. l. c.

4. **Artemisia pallens,** *Wall, Cat.* (1828) 3302. Herbaceous, $\frac{1}{2}$—1 ft. high, erect, branched, woolly-canescent, very aromatic ; stem rather thick. Lower and middle stem-leaves orbicular in outline, 2-pinnatisect, $\frac{3}{4}$—$1\frac{1}{4}$ in. long and broad with a petiole $\frac{3}{8}$ in. long, pinnæ 3 pairs, ultimate segments linear, obtuse ; upper leaves gradually smaller, less cut and with shorter petioles or sessile ; the uppermost leaves oblong or subspathulate, toothed or entire. Heads globose, $\frac{1}{8}$—$\frac{1}{4}$ in. in diam., in lax compound racemes or leafy panicles, shortly pedicelled. Invol.-bracts 15—20, the exterior oblong, obtuse, concave, rather thick, herbaceous, with a hyaline and slightly ciliate margin, the intermediate broad, cucullate, scarcely or a little shorter than the exterior, veined and with a broader hyaline margin ; the innermost smaller, much thinner. Receptacle naked. Outer flowers ♀, about $\frac{1}{12}$ in. long ; disk-flowers ☿, subcampanulate, a little shorter than the outer flowers, all fertile, glabrous. Style-arms of ☿ flowers truncate, fimbriate. Achenes $\frac{1}{16}$ in. long, oblong, glabrous. Fl. B. I. v. 3, p. 329 (under doubtful species) ; C. B. Clarke, Comp. Ind. p. 163 ; Stapf, in Hook. Icon. Pl. v. 26 (1899) t. 2597 ; DC. in Wight, Contrib. p. 20 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650. *Artemisia paniculata,* Roxb. Hort. Beng. p. 61 ; Fl. Ind. v. 3, p. 418 ; Icones

Roxburgh ined. in Herb. Kew. no. 1640 (*not* of Lamk.).—Flowers: Mar.—Apr. VERN. *Davaná.*

Cultivated at Alandi and Jejuri in the Deccan for use as an offering at the Rám Navami festival. The specimens from which the figure in Hook. Icon. was taken were sent to Kew from Alandi by Mr. Woodrow. There seems to be no evidence as to where the plant is to be found in a wild state. Roxburgh, Fl. Ind l. c. mentions his having grown the plant in the Botanic Gardens, Calcutta, but states that he has not been able to ascertain its native country.

40. GYNURA, Cass.

Succulent herbs, rarely undershrubs, glabrous or hispid. Leaves alternate, entire, toothed or pinnatisect. Heads solitary or corymbose, bracteolate at the base, homogamous, disciform; flowers all ♀, fertile, or rarely a few of the outer flowers ♀. Involucre cylindric or subcampanulate; bracts 1-seriate, narrow, equal, sometimes cohering for a considerable distance, with scarious margins. Receptacle flat, pitted or shortly fimbrillate. Corollas regular, slender, tubular; limb slightly enlarged, very shortly 5-fid. Anther-bases entire or subauricled. Style-arms slender; tips long, subulate, hispid. Pappus-hairs copious, ∞-seriate, slender, white. Achenes narrow, many-ribbed.—DISTRIB. Warm regions of Asia, Africa, and Australia, species about 20.

1. **Gynura angulosa,** *DC. Prodr.* v. 6 (1837) p. 298 Robust, glabrous, 3—10 ft. high, more or less corymbosely branched at top; stem as thick as the little finger, angled and grooved, glabrous. Leaves variable, 4—8 by 1½—3½ in.; the upper leaves sessile, oblong or obovate, coarsely sinuate-toothed, auricled at the base, the lower leaves often lanceolate and attenuated at the base. Flowers deep orange; heads corymbose, numerous, ¾—1 in. long, with a few linear acute bracteoles beneath the involucre; peduncles glabrous or nearly so. Invol.-bracts ½—⅝ in. long, linear, striate, and with scarious margins, glabrous. Pappus copious, white, longer than the bracts, but shorter than the corollas. Achenes deeply ribbed, oblong, narrow, quite glabrous, sometimes papillose between the ribs. Fl. B I v. 3, p. 334; C. B. Clarke, Comp. Ind p. 170 *Gynura simplex*, Dalz & Gibs. p. 130. *Gynura nitida*, Woodr. in Journ. Bomb. Nat v 11 (1898) p. 650 (*not* of DC.).—Flowers: Aug.—Oct.

KONKAN: *Stocks*!; Neral, *Bhiwa*! DECCAN: highest hills round Junnar, *Dalzell & Gibson*; Panchgani, *Cooke*!, Mahableshwar, *Cooke*!; Fitzgerald Ghát, *Cooke*!; hills W. of Poona, *Woodrow*!, Sinhagad *Woodrow*!, Lanoli, *Woodrow*!; Purandhar, *Dr. Barnes*! S. M. COUNTRY: Belgaum, *Ritchie*, 1093!—DISTRIB. India (temperate Himalaya, Khasia Mountains, hills of the W. Peninsula).

41. EMILIA, Cass.

Annual or perennial often glaucous herbs, glabrous or hairy. Leaves variable; radical leaves crowded at the base of the stem, petiolate, entire, toothed or pinnatifid; cauline leaves few, alternate, usually amplexicaul and auricled. Heads on long peduncles, solitary or laxly corymbose, without bracteoles at the base, homogamous,

discoid ; flowers all ♀, fertile, purple or red. Involucre cylindric ; bracts 1-seriate, equal, free or more or less cohering, striate. Receptacle flat, naked. Corollas tubular ; limb elongate, cylindric, shortly 5-fid. Anther-bases obtuse, subentire. Style-arms subterete, ending in a short obtuse or elongate acute appendage. Pappus-hairs copious, white, soft, very slender. Achenes subterete, or angled and 5-ribbed, glabrous or scabrid on the angles.—DISTRIB. East Indies and Tropical Africa ; species 4 or 5.

1. **Emilia sonchifolia,** *DC. in Wight, Contrib.* (1834) p. 24. A glabrous scabrid or puberlous slender herb, 1—1½ ft. high, erect or diffuse, variously branched, sometimes decumbent and rooting near the base. Leaves very variable ; the lower petioled, lyrate or obovate, toothed or entire ; the cauline more or less amplexicaul and auricled, usually acute, less commonly obtuse at the apex. Heads few, reaching ½ in. long, laxly corymbose, without bracteoles beneath the head ; flowers purplish ; peduncles very slender, nodding when young, glabrous. Involucre cylindric, glabrous or puberulous towards the top ; bracts almost equalling the corollas, linear-oblong, acute, with scarious margins. Style-arms ½-cylindric ; tips conic. Pappus copious, white, soft, nearly equalling the involucre-bracts. Achenes ¼ in. long, narrowly oblong, 5-ribbed, brown, scabrid on the ribs. Fl. B. I. v. 3, p. 336 ; C. B. Clarke, Comp. Ind. p. 174 ; Trim. Fl. Ceyl. v. 3, p. 45 ; Woodr. in. Journ. Bomb. Nat. v. 11 (1898) p. 650. *Cacalia sonchifolia,* Linn. Sp. Pl. (1753) p. 835 ; Grah. Cat. p. 98.—Flowers : Sept. VERN. *Sadamandi.*

KONKAN : *Law* ! DECCAN : Poona, *Woodrow* ! S. M. COUNTRY : Castlerock, *Cooke* !, Belgaum, common, *Ritchie,* 366 !—DISTRIB. Throughout India ; Ceylon, most tropical and subtropical regions.

Emilia flammea, Cass. Dict. Sc. Nat. v. 14, p. 406. A small plant with showy scarlet flowers and involucre-bracts much shorter than the flowers, often grown in gardens but not indigenous. It is a native of Tropical Africa. Fl. B. I. v. 3, p. 336. *Emilia sagittata,* DC. Prodr. v. 6, p. 302 ; Dalz. & Gibs. Suppl. p. 46.

42 **NOTONIA,** DC.

Fleshy glabrous undershrubs. Leaves alternate, obovate or lanceolate, quite entire or crenulate, fleshy. Heads large, on large peduncles, subcorymbose, homogamous, discoid, bracteolate or not ; flowers all ♀, fertile, yellow. Involucre cylindric ; bracts 1-seriate, equal. Receptacle flat, naked or scarcely fimbrillate. Corollas regular, tubular, slender ; limb elongate, cylindric, shortly 5-fid. Anther-bases entire. Style-arms elongate ; tips short, ovoid, thick, papillose. Pappus-hairs copious, slender. Achenes glabrous, subterete, 10-striate. —DISTRIB. India ; Ceylon ; species 3 or 4.

1. **Notonia grandiflora,** *DC. in Wight, Contrib.* (1834) p. 24. A semi-shrubby glabrous perennial 2—5 ft. high ; stems stout, fleshy, not much branched, marked with the scars of fallen leaves. Leaves 2½—5 by 1—3 in., sessile or shortly petioled, obovate or elliptic-

lanceolate, quite entire, very fleshy, pale glaucous-green (especially beneath). Heads ¾—1¼ in. long, corymbose, few- or many-flowered, pale-yellow ; peduncles 4—12 in. long, stout, glabrous, furnished with a few small scattered leafy bracts. Involucre-bracts ½—¾ in. long, equal, linear-oblong, acute, striate and with scarious margins. Pappus-hairs copious, longer than the involucre but shorter than the corollas. Achenes ¼ in. long, oblong, 10-striate, glabrous. Fl. B. I. v. 3, p. 337 ; Dalz. & Gibs. p. 132 ; C. B. Clarke, Comp. Ind. p. 176 ; Trim. Fl. Ceyl. v. 3, p. 47 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 5, p. 430. *Notonia corymbosa*, DC. Prodr. v. 6 (1837) p. 442. *Notonia balsamica*, Dalz. & Gibs. Bo. Fl. (1861) p. 133.—Flowers: Sept. VERN. *Vándar-roti.*

I cannot find that the pappus of Dalzell's *Notonia balsamica* differs from that of *N. grandiflora.*

KONKAN : *Lambert*! DECCAN : Kamatki Ghât, *H. M. Birdwood, Cooke*! ; Kartriz Ghât, *Woodrow*! ; Malhargad (Poona districts), *Woodrow*! ; Panchgani, *Cooke*!—DISTRIB. India (hilly districts of W. Peninsula) ; Ceylon.

43. **SENECIO,** Linn.

Herbs, shrubs, or undershrubs. Leaves alternate or radical, entire or variously divided. Heads solitary, corymbose or racemose, heterogamous (rarely homogamous), usually yellow ; ray-flowers fertile, ♀, or 0 ; disk-flowers ☿, fertile. Involucre various ; bracts 1- or sub-2-seriate, equal, erect, free or connate at the base, usually keeled or 3-nerved on the back, with sometimes few or several small bracteoles below the involucre. Receptacle flat or convex, naked, pitted or fimbrillate. Corollas of ♀ flowers ligulate, the ligules elongate, spreading, or very small and revolute, or scarcely conspicuous ; corollas of ☿ flowers regular, tubular, 5-fid. Anther-bases obtuse, or auricled, or minutely tailed. Style-arms of ☿ flowers recurved ; tips truncate, penicillate, rarely rounded or with a short narrow point. Pappus-hairs copious or sparse, soft, usually white, smooth, scabrid or barbellate. Achenes subterete or the outer dorsally compressed, 5—10-ribbed.—DISTRIB. Chiefly in temperate climates and in mountains of the Tropics ; species about 900.

Leaves not clothed beneath with white or grey cottony tomentum.	
Leaves pinnatifid; ligules 6—10	1. *S. tenuifolius.*
Leaves oblong-obovate; ligules 3	2. *S. hewrensis.*
Leaves clothed beneath with white or grey cottony tomentum.	
Heads bracteolate.	
Pappus-hairs slender.	
Suffruticose; leaves rhomboid or ovate	3. *S. Edgeworthii.*
Herbaceous; leaves linear-oblong	4. *S. Dalzellii.*
Pappus paleaceous	5. *S. Grahami.*
Heads ebracteolate.	
Pappus slender, not paleaceous; achenes glabrous.	6. *S. Gibsoni.*
Pappus 0; achenes hairy	7. *S. belgaumensis.*

1. **Senecio tenuifolius,** *Burm. Fl. Ind.* (1768) t. 60, f. 4. Annual, slender, herbaceous, 6—18 in. high, usually much branched, glabrous. Leaves sessile, pinnatifid or sub-2-pinnatifid ; segments slender,

spreading, obtuse. Heads ¼—$\frac{5}{16}$ in. in diam., few, in divaricating corymbs, rayed ; peduncles slender, glabrous, furnished with a few scattered acute bracts. Involucral-bracts 10—13, oblanceolate, subequal, ⅛—¼ in. long, acute or acuminate, with broad scarious margins and yellowish nerves, glabrous or nearly so. Ligules 6—10. Pappus copious, yellowish, as long as the achenes. Achenes of the ray-flowers usually abortive, elongate, finely pubescent or glabrous, those of the disk-flowers narrowed at the base, ⅛ in. long, faintly ribbed, hairy with white hairs on the ribs, brown. Fl. B. I. v. 3, p. 345 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prodr. v. 6, part 2, p. 501. *Senecio multifidus*, Willd. Sp. Pl. v. 3 (1800) p. 1986 ; C. B. Clarke, Comp. Ind. p. 198. *Doronicum tenuifolium*, Wight, Icon. t. 1129.—Flowers : Sept.—Oct.

S. M. COUNTRY : Badami, *Cooke* !, *Woodrow* ; Belgaum hills, *Ritchie*, 388 ! —DISTRIB. India (W. Peninsula) ; Java.

2. **Senecio hewrensis,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 346. A small herbaceous annual 3—12 in. high. Lower leaves 1—1½ by ¼—½ in., oblong or somewhat obovate, subobtuse, petioled, coarsely toothed or pinnatisect, more or less hairy and ciliate ; cauline leaves narrower, linear, acute or subobtuse, sessile or nearly so, auricled at the base, more or less hairy. Heads in lax corymbose cymes, yellow ; peduncles capillary, long. Involucral-bracts about 10, linear-oblong or somewhat oblanceolate, acuminate, ⅛—¼ in. long, pubescent. Corollas yellow ; ligules 3 in each head, broadly spathulate, short, veined. Pappus as long as the achenes, copious, pale-yellowish. Achenes $\frac{1}{10}$—⅛ in. long, slightly tapering downwards, obscurely ribbed, hairy. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650. *Doronicum hewrense*, Dalz. in Dalz. & Gibs. Bo. Fl. p. 130.—Flowers : Sept.

Rare. DECCAN : hills near Junnar, *Dalzell & Gibson*, *Woodrow* ! *Kanitkar* ! This small plant is tolerably abundant on the hills near Junnar (Poona districts), but does not appear to have been found elsewhere.

3. **Senecio Edgeworthii,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 346. Suffruticose, erect ; stem and branches terete or obtusely angled, at first woolly-pubescent, at length glabrous. Leaves petioled, 1—1¾ by 1—1⅜ in., cordate or rhomboid, or ovate, obtuse or subacute, upper surface rough, the lower clothed with white cottony pubescence, the margins sinuate-dentate ; nerves prominent beneath ; petioles ¼—⅜ in. long, slender, woolly, auricled at the base. Heads few or many, laxly corymbose, yellow, bracteolate ; peduncles very slender, furnished with a few small scattered bracts. Involucral-bracts woolly at the base, ⅛ in. long, linear-lanceolate, acute. Ray-flowers 12—14, sterile, ligulate, the ligules linear, 4-nerved, obscurely 3-toothed at the apex. Style-branches of ♀ flowers truncate, penicillate. Pappus somewhat scanty, white, slender, slightly longer than the achenes. Achenes $\frac{1}{10}$ in. long, oblong, slightly ribbed. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650. *Senecio tomentosus*, C. B. Clarke, Comp. Ind. p. 200 (*not* of Michaux). *Madaractis lanuginosa*, Edgew. in Trans. Linn. Soc. v. 20 (1851) p. 75. *Doronicum tomentosum*, Wight, in Calc. Journ. Nat. Hist. v. 7 (1847) p. 155 ; Icon. t. 1151. *Doronicum argenteum*, Dalz. MS. in Herb. Kew.—Flowers : Aug.—Nov.

DECCAN: very abundant along the Ghât road from Wai to Panchgani, *Cooke*!; Kartriz Ghât, *Woodrow*; Dongergaon near Ahmednagar, *Woodrow*.—DISTRIB. India (W. Peninsula, Central India).

4. **Senecio Dalzellii,** *C. B. Clarke, Comp. Ind.* (1876) p. 201. Herbaceous, erect, 1—3 ft. high, branched; stem and branches more or less white and cottony. Leaves coriaceous, sessile or the lower petioled, 1½—3 by ⅛—½ in., gradually becoming narrower upwards, linear-oblong or linear-lanceolate, apiculate, more or less cottony or scabrid above, densely white-woolly beneath, entire or irregularly toothed, the margins often recurved, base contracted or sometimes dilated and auricled. Heads ¼—½ in. in diam., bracteolate, dichotomously corymbose; peduncles slender, furnished with a few scattered bracts. Involucral-bracts 10—17, linear-lanceolate, acuminate, 1/10—⅛ in. long, pubescent, with or without narrow scarious margins. Ligules 8—15, narrow, about ⅛ in. long with 2 very obscure teeth at the apex, yellow. Pappus sub-2-seriate, white, rigid, a little longer than the achenes, scabrid. Achenes 1/16 in. long, scabrid with short hairs. Fl. B. I. v. 3, p. 346; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650. *S. Lawii,* C. B. Clarke, Comp. Ind. p. 201; Hook. f. Fl. B. I. v. 3, p. 347.—Flowers: Nov.—Dec.

KONKAN: *Law*!; Matheran, *Cooke*!, *Woodrow*; Suvurndrug (a small island close to the Ratnagiri coast on which an old fort stands), *Dalzell*! DECCAN: Khandala, *Cooke*!—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Senecio Grahami,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 347. Herbaceous, erect, much-branched, 1—3 ft. high; stem and branches grooved and angled, glabrous or nearly so. Leaves 1—4 by ⅜—2¾ in., rhomboid-ovate, acute, coarsely and irregularly toothed, minutely araneo-pubescent, glabrous, or minutely scabrous above, white-tomentose between the nerves beneath, base suddenly tapering into the petiole; nerves broad, green, conspicuous, glabrous; petioles variable in length, the lower often as long as the leaf-blade, usually with lanceolate auricles at or a little above the base. Heads yellow, laxly subcorymbose, ⅜—⅞ in. in diam.; bracteoles linear-subulate; peduncles elongate, slender, furnished with a few scattered linear bracts; flowers of the ray ligulate, usually sterile, the throat hairy within, ligules 10—13, sometimes (in well developed heads) reaching ½ in. long by 1/10 in. broad, the apex rounded, shortly 3-toothed. Involucral-bracts 12—24, pubescent, ⅛—¼ in. long, connate for about ⅓ of the way up from the base, obovate-oblong, caudate-acuminate. Style-arms of ♀ flowers truncate, penicillate. Pappus of ray-flowers 0, of the disk-flowers slightly longer than the achenes, dilated and paleaceous at the base, setaceous above, dirty-white or yellowish. Achenes 1/12 in. long, ribbed, scabrid. Woodr in Journ. Bomb. Nat. v. 11 (1898) p. 650. *Senecio reticulatus,* C. B. Clarke, Comp. Ind. p. 199 (*not* of DC. v. 6, p. 431). *Doronicum reticulatum,* Wight, in Calc. Journ. Nat. Hist. v. 7 (1847) p. 156; Icon. t. 1151, B; Dalz. & Gibs. p. 130.—Flowers: Aug.—Dec. VERN. *Sonki.*

Dalzell & Gibson (Bo. Fl. p. 130) state that the achenes are without pappus, a mistake which has arisen from these authors having incompletely quoted Wight's description (Icon. t. 1151, B) from which

the description in their 'Bombay Flora' has been taken. Wight says that the *ray-flowers* have no pappus, but afterwards goes on to describe the paleaceous pappus of the *disk-flowers*. Dalzell & Gibson, in quoting Wight, stopped at the end of the description of the pappus of the ray-flowers, and have therefore made it appear that the pappus is altogether wanting. (See also Hook. f. Fl. B. I. v. 3, p. 348, under *Senecio belgaumensis*.)

KONKAN : *Law* ! ; island of Karanja, *Dalzell & Gibson*. DECCAN : Khandala, *Cooke* !, *Woodrow* ! : Mahableshwar, *Cooke* !—DISTRIB. India (W. Peninsula, Rajputana).

6. **Senecio Gibsoni,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 347. Herbaceous, erect, much-branched, 1—2 ft. high ; stem and branches slender, glabrous or scaberulous, striate. Leaves sessile or petioled, ovate-lanceolate or subrhomboid, acute, apiculate, glabrous or scaberulous above, grey with appressed cottony tomentum beneath, the margins irregularly toothed or subentire ; nerves prominent beneath ; petioles short, auricled. Heads yellow, ebracteolate, laxly and dichotomously corymbose ; peduncles slender, pubescent, with scattered linear bracts. Involucral-bracts 15—18, oblong-lanceolate or obovate, acuminate or very acute, $\frac{1}{8}$—$\frac{1}{6}$ in. long, pubescent and with scarious margins. Ligules 8—10, linear-oblong, $\frac{3}{8}$ by $\frac{1}{10}$ in., 3-toothed at the apex. Style-arms of ♀ flowers truncate, penicillate. Pappus-hairs unequal, slender, rigid, scabrid, not at all paleaceous, white or yellowish. Achenes $\frac{1}{10}$ in. long, obconic, ribbed, glabrous. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650.

Rare. KONKAN : *Law* !, *Lambert* ! DECCAN : Poona, *Woodrow* !

7. **Senecio belgaumensis,** *C. B. Clarke, Comp. Ind.* (1876) p. 200. Annual, erect, herbaceous, 1—2½ ft. high, branched ; stems and branches usually pubescent. Leaves 1¾—3 by ¾—2 in., petioled, rhomboid-ovate, coarsely toothed or gashed, strigosely hairy or glabrate above, cottony-white between the nerves beneath, tapering into the petiole ; nerves conspicuous green, glabrous ; petioles shorter upwards, those of the upper leaves with 2 lanceolate auricles at or near the base, those of the lower leaves often without auricles. Heads corymbose, yellow, smaller than in the preceding species, usually ebracteolate ; peduncles capillary with a few scattered linear bracts. Ligules usually 8, linear-oblong, $\frac{3}{8}$ in. long, 3-toothed at the apex. Involucral-bracts 12—18, hairy, $\frac{1}{8}$—$\frac{1}{6}$ in. long, linear-oblong or obovate, acuminate, with narrow scarious margins, more or less connate about $\frac{1}{3}$ of the way up, at length free. Style-arms of ♀ flowers truncate, penicillate. Pappus 0. Achenes $\frac{1}{10}$ in. long, turbinate, ribbed, hairy. Fl. B. I. v. 3, p. 348 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650. *Madacarpus belgaumensis*, Wight, in Calc. Journ. Nat. Hist. v. 7 (1847) p. 157 ; Icon. t. 1152 ; Dalz. & Gibs. p. 130.—Flowers : Aug.—Jan. VERN. *Sonki*.

Very like *Senecio Grahami* in habit and general appearance. The absence of pappus at once distinguishes it, but it may often be recognized when growing by the fewer ligules, which I find almost invariably number 8.

KONKAN: *Law*!, *Lambert*! DECCAN: Mahableshwar, *Cooke*!; Fitzgerald Ghát, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 384!, *Cooke*!, *Law*, 22! KANARA: *Law*!; Yellur Fort walls, *Ritchie*, 384!; Ainshi (N. Kanara), *Talbot*, 1371!; Kála naddi, *Ritchie*, 8[illegible]!—DISTRIB India (W. Peninsula), apparently endemic.

Senecio sempervivus, Sch.-Bip. in Flora, v. 28 (1845) p. 500, a native of Arabia, is often grown as a pot-plant about bungalows. *Cacalia sempervirens*, Vahl, Symb. v. 3, p. 92; Dalz. & Gibs. Suppl. p. 46.

44. **ECHINOPS**, Linn.

Thistle-like herbs more or less albo-tomentose. Leaves alternate, pinnatifid, spinous. Heads in globose involucrate solitary balls, blue or white, sessile or shortly stipitate on a common receptacle, 1-flowered; flowers ☿, all fertile. Involucre oblong; bracts ∞-seriate, rigid, pungent or some spinescent, outer shorter, inner spathulate, innermost linear or lanceolate, sometimes all connate into a tube with 1 rigid spine on the outer side. Receptacle minute. Corolla regular; tube slender; limb cylindric, 5-partite with slender segments. Filaments glabrous; anther-bases sagittate, the auricles connate; tails short, fimbriate or entire. Style-arms thick and with a thick basal ring, at length more or less spreading. Pappus coroniform, of many short subpaleaceous free or more or less connate bristles. Achenes elongate, subterete or 4-gonous, villous (rarely glabrous).—DISTRIB. S. Europe, N. Africa, and Asia to Japan; species about 70.

1. **Echinops echinatus**, *Roxb. Hort. Beng.* (1814) p. 62. A much-branched rigid annual 1—3 ft. high; branches widely spreading from the base, white with cottony pubescence. Leaves sessile, 3—5 in. long, glabrous or minutely scaberulous (rarely araneously pubescent) above, white with cottony wool beneath, oblong, deeply pinnatifid, the lobes triangular and oblong, sinuate and spinescent, the spines often 1 in. long. Balls of the heads white, 1—1½ in. (rarely more) in diam. (excluding the spines); segments of corolla-limb ⅛ by $\frac{1}{80}$ in., linear, acute. Involucres surrounded by strong white bristles resembling pappus-hairs; outer invol.-bracts oblanceolate, glabrous, pungent; intermediate bracts with 1 or 2 of the bracts often produced into sharp spines sometimes exceeding 1 in. long, causing the balls frequently to bristle with many spines; innermost bracts 5—8, nearly ½ in. long, connate for more than ½ their length into a tube round the achenes, the free segments acute, or obtuse and laciniate at the apex, ciliate and with scarious margins. Anther-tails fimbriate. Pappus short, yellowish, forming a short cylindric brush above the achene. Achenes ⅛ in. long, obconic, densely villous. Fl. B. I. v. 3, p. 358; Grah. Cat. p. 95; Dalz. & Gibs. p. 131; Wight, Contrib. p. 24; C. B. Clarke, Comp. Ind. p. 211; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651.—Flowers: Nov.—Jan. VERN. *Utkatár*.

KONKAN: *Lambert*! DECCAN: common, *Graham*, *Woodrow*!, *Cooke*!; Poona, *Cooke*!, *Woodrow*!; Lodwick Point, Mahableshwar, *Graham*. S. M.

COUNTRY: *Law* ex *Graham*. SIND: *Stocks*!—DISTRIB. More or less throughout India.

45. GONIOCAULON, Cass. in Bull. Soc. Philom.

An annual erect glabrous herb with an angled branched stem. Leaves alternate, narrow, toothed. Heads narrow, fascicled and corymbose, homogamous; flowers few, all ☿, fertile. Involucre oblong with narrow base; bracts ∞-seriate, imbricate, subpaleaceous, acute, erect, not spinescent, the inner elongate, the outer gradually shorter. Receptacle small, paleaceous. Corolla-tube slender; limb long, cylindric, 5-fid to the middle or lower, segments narrow. Filaments hairy; anther-bases sagittate, connate, tails short. Style-arms filiform. Pappus paleaceous, the scales ∞-seriate, very unequal. Achenes glabrous, oblong, subterete, with about 20 ribs.—DISTRIB. East Indies; species 1.

1. **Goniocaulon glabrum,** *Cass. in Dict. Sc. Nat.* v. 19 (1821) p. 201. Erect, herbaceous, 1—3½ ft. high with a straight tap-root; stem glabrous, 4—8-angled, striate between the angles. Leaves sessile, 2—5 by ⅜—1 in., ½-amplexicaul, linear-oblong or obovate-oblong, obtuse or subacute, toothed or serrate, sprinkled with black dots on both sides, base narrowed. Heads ½—⅔ in. long, narrow, with 4—6 corollas in each head, fascicled in compound corymbs with linear bracts beneath the peduncles and very short pedicels. Invol.-bracts ∞-seriate, lanceolate, acute, striate, almost white, or with colored tips. Corollas much exserted beyond the involucre, rose-colored. Pappus paleaceous, the scales very unequal, linear, slightly obovate, subobtuse. Achenes ⅛ in. long, closely ribbed, glabrous. Fl. B. I. v. 3, p. 377; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651. *Goniocaulon indicum*, C. B. Clarke, Comp. Ind. p. 236. *Amberboa indica*, DC. Prodr. v. 6, p. 558; Dalz. & Gibs. p. 131; Wight, Icon. t. 479.—Flowers: Jan.—Feb. VERN. *Kadkusumbá*.

DECCAN: *Woodrow*!, *Cooke*!; Kelgaon (Poona districts), *Bhiva*!; Uruli near Poona, *Woodrow*!; Lasalgaon, *Kanitkar*!—DISTRIB. India (Bandelkhand, Central India, W. Peninsula).

46. TRICHOLEPIS, DC.

Annual or perennial branched unarmed herbs. Leaves alternate, entire, toothed or the lower sublyrate, often punctate. Heads terminal, solitary, pedunculate, homogamous; flowers all ☿, fertile. Involucre ovoid or broad; bracts ∞-seriate, imbricate, narrow, the exterior gradually shorter, all aristate-acuminate or the outer mucronate. Receptacle flat or convex, densely bristly. Corollas yellow, red, or purple, regular or slightly oblique; tube slender; limb deeply 5-fid. Filaments papillose; anther-bases sagittate, with connate auricles; tails slender, lacerate. Style-arms usually slender, elongate (short and subdeltoid in *T. amplexicaulis*). Pappus-bristles ∞-seriate, very unequal, serrulate, barbellate, or plumose, long and slender, or sometimes short and paleaceous (rarely 0). Achenes glabrous, with a very oblique or lateral areole, oblong or obovoid, smooth, faintly ribbed.—DISTRIB. East Indies; species 7.

Pappus copious.
A divaricately branched often decumbent herb; paleæ of the receptacle not reaching above the pappus..... 1. *T. radicans.*
An erect glabrous herb; paleæ of the receptacle reaching above the pappus..... 2. *T. glaberrima.*
Pappus obsolete..... 3. *T. amplexicaulis.*

1. **Tricholepis radicans,** *DC. Prod.* v. 6 (1837) p. 564. A slender erect or decumbent herb divaricately branched from the base; stem and branches angled, glabrous or minutely scaberulous, leafy. Leaves sessile, 1—2 by $\frac{1}{4}$—$\frac{3}{4}$ in.; lower leaves usually obovate; cauline oblong; all coarsely toothed or serrate or sometimes pinnatisect, glabrous, punctate, the teeth or serratures as well as the apex mucronate or bristle-pointed. Heads $\frac{3}{8}$—$\frac{5}{8}$ in. in diam., more or less woolly-pubescent; peduncles solitary, erect, glabrous, angled and grooved. Corollas $\frac{3}{4}$ in. long, purple. Invol.-bracts elliptic-lanceolate, aristate-acuminate, glabrous, the bristles long, recurved, barbellate; outer bracts green with scarious margins; innermost almost entirely scarious and with shorter bristles than the outer. Style-arms slender, with a very small ring of hairs at the base of the lobes. Paleæ of the receptacle linear, acute, shorter than the achenes, but not reaching above the pappus. Pappus yellowish, subpaleaceous, a little shorter than the achenes; the setæ flattened, very unequal, numerous, persistent. Achenes oblong, smooth, $\frac{1}{5}$ in. long, faintly striate. Fl. B. I. v. 3, p. 381; Dalz. & Gibs. p. 131; C. B. Clarke, Comp. Ind. p. 239; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651.—Flowers: Sept.—Nov. VERN. *Dáhán.*

KONKAN: *Stocks!*, *Lambert!* DECCAN: Kolhapur, *Cooke!*; Dongergaon near Ahmednagar, *Cooke!*; ravines in the Deccan, common, *Dalzell & Gibson.* S. M. COUNTRY: north of Dharwar, *Ritchie,* 1098!, Belgaum, *Ritchie,* 1098! KANARA: *Law*—DISTRIB. India (W. Peninsula).

2. **Tricholepis glaberrima,** *DC. Prodr* v. 6 (1837) p. 564. Quite glabrous; stem erect, slender, and as well as the branches angled and ribbed. Leaves sessile, 1—2½ by $\frac{1}{8}$—$\frac{1}{4}$ in., linear-oblong or lanceolate, acute, entire, spinous-toothed or spinous-serrate, punctate, base of the cauline leaves not or rarely auricled; midrib and nerves very prominent beneath. Heads $\frac{1}{4}$—$\frac{1}{3}$ in. long, ovoid, glabrous. Corollas $\frac{1}{2}$—$\frac{9}{16}$ in. long, purple. Invol.-bracts linear-lanceolate, aristate-acuminate, ciliolate, suberect or slightly recurved. Style-arms slender, with a ring of hairs at the base of the lobes. Paleæ of the receptacle reaching much above the pappus, narrowly linear, acute. Pappus shorter than the achenes, copious, yellowish-brown, rigid, subpaleaceous. Achenes oblong, faintly ribbed. Fl. B. I. v. 3, p. 381; Dalz. & Gibs. p. 131; C. B. Clarke, Comp. Ind. p. 240; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651; Hoffm. in Engl. & Prantl, Pflanzenf. v. 4, part 5, p. 325, fig. 148, D; Watt, Dict. Econ. Prodr. v. 6, part 4, p. 80. *Serratula indica,* Willd. Sp. Pl. v. 3, p. 1642; Grah. Cat. p. 95.—Flowers: Dec. VERN. *Dáhán.*

KONKAN: *Law!*; Salsette, *Graham.* DECCAN: Khandala, *Cooke!*; Panchgani, *Woodrow!* S. M. COUNTRY: Erur, *Graham.* KANARA: *Thomson!*—DISTRIB. India (W. Peninsula, Central India, Márwar).

3. **Tricholepis amplexicaulis,** *C. B. Clarke, Comp. Ind.* (1876) p. 240. An erect annual 3—5 ft. high ; stem stout and as well as the branches angled and ribbed, glabrous or minutely scaberulous. Leaves sessile, 3—5 by ¾—1½ in., punctate, mucronate, glabrous, distantly and irregularly spinous-toothed or serrate, the margins between the teeth often minutely denticulate, linear-oblong or obovate-oblong, base dilated, auricled, toothed, ½-amplexicaul ; midrib and nerves prominent beneath. Heads ¾—1¼ in. in diam., more or less woolly-pubescent ; peduncles short, stout, angular, glabrous or nearly so, furnished with leafy bracts. Corollas reaching ¾ in. long, purple, the lobes of the limb ¼ by $\frac{1}{50}$ in. Outer invol.-bracts linear-lanceolate, aristate-acuminate, with narrow scarious margins, the apical bristles very long and almost glabrous, spreading or recurved ; the inner bracts much longer than the outer with shorter bristles, linear, acute, almost entirely scarious, ciliate towards the top. Style-arms short, subdeltoid, with a ring of hairs at the base of the lobes. Paleæ of the receptacle longer than the achenes but shorter than the corollas, very narrow, acute. Pappus 0 or rarely of a few hairs. Achenes ⅛—¼ in. long, obovoid, smooth, glossy, the basal areole very oblique, top rounded and with a very small apical scar, dark-brown, nearly black. Fl. B. I. v. 3, p. 381 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651.—Flowers : Nov.—Dec. VERN. *Dáhán.*

KONKAN : *Stocks* !, *Law* !, *Dalzell* ! DECCAN : Khandala, *Cooke* !, *Woodrow* ! KANARA : *Law* !—DISTRIB. India (W. Peninsula).

47. VOLUTARELLA, Cass.

Erect or divaricately diffuse annuals. Leaves alternate, toothed or remotely pinnatifid. Heads heterogamous ; outer flowers 1-seriate, neuter ; disk-flowers ♀, fertile. Involucre ovoid or globose ; bracts ∞-seriate, imbricate, the innermost narrow, acute, sometimes colored, erect, the exterior gradually shorter, acute, mucronate, or terminated by an awn or a simple spreading spine. Receptacle flat, densely bristly. Corollas regular, purple, violet, or blue ; tube slender ; limb cylindric, deeply 5-fid. Filaments glabrous or hairy ; anther-bases sagittate, the auricles connate, shortly tailed. Style filiform, the arms free or connate. Pappus more or less paleaceous, ∞-seriate, the innermost 2—4, dilated and flattened, the outer gradually shorter. Achenes obovoid or oblong, subterete or angled, prominently and regularly 5—15-ribbed, the areole oblique or lateral.—DISTRIB. S. Europe, N. Africa, W. Asia, India ; species 4 or 5.

1. **Volutarella divaricata,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1873) p. 476 (exclud. syn. *Centaurea patula* and *Serratula divaricata*). Stem erect, dichotomously branched, glabrous or scaberulous ; branches 1—2 ft. long, angled, smooth or scabrid. Leaves oblong or obovate, entire, toothed or pinnatifid with mucronulate lobes, often undulate or crisped, glabrous or pubescent. Heads ovoid-oblong, ½—1 in. long by ¼—½ in. in diam., araneously pubescent ; peduncles grooved, glabrous or puberulous, with a few small foliaceous bracts. Invol.-bracts elliptic-oblong with a long spreading or

recurved spinescent awn. Corollas ½—¾ in. long, purple; lobes ⅛ in. long by about $\frac{1}{30}$ in. wide, linear, acute, very tender. Anther-tails connate to the tips, with a membrane between them in front of the minutely pubescent filaments. Style-arms long, slender, recurved. Paleæ of the receptacle short, about equalling or shorter than the achenes. Pappus of many unequal hairs, silvery-brown, the innermost flattened and long. Achenes ¼ in. long, acutely angled, and, in the ripe fruit, punctate between the angles, areole small, the top broad, truncate. Fl. B. I. v. 3, p. 383; C. B. Clarke, Comp. Ind. p. 242; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651; Watt, Dict. Econ. Prod. v. 6, part 4, p. 297. *Tricholepis procumbens*, Wight, Icon. t. 1139; Dalz. & Gibs. p. 131. *Tricholepis Candolleana*, Wight, in Hook. Comp. Bot. Mag. v. 1 (1835) p. 81, t. 4.—Flowers: Nov. VERN. *Lih-katmanda.*

KONKAN: *Law!*, *Lambert!* DECCAN: near Wadi, *Cooke!* GUJARAT: common in light soils, *Dalzell & Gibson*; Broach (dry places), *Kanitkar!* SIND: *Dalzell!*; Karachi to Mugger Peer, *Perry!*; Mulir, *Woodrow!*, *Cooke!*; Jemadar ka Landa near Karachi, *Stocks*, 1192!—DISTRIB. Central, Western, and Southern India; Afghanistan, Beluchistan.

48. **DICOMA,** Cass.

Herbs or low shrubs. Leaves alternate. Heads subsessile on the branches or in the axils of the upper leaves, or leaf-opposed, rarely corymbose, homogamous, discoid, all the flowers ☿; or heterogamous, the outer flowers being ♀, all fertile or the innermost sterile. Involucre globose, conic or subcampanulate; bracts ∞-seriate, imbricate, ovate, lanceolate or linear, acuminate, spinescent or mucronate or with a long apical spine, the outer bracts gradually shorter. Receptacle flat, naked, often pitted. Corollas of ☿ flowers tubular, the limb enlarged, 5-partite, with erect or revolute lobes; corollas of ♀ flowers, if present, slender, subligulate. Anther-bases sagittate; tails long, more or less bearded. Style-arms short, erect, obtuse. Pappus-hairs ∞-seriate, the inner or all flat, barbellate or feathery, the outer shorter, paleaceous or of slender bristles. Achenes turbinate, densely silky-villous, 5—10-ribbed.—DISTRIB. Tropical and S. Africa; 1 species widely spread throughout India; species 13.

1. **Dicoma tomentosa,** *Cass. in Bull. Soc. Philom.* (1818) p. 47. Annual, erect, much-branched, 6—18 in. high; stem woody at the base and as well as the branches terete, clothed with white cottony wool, the older branches often tinged with purple. Leaves sessile, 1—2½ by ⅛—⅜ in., linear or linear-obovate, obtuse or subacute, apiculate, entire, clothed on both sides with cottony wool. Heads numerous, campanulate, subsessile or shortly peduncled, solitary, axillary, leaf-opposed and terminal. Corolla white or pale-yellow, ¼ in. long; segments of the limb ⅛ in. long. Invol.-bracts ½—¾ in. long, linear-lanceolate, membranous, glabrous, terminated by a long spine. Pappus longer than the achenes, the outer bristles slender, slightly shorter than the inner, the inner ½ in. long, paleaceous, lanceolate-subulate, strongly nerved and with a rigid midrib. Achenes ⅛ in. long, $\frac{1}{12}$ in. broad, turbinate, truncate at top, densely clothed with

long silky hairs. Fl. B. I. v. 3, p. 387 ; C. B. Clarke, Comp. Ind. p. 245 ; Aitch. Pb. & Sind Pl. p. 81 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 ; Watt, Dict. Econ. Prod. v. 3, p. 111. *Dicoma lanuginosa*, DC. in Wight, Contrib. (1834) p. 26 ; Icon. t. 1140 ; Dalz. & Gibs. p. 132.—Flowers : Nov.—Mar. VERN. *Navanangi*.

DECCAN : hills near Alandi, *Kanitkar* ! ; Gokak Falls, *Ritchie*, 1803 ! S. M. COUNTRY : Badami, *Cooke* ! GUJARAT : near Gogo (Kathiawar), *Dalzell & Gibson* ; Junaghad (Kathiawar), *Cooke* ! SIND : *Stocks* ! ; Tata, *Woodrow* !, *Bhola Puran* !—DISTRIB. India (N.W. Provinces, W. Peninsula) ; Tropical Africa.

The plant has been used medicinally in Belgaum as an agreeable bitter and febrifuge See Watt, Dict. Econ. Prod. l. c.

49. **HOCHSTETTERIA,** DC.

A rigid branched perennial herb. Leaves alternate, usually denticulate. Heads solitary, terminal, homogamous, discoid ; flowers orange, all ♀, fertile. Involucre hemispheric ; bracts ∞-seriate, narrow, very acute, rigid, with scarious margins, the outer shorter. Receptacle convex, pitted, the margins of the pits often produced into short paleæ. Corollas regular, tubular ; limbs elongate, 5-partite, the lobes more or less revolute. Anther-bases subciliate, the auricles produced into long lanceolate subciliate tails. Style-arms linear, obtuse, flattened. Pappus of 10 stellately spreading paleæ with hyaline margins below the middle, slender and barbellate above.—DISTRIB. Tropical Africa, Arabia, Sind ; species 1.

1. **Hochstetteria Schimperi,** *DC. Prodr.* v. 7 (1838) p. 287. An erect, much-branched, rather rigid herb 1—2 ft. high ; branches slender, erect or ascending, angular, glabrous or pubescent. Leaves (including the petiole) ¾—2 by ¼—¾ in., elliptic-oblong, subobtuse, mucronate, serrulate, araneously-pubescent on both sides, attenuated at the base into a short obscurely winged petiole. Heads ½—¾ in. in diam., usually with foliaceous bracts at the base which are shorter than the involucre. Invol.-bracts linear-lanceolate, aristate, the outer very short, the inner-most reaching ½ in. long, pubescent, with a strong midrib and scarious and ciliolate margins. Receptacle convex, deeply pitted, the pits with toothed paleaceous margins. Corolla ¼ in. long ; lobes linear-lanceolate, ⅛ in. long. Pappus much longer than the achenes, slightly shorter than the corolla ; hairs 10, rigid, with a hyaline wing at each side at the base, barbellate above. Achenes turbinate, 1/10 in. long, densely villous with long brownish hairs which cover the achene. Fl. B. I. v. 3, p. 388 ; C. B. Clarke, Comp. Ind. p. 246 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651. —Flowers : Jan.

In India confined to Sind. SIND : *Bhola Puran* !, *Woodrow* ; sandstone rocks near Shah Bilawah, *Dalzell* !—DISTRIB. Nubia, Arabia (tolerably abundant at Aden).

50. **LACTUCA,** Linn.

Glabrous (rarely hispid) usually milky herbs. Leaves radical and alternate, entire, coarsely toothed or pinnatifid, the margins setoso-ciliate or naked ; cauline leaves often amplexicaul and auricled. Heads

variously paniculate, sessile or pedunculate, homogamous ; flowers all ligulate, yellow, purple or blue. Involucre cylindric, usually narrow , bracts usually few-seriate, often with scarious margins ; the innermost elongate, subequal, the outer often very short. Receptacle flat, naked. Corollas ligulate, truncate and 5-toothed at the apex. Anther-bases sagittate, with acute or shortly setaceo-acuminate auricles (rarely prolonged into lacerate tails). Pappus copious ; hairs ∞-seriate, very slender, simple, persistent or separately deciduous. Achenes ovoid, oblong or narrow, more or less compressed, sometimes flattened, shortly contracted at the base, abruptly or gradually produced into a beak at the apex ; faces 3—5-ribbed, the ribs slender or strong, smooth or rarely transversely rugose ; beak slender or short and cylindric, more or less dilated into an entire or toothed pappiferous disk.—DISTRIB. Europe, Asia, Africa, and N. America ; species about 60.

A stout herb 2—5 ft. high; leaves sometimes 12 in. long..... 1. *L. runcinata.*
A slender herb 8—18 in. high; leaves rarely exceeding 4 in. long..... 2. *L. remotiflora.*

1. **Lactuca runcinata,** *DC. in Wight, Contrib.* (1834) p. 26. A tall glabrous herb 2—5 ft. high ; stem, erect, cylindric, hollow below, often very stout and much-branched. Leaves sessile, mostly radical, runcinate or pinnatifid, membranous, glabrous on both sides, with spinoso-ciliate often inciso-serrate margins ; radical leaves 4—12 in. long, obovate, obtuse, narrowed at the base ; cauline leaves few, remote, narrower, ½-amplexicaul, auricled. Heads ½ in. long, cylindric, usually sessile, solitary or in small distant clusters along slender leafless branches ; flowers pinkish-white. Outer involucral-bracts few, 1/16—⅛ in. long, ovate, acute, with broad scarious margins ; inner bracts ⅓ in. long, linear-oblong, subobtuse, with scarious margins. Ligules narrow, shortly and bluntly 5-toothed at the apex. Anther-bases shortly setaceo-acuminate. Style-arms slender. Pappus white, soft, slender, longer than the achenes, copious. Achenes 1/16—⅛ in. long, compressed, faintly ribbed, muriculate, black, tapering into a beak which is suddenly dilated into a whitish cup-like disk beneath the pappus. *Lactuca Heyneana,* DC. Prodr. v. 7 (1838) p. 140 ; Hook. f. Fl. B. I. v. 3, p. 403 ; C. B. Clarke, Comp. Ind. p. 261 (exclud. syn. *Prenanthes sarmentosa*) ; Trim. Fl. Ceyl. v. 3, p. 52 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651. *Brachyramphus Heyneanus,* Wight, Icon. t. 1146 ; Dalz. & Gibs. p. 132.—Flowers: Dec. VERN. *Páthari.*

The name *L. runcinata* is 4 years prior to that of *L. Heyneana* and by the same author.

Common on old walls, *Dalzell & Gibson.* DECCAN : widely, *Woodrow.*—DISTRIB. India (N. Western Provinces, W. Peninsula) ; Ceylon.

2. **Lactuca remotiflora,** *DC. in Wight, Contrib.* (1834) p. 26. Herbaceous, 8—18 in. high ; stem slender, branched. Leaves mostly radical, sessile, 2—4 by 1—1½ in., obovate or oblong-pinnatifid, rounded at the apex, finely sinuate-toothed, glabrous. Heads usually solitary (rarely fascicled) along the naked slender branches, with peduncles nearly as long as the head. Involucral-bracts, flowers, pappus

and achenes as in *Lactuca runcinata*, but the achenes rather longer than in that plant. Fl. B. I. v. 3, p. 403 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 ; Watt, Dict. Econ. Prod. v. 4, p. 578. *Brachyramphus sonchifolius*, DC. Prod. v. 7 (1838) p. 177 ; Dalz. & Gibs. p. 132.—Flowers : Sept. VERN. *Páthari.*

DECCAN : Poona, *Woodrow* ! ; Kirki, *Woodrow* ! S. M. COUNTRY : Badami, *Woodrow*. SIND : *Dalzell*, 48 ! ; Jemadar ka Landa near Karachi, *Stocks*, 1190 !— DISTRIB. North Western Provinces of India ; Arabia.

Lactuca Scariola, Linn. Sp. Pl. ed. 2, p. 1119. VAR. *sativa*.—The *Garden Lettuce*, cultivated widely throughout the Bombay Presidency and generally throughout India. A very excellent variety which Woodrow has named the *Poona Brown Cos* was introduced into Poona more than 40 years ago, and has become a favorite with market gardeners. It is a large lettuce of the true Cos form and black-seeded, the leaves are a rich brown outside, greenish-white inside, tender, crisp, and of good flavor. The seed is procurable from any Poona seed-merchant. Fl. B. I. v. 3, p. 404 ; Grah. Cat. p. 94 ; Dalz. & Gibs. Suppl. p. 45 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 ; Gard. in Ind. ed. 5, p. 361 ; Watt, Dict. Econ. Prod. v. 4, p. 578.

51. **SONCHUS,** Linn.

Annual or perennial herbs with milky juice. Leaves radical or alternate, the cauline often amplexicaul and auricled, entire, toothed or pinnatifid, the margins sometimes rigidly ciliolate or subspinous. Heads terminal, irregularly subcorymbose, umbellate or paniculate, rarely solitary, yellow, homogamous. Involucre ovoid, campanulate, or cylindric, often dilated, thickened or conic at the base ; bracts ∞-seriate, imbricate, herbaceous, the outer smaller. Receptacle flat, naked. Corollas all ligulate, truncate and 5-toothed at the apex. Anther-bases sagittate, the auricles shortly setaceo-acuminate. Style-branches slender. Pappus copious ; hairs ∞-seriate, very slender, simple, usually pure white, united at the base into a deciduous ring. Achenes ovoid, obovoid, or ellipsoid, more or less compressed, ribbed, slightly contracted at the base and apex (but not beaked), glabrous, smooth or transversely rugose.—DISTRIB. Europe, Asia, Africa, and Australasia ; a few species spread over the globe ; species about 24.

Auricles of the cauline leaves acute, spreading..... 1. *S. oleraceus.*
Auricles of the cauline leaves obtuse, appressed.
  Invol.-bracts glabrous; achenes much compressed, not transversely rugose..... 2. *S. asper.*
  Invol.-bracts glandular-hairy; achenes scarcely compressed, transversely rugose..... 3. *S. arvensis.*

1. **Sonchus oleraceus,** *Linn. Sp. Pl.* (1753) p. 794. A coarse erect annual 1½—3 ft. high ; stem glaucescent, striate, branched above. Cauline leaves sessile, oblong or obovate, entire or runcinate-pinnatifid, ½-amplexicaul, with spreading acute auricles, dentate, glabrous. Heads in irregular umbellate cymes, campanulate, ½—⅝ in. long, many-flowered ; flowers yellow ; pedicels often glandular.

Involucral-bracts glabrous or nearly so; outer bracts shorter than the inner, which reach ½ in. long. Pappus copious, pure white, longer than the achenes. Achenes ⅛ in. long, compressed, narrowly obovoid, longitudinally ribbed, distinctly transversely muriculate, light-brown. Fl. B. I. v. 3, p. 414; Grah. Cat. p. 94; Syme, Eng. Bot. ed. 3, v. 5, p. 153; C. B. Clarke, Comp. Ind. p. 275; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651; Watt, Dict. Econ. Prod. v. 6, part 3, p. 275. *Sonchus ciliatus,* Lam. Fl. Fr. v. 2 (1778) p 87; Wight, Icon. t. 1141.—Flowers: Sept.—Feb. VERN. *Mhatara.*

Probably an introduction. In Graham's Catalogue of Bombay plants the plant is mentioned as occurring in Deccan gardens, but it has since spread itself tolerably widely throughout that Province. KONKAN: Matheran, *Cooke!* DECCAN: *Woodrow*; Bijapur, *Cooke!* S. M. COUNTRY: Belgaum, *Ritchie,* 367! GUJARAT: Surat, *Ninmo* ex *Graham.* SIND: Jemadar ka Landa near Karachi, *Stocks!*—DISTRIB. Throughout India sparingly; all temperate and many tropical countries, wild or introduced.

2. **Sonchus asper,** *Hill, Herb. Brit.* v. 1 (1769) p. 47. Annual, glabrous or sparsely glabrous above; stem branched. Leaves sessile, slightly rugose; the cauline elliptic-oblong entire, or runcinate or pinnatifid, ½-amplexicaul with rounded appressed auricles, undulate, spinous-dentate or simply dentate. Heads crowded in an irregular umbel; flowers yellow. Involucral-bracts glabrous. Pappus copious, very slender, white. Achenes ⅛ in. long, much compressed, elliptic in outline, longitudinally striate by fine distant ribs, not transversely muriculate. Fl. B. I. v. 3, p. 414; Aitch. Pb. & Sind Pl. p. 82, C. B Clarke, Comp. Ind. p. 275; Syme, Eng. Bot. ed. 3, v. 5, p. 154; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651.—Flowers: Jan.–Mar. VERN. *Mhatara.*

The plant is considered by Bentham to be a variety of *Sonchus oleraceus,* Linn., from which it differs in the achenes, which are not transversely muriculate, and in the leaf-auricles, which in *S. asper* are rounded and appressed, in *S. oleraceus* acute and spreading.

Not common, probably introduced. DECCAN: Sinhagad, *Woodrow!*, Poona, *Woodrow.* SIND: *Stocks!*—DISTRIB. Throughout India, sparingly, all temperate and many tropical countries, wild or introduced.

3. **Sonchus arvensis,** *Linn. Sp. Pl* (1753) p. 793. A tall perennial; rootstock with long slender creeping stolons, which send up small tufts of radical leaves; stems glabrous, more or less angular, 2—5 ft. high, hollow below. Leaves 6—12 in. long, green and shining above, glaucous beneath, glabrous; lower leaves narrowly oblanceolate, subacute, entire or pinnatifid or runcinate-pinnatifid; middle and upper cauline leaves lanceolate, or the uppermost linear, usually undivided, abruptly acuminate, ½-amplexicaul with short rounded appressed auricles, all more or less undulate and with spinous-dentate margins. Heads few, 1—2 in. across, umbellately corymbose; peduncles glandular-hairy; flowers bright yellow. Involucral-bracts clothed (as is often also the upper part of the stem) with long hairs tipped with greenish-yellow glands. Pappus white silky, scarcely exceeding the involucral-bracts. Achenes scarcely compressed, longitudinally ribbed and transversely rugose. Fl. B. I. v. 3, p. 414; Syme, Eng. Bot. ed. 3, v. 5, p. 154; C. B. Clarke, Comp. Ind. p. 276;

Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 275. *Sonchus Wightianus*, DC. Prod. v. 7 (1838) p. 187 ; Wight, Icon. t. 1142.—Flowers : Dec.—Jan.

Rare. DECCAN : Bijapur, *Woodrow*.

The occurrence of this plant in the Bombay Presidency is somewhat doubtful. Woodrow in his list of Bombay Plants gives it as occurring at Bijapur, but I have seen no specimens from that locality, and there are none from Bombay in Herb. Kew.—DISTRIB. Very sparingly throughout the plains of India, more common on the hills; all temperate and many tropical countries, wild or introduced.

52. LAUNÆA, Cass.

(MICRORHYNCHUS, Less.)

Perennial glabrous herbs usually with yellow juice. Leaves mostly radical, sinuately-lobed or pinnatifid ; margins often with cartilaginous or subspinous teeth. Heads pedunculate or subsessile, solitary, fascicled, racemose or paniculate, homogamous ; flowers all ligulate, yellow. Involucre campanulate or cylindric ; bracts ∞-seriate, imbricate, often with scarious margins ; innermost bracts subequal ; the outer gradually shorter, the outermost often very short. Receptacle flat, naked. Corollas ligulate, truncate and 5-toothed at the apex. Anther-bases sagittate, with acute or shortly setaceo-acuminate auricles. Style-arms slender. Pappus copious ; hairs ∞-seriate, simple, very slender, white, a few inner sometimes longer and stronger, all connate at the base into a deciduous ring. Achenes narrow, usually columnar, not contracted at the base or apex, truncate at both ends, sometimes winged, 4—5-ribbed.—DISTRIB. Europe (Mediterranean region), East Indies, Africa, and the Canary Islands ; species about 20.

Achenes not winged.
- Heads terminal on the paniculately branched flowering stems ... ... 1. *L. chondrilloides.*
- Heads more or less racemose or fascicled on the flowering stem or its branches
  - Stems and branches not rooting at the nodes 2. *L. nudicaulis.*
  - Stems and branches rooting at the nodes .. 3. *L. pinnatifida.*

Achenes winged ..... 4. *L. glomerata.*

1 **Launæa chondrilloides,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 415. Perennial, glabrous, or nearly so, stem erect, paniculately branched. Radical leaves rosulate, 3—5 in. long, narrow, runcinate-pinnatifid ; lobes numerous, unequal, irregularly and acutely toothed. Cauline leaves sessile, auricled, irregularly toothed or pinnatifid. Flowering branches few or many, 6—18 in. long, stout, dichotomously branched, with small leafy bracts at the forks. Heads terminal, ½—1 in. long, cylindric or ovoid ; peduncles bracteate. Involucre-bracts glabrous, 3- or 4-seriate ; the outer ovate, acute, subcordate, much shorter than the inner ; innermost sometimes reaching ¾ in. long, linear-lanceolate, acute, membranous, ciliolate at the apex. Pappus soft, white, longer than the achenes, the outer hairs numerous, slender, the inner hairs much longer, reaching nearly ½ in. long, rigid, and much stouter than the outer. Achenes ⅛—¼ in. long, narrowly oblong, truncate at both ends, strongly ribbed, the ribs slightly papillose. *Microrhynchus*

chondrilloides D. Clarke, Comp. Ind. p. 277 (*not* of Sch.-Bip.). *Sonchus Cameolleanus*, Jaub. & Spach, Illust. Pl. Orient. v. 3, p. 110, t. 279 ; Aitch. Pb. & Sind Pl. p. 82.

Rare. SIND : *Stocks*, 715! ; sandy shore near Karachi, *Dalzell*, 47!— DISTRIB. India (Panjáb) ; Afghanistan, Persia, Arabia, Egypt.

2. **Launæa nudicaulis**, *Hook. f. Fl. B. I.* v. 3 (1881), p. 416. Glabrous, 6—24 in. high, branched. Leaves 2—10 by 1—3 in., mostly radical ; lower leaves obovate-oblong, pinnatifid, with rounded or very obtuse segments, spinulose on the margins with white cartilaginous teeth ; cauline leaves distant, few, sessile, narrowly oblong, pinnatifid. Flowering stems decumbent or spreading, irregularly branched. Heads ½—¾ in. long, cylindric, remotely subracemose along the branches, shortly pedicelled, subsolitary or fascicled (sometimes 6—10 in a cluster), supported by leaves or naked. Involucral-bracts all with broad white membranous margins ; the outer very short, ovate, acute, with a strong midrib, subcordate ; the innermost thrice as long as the outer, reaching ½ in. long, linear, subacute, longer than the pappus, the midrib thickened in front. Pappus-hairs subequal, soft, white, copious. Achenes $\frac{1}{10}$—⅛ in. long, polymorphous ; inner sometimes as if composed of 4 thick ribs ; outer slightly curved and flattened, with a thick ventral and several thick dorsal ribs, all smooth or obscurely uneven *Microrhynchus nudicaulis*, Less. Syn. p. 139 ; Aitch. Pb. & Sind Pl. p. 83. *M. fallax*, Jaub & Spach, Ill. Pl. Orient. v. 3, p. 106, t. 276 *Lactuca obtusa*, C B Clarke, Comp. Ind. p. 261 (exclud. many syn.), *not* of Benth. -Flowers : Nov. VERN. *Páthari*.

S. M. COUNTRY : Belgaum, *Ritchie*, 365! KANARA Yellur, *Ritchie*, 1802! SIND *Ritchie*, 1801!, Jemadar ka Landa near Karachi, *Stocks*, 688!—DISTRIB. More or less throughout the plains of India, Afghanistan and westwards to the Atlantic.

3. **Launæa pinnatifida**, *Cass. in Ann Sc. Nat* sér 1, v 23 (1831) p. 85. Glabrous, flagelliform, procumbent ; stems 1-3 ft long, rooting and leaf-bearing at the nodes and arching between them. Leaves radical and springing from the nodes ; the radical 1-3 in. long, oblong, runcinate-pinnatifid or sinuate-toothed or lobed, the teeth rarely white and cartilaginous. Heads ⅜—½ in long, solitary or in clusters of 1—2, arising from the nodes together with the cauline leaves ; peduncles short and with several small bracts. Involucral-bracts with white membranous margins ; the outer small, oblong, subobtuse ; the inner ½ in. long, linear, subacute. Pappus ¼ in. long, deciduous, the hairs subequal, soft, white. Achenes pale, ⅛ in. long, obtusely 4-gonous. Fl. B. I. v. 3, p. 416 ; Trim. Fl. Ceyl. v. 3, p. 52 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 ; Watt, Dict. Econ. Prod. v. 4, p. 595. *Microrhynchus sarmentosus*, DC. Prodr. v. 7, p. 181 ; Wight, Ill. t. 133 ; Dalz. & Gibs. p. 132 ; C. B. Clarke, Comp. Ind. p. 277. *Prenanthes sarmentosa*, Willd. Sp. Pl. v. 3, p. 1540 ; Grah. Cat. p. 94.—Flowers : Dec. VERN. *Páthari*.

KONKAN : Bombay, *Graham*, Revadanda, *Kanitkar*!, Shrivardhan (seashore), *Woodrow*! GUJARAT : Veráwal (Kathiawar), *Woodrow*. SIND : *Cooke*!

The plant is often given in Bombay to buffaloes to promote the secretion of milk, and the juice is given as a soporific to children. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. India on sandy sea-shores; Ceylon, Mauritius, Egypt, E. Africa.

4. **Launæa glomerata,** *Hook. f. Fl. B. I.* v. 3 (1881) p. 417. A glaucescent glabrous plant, with a perennial root ; stems cylindric, usually numerous, 2—7 in. long, diffuse or ascending or suberect or decumbent, almost leafless. Radical leaves 3—5 by 1—1½ in., sessile, sinuately-lobed, pinnatifid or runcinate, the lobes usually rounded and with white cartilaginous teeth. Flowering branches spreading, sparingly dichotomously branched. Heads subsessile, ½—⅔ in. long, broader than in the three preceding species, campanulate, clustered at the ends of the branches ; flowers yellow. Involucral-bracts with broad membranous margins ; outer ovate, small , the innermost ⅔ in. long, oblong-lanceolate, acute, scarcely exceeding the pappus. Pappus ¼ in. long, deciduous ; the hairs subequal, soft, white. Achenes ⅛ in. long, corky, oblong, truncate at both ends, white or pale-yellow, conspicuously winged. *Microrhynchus glomeratus*, Jaub. & Spach, Ill. Pl. Orient v. 3, p. 105, t 275.

SIND *Stocks* !

I have seen but one Bombay specimen collected in Sind by Stocks.—DISTRIB India (Panjáb), Persia, Arabia, Egypt, Algiers

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A great many plants of the Order have been introduced into India, some of which have become naturalized and, in some cases, as for example *Lagasca mollis*, have become almost pests of agriculture. Several are grown for economic purposes, while a large number are cultivated in gardens as ornamental plants.

Some of the most important of the species introduced into the Presidency of Bombay are given below.

Aster Amellus, Linn Sp Pl (1753) p 873 The *Michaelmas Daisy*. Herbaceous perennial which thrives in the climate of the Deccan and is deserving of attention for the garden Woodr. in Journ. Bomb. Nat. v. 11 (1898) p 647 ; Gard in Ind. ed. 5, p. 363.

Vittadinia australis, A. Rich. Ess. Fl. Nouv. Zél. p. 251. The *Australian Daisy*, cultivated in gardens. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p 647.

Eupatorium triplinerve, Vahl, Symb v 3, p. 97. A native of Tropical America, with slaty-blue flowers, now common in gardens. The leaves are a good bitter. *Eupatorium Ayapana*, DC Prodr. v. 5, p. 169 ; Grah. Cat. p. 98 ; Dalz. & Gibs. Suppl. p. 47.

Brachycome iberidifolia, Benth. in Enum. Pl. Hueg. (1837) p. 59. A native of Australia, known as the *Swan River Daisy*, with blue and white flowers. In gardens. Woodr. Gard. in Ind. ed. 5, p. 362.

Charieis heterophylla, Cass. in Bull. Soc. Philom. (1817) p. 68. A native of S. Africa, cultivated in gardens in Europe and recently introduced into India. The ray-flowers are blue, those of the disk blue or yellow. Woodr. Gard. in Ind. ed. 5, p. 362.

Callistephus hortensis, Cass. in Dict. Sc. Nat. v. 37 (1825) p. 491 (gen. name changed from *Callistemma*, Cass. l. c. v. 6 (1817) Suppl. p. 46). The well-known *German* or *Chinese Aster*. Firminger (Man. Gard. ed. 3, p. 317) says that, to obtain fine flowers, the German imported seed is better than English. Woodr. Gard. in Ind. ed. 5, p. 358. *Callistemma hortense*, Cass. in Dict. Sc. Nat. v. 6 (1817) Suppl. p. 46.

Helipterum roseum, Benth. Fl. Austr. v. 3, p. 640. A native of S. Western Australia, 1—2 ft. high, bearing solitary terminal rose-colored flower-heads. *Acroclinium roseum*, Hook. Bot. Mag. t. 4801 ; Woodr. Gard. in Ind. ed. 5, p. 362.

Helipterum Manglesii, F. Muell. ex Benth. Fl. Austr. v. 3, p 640. A native of Western Australia, a very pretty pot-plant bearing small delicate rose-colored *everlasting* flowers. Woodr. Gard. in Ind. ed. 3, p. 362. *Rhodanthe Manglesii*, Lindl. Bot. Reg. t. 1703.

Melampodium paludosum, H. B. & K. Nov. Gen. v. 4, p. 273. A native of Tropical America, with yellow flowers, now become a weed in gardens in Poona. Dalz. & Gibs. Suppl. p. 47. *Melampodium divaricatum*, DC. Prodr. v. 5, p. 520 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649.

Zinnia elegans, Jacq. Coll. Suppl. (1796) p. 152. A well-known garden plant very easy of culture and rapidly becoming naturalized in the Deccan. Grah. Cat. p. 99 ; Dalz. & Gibs. Suppl. p. 46 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Gard. in Ind. ed. 3, p. 359.

Tithonia tagetiflora, Desf. in Ann. Mus. Par. v. 1 (1802) p. 49, t. 4. A tall soft-wooded shrub reaching 6 ft. high, bearing alternate divided leaves and numerous orange-colored flowers resembling small sun-flowers, a native of Mexico. It grows readily either from seeds or cuttings and spreads with great rapidity. Woodr. Gard. in Ind. ed. 5, p. 366.

Helianthus annuus, Linn. Sp. Pl. (1753) p. 904. The *Common Sunflower*, a native of the Western United States of America. Grows to a height of 6 ft. and more, and is common in gardens throughout India. The finest variety of the annual species is *globosus-fistulosus*. Grah. Cat. p. 100 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Gard. in Ind. ed. 5, p. 359 ; Watt, Dict. Econ. Prod. v. 4, p. 209.—VERN. *Suryaphul*.

Helianthus rigidus, Desf. Cat. Hort. Par. ed. 3, p 184. The *Small Sunflower*, a native of N. W. America, a recent introduction into gardens at Poona. Mr. Woodrow (Gard. in Ind. ed. 5, p. 363) states that it was lately used at that station in a competition in table-decoration and was much admired. The flower-heads reach 4 in. in diam. ; the ray is of a deep golden- and the disk of a very dark chocolate-color.

Helianthus tuberosus, Linn. Sp. Pl. (1753) p. 905. The *Jerusalem Artichoke*, a well-known and much appreciated culinary vegetable, a native of N. America and now very generally cultivated. Grah. Cat. p. 100 ; Dalz. & Gibs. Suppl. p. 47 ; Woodr. in Journ.

Bomb. Nat. v. 11 (1898) p. 649 ; Gard. in Ind. ed. 5, p. 363 ; Watt, Dict. Econ. Prod. v. 4, p. 211.

Guizotia abyssinica, Cass. in Dict. Sc. Nat. v. 59 (1829) p. 248. A stout erect leafy herb 1—3 ft. high bearing numerous yellow flowers, a native of Tropical Africa, but extensively cultivated in India for the oil produced from the seeds. The oil is used by the poorer classes as a substitute for *ghi.* It is also used to adulterate gingelly and castor oils. Fl. B. I. v. 3, p. 308 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 649 ; Gard. in Ind. ed. 5, p. 365 ; Watt, Dict. Econ. Prod. v. 4, p. 186. *Guizotia oleifera,* DC. Sept. Not. Pl. Rar. Jard. Genèv. p. 5 ; Dalz. & Gibs. p. 128—VERN *Kála-til ; Káralá ; Rám-til.*

Coreopsis tinctoria, Nutt. in Journ. Acad. Philad. v. 2 (1821) p. 114. A well-known tall handsome annual, a native of N. America. The flower-heads have long yellow rays and a maroon-colored disk. It is a very common plant in gardens and has become almost naturalized about Belgaum. Woodr. Gard. in Ind. ed. 5, p. 358. *Calliopsis tinctoria,* DC. Prodr. v. 5, p. 568 ; Grah. Cat. p. 101 ; Dalz. & Gibs. Suppl. p. 47.

Coreopsis aristosa, Michx. Fl. Bor.-Am. v. 2, p. 140. A dwarf plant similar to the former in the color of the flowers. Leaves deeply pinnatifid. Woodr. Gard. in Ind. ed. 5, p. 358.

Dahlia variabilis, Desf. Cat. Hort. Par. ed. 3, p. 182. Several varieties of this showy flower are grown in gardens in the Deccan, where both single and double Dahlias are much cultivated. Grah. Cat. p. 100 ; Dalz. & Gibs. p. 47 ; Woodr. Gard. in Ind. ed. 5, p. 357.

Cosmos bipinnatus, Cav. Icon. v. 1, p. 10, t. 14. A native of Mexico, often grown in gardens. It is about 2 ft. high and bears pretty pink daisy-like flowers. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Gard. in Ind. ed. 5, p. 358.

Flaveria contrayerba, Pers. Syn. v. 2, p. 489. A weed, a native of Peru, which has become naturalized in the Deccan, where it is plentiful about Poona, Bijapur, and Hewra. It has 3-nerved leaves with spinous margins and dense heads of yellow flowers and is medicinal, but by no means an attractive plant. Dalz. & Gibs. Suppl. p. 47 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650.

Tagetes erecta, Linn. Sp. Pl. (1753) p. 887. The *African Marigold,* grown abundantly in the gardens of Europeans and natives. It seems originally to have come from Mexico and grows about 2 ft. high, with erect stem and erect branches. Grah. Cat. p. 99 ; Woodr. Gard. in Ind. ed. 5, p. 359 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 402.

Tagetes patula, Linn. Sp. Pl. (1753) p. 887. The *French Marigold,* a smaller plant than *T. erecta* and with smaller flowers. It grows to a height of 1½ ft., the stem erect, the branches spreading.—It is a native of Mexico. Grah. Cat. p. 99 ; Dalz. & Gibs. Suppl. p. 46 ; Woodr. Gard. in Ind. ed. 5, p. 359.—VERN. *Machamul ; Guljáphiri.*

Gaillardia aristata, Pursh, Fl. Am. Sept. v. 2, p. 573. A very beautiful perennial, 1½ ft. high, recently introduced from N. America. Woodr. Gard. in Ind. ed. 5, p. 362.

Gaillardia pulchella, Fouger, in Mém. Acad. Sc. Par. 1786 (1788) p. 5. An older introduction than the former species. The ray-flowers are crimson tipped with bright yellow, and the plant is about 2—3 ft. high. An improved form of this named *G. Lorenziana* is very handsome and unique in its appearance. The ray- and disk-flowers develop into tubular funnel-shaped 3—5-lobed florets and form handsome flower-heads admirably adapted for cutting (*Nicholson*). Woodr. Gard. in Ind. ed. 5, p. 362. *Gaillardia picta,* Sweet, Brit. Flow. Gard. n.s. 3, t. 267 ; Dalz. & Gibs. Suppl. p. 48.

Achillea Millefolium, Linn. Sp. Pl. (1753) p. 899. The *Yarrow* or *Milfoil,* a common plant throughout the British Isles, is often seen in gardens in Bombay and Belgaum. Grah. Cat. p. 102 ; Dalz. & Gibs. Suppl. p. 48 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 650 ; Watt, Dict. Econ. Prod. v. 1, p. 78.

Chrysanthemum indicum, Linn. Sp. Pl. (1753) p. 889. A few varieties of this plant, which is a native of China and Japan, are largely grown by market-gardeners for cut flowers. Grah. Cat. p. 102 ; Dalz. & Gibs. Suppl. p. 48 ; Woodr. Gard. Ind. ed. 5, p. 365 ; Watt, Dict. Econ. Prod. v. 2, p. 272.—VERN. *Gul-daudi.*

Crossostephium artemisoides, Less. in Linnæa, v. 6, p. 220. A small useful bedding-plant, a native of China. It has small alternate much-divided leaves of a greenish-grey color, contrasting well with *Alternantheras* and other dark-colored plants. Propagation by cuttings in sandy soil is easy. Woodr. Gard. in Ind. ed. 5, p. 362.

Calendula officinalis, Linn. Sp. Pl. (1753) p. 921. The *Marigold,* grown everywhere in gardens. Grah. Cat. p. 101 ; Dalz. & Gibs. Suppl. p. 48 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 ; Gard. in Ind. ed. 5, p. 358 ; Watt, Dict. Econ. Prod. v. 2, p. 24.

Cynara Cardunculus, Linn. Sp. Pl (1753) p. 827. The *Cardoon,* of which *Cynara Scolymus,* Linn., the *Globe Artichoke,* is a cultivated form, is sometimes grown, but chiefly as an ornamental plant, as the globe variety rarely forms heads in the Deccan. I have found that the only way of growing the globe artichoke successfully in Poona was by obtaining seed from acclimatized plants from some station in Northern India. Grah. Cat. p. 95 ; Dalz. & Gibs. Suppl. p. 45 ; Woodr. Gard. in Ind. ed. 5, p. 364 ; Watt, Dict. Econ. Prodr. v. 2, p. 678.

Centaurea Cyanus, Linn. Sp. Pl. (1753) p. 911. The well-known *Corn Blue-bottle,* a native of Europe. Often grown in gardens, especially about Belgaum. Grah. Cat. p. 95 ; Dalz. & Gibs. Suppl. p. 46 ; Woodr. Gard. in Ind. ed. 5, p. 358.

Carthamus tinctorius, Linn. Sp. Pl. (1753) p. 830. The *Safflower,* cultivated throughout a large part of India and in the black soil districts of the Bombay Presidency, for the use of dyers as well as for the oil extracted from the seeds. The native country of the plant

is uncertain. It has been cultivated as a source of a red dye in Spain, Germany, Italy, Persia, China, Egypt, S. America, and S. Russia. DeCandolle says that the cloths found on Egyptian mummies were dyed with it. The dye is prepared from the flowers. A very full description of the mode of preparation of the dye and the oil will be found in Watt's Dict. Econ. Prod. v. 2, pp. 184—195. Fl. B. I. v. 3, p. 386 ; Grah. Cat. p. 95 ; Dalz. & Gibs. Suppl. p. 45 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 651 , Gard. in Ind. ed. 5, p. 357.—VERN. *Kusumba*.

Cichorium Endivia, Linn. Sp. Pl. (1753) p. 813. The *Garden Endive*, cultivated but not nearly so extensively as lettuce, a native of Europe. Grah. Cat. p. 94 ; Dalz. & Gibs. Suppl. p. 45 ; Woodr. Gard. in Ind. ed. 5, p. 366 ; Watt, Dict. Econ. Prod. v. 2, p. 285.

Cichorium Intybus, Linn. Sp. Pl. (1753) p. 813. *Chicory*, occasionally though rarely grown in the Deccan. Woodr. Gard. in Ind. ed. 5, p. 365 ; Watt, Dict. Econ. Prodr. v. 2, p. 285.

Tragopogon porrifolium, Linn. Sp. Pl. (1753) p. 789, and *Scorzonera hispanica*, Linn. Sp. Pl. (1753) p. 791. The *White* and *Black Salsify* respectively. These may be grown with advantage in the Deccan, especially if irrigation is available, but they are not often planted. I have grown both for several years successively in Poona and have found them very satisfactory. Woodr. Gard. in Ind. ed. 5, p. 365.

Taraxacum officinale, [Weber, in] Wigg. Prim. Fl. Holsat. p. 56. The *Dandelion*, whose roots furnish the well-known medicinal extract. It was grown for many years near Poona, whence the extract was supplied to the Government Medical Stores. Mr. Woodrow, who superintended the work of growing the plant and making the extract, says that a fair crop would yield about 1500 lbs. of fresh roots per acre, from which 18 per cent. of the extract was obtainable. Woodr. Gard. in Ind. ed. 5, p. 362 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 414. *Leontodon Taraxacum*, Linn. Sp. Pl. (1753) p. 798 ; Dalz. & Gibs. Suppl. p. 48.

ORDER LXXII. GOODENIACEÆ.

Herbs or shrubs ; juice not milky. Leaves alternate or radical (very rarely opposite) ; stipules 0. Flowers hermaphrodite, often irregular, solitary or in axillary or terminal spikes, racemes, or panicles. Calyx-tube adnate to the ovary or rarely free ; limb 5-fid or nearly obsolete. Corolla gamopetalous ; lobes 5, valvate in bud. Stamens 5, inserted at the base of the corolla and alternate with its lobes ; anthers free or connate in a ring round the style. Ovary altogether or partly inferior (rarely free), 1—2-celled ; ovules in each cell 1 or many, on the dissepiment ; style simple (rarely 2-fid), with a cup-shaped or 2-lipped indusium including the stigma. Fruit a drupe or capsule. Seeds albuminous ; embryo straight ; radicle next the hilum.—DISTRIB. Australia, Temperate America, New Zealand, S.E. Asia ; species about 200.

1. SCÆVOLA, Linn.

Herbs or shrubs. Leaves alternate (rarely opposite), entire or toothed. Flowers axillary, on a 1-flowered peduncle between 2 opposite bracts, or at the bifurcations of a dichotomously branched peduncle, sessile or pedicelled. Calyx-tube adnate to the ovary, turbinate, ovoid or globose ; limb usually short, annular, cup-shaped or 5-partite, sometimes obsolete. Corolla oblique, split at the back to the base ; lobes subequal, at length usually digitately spreading. Anthers free. Ovary usually inferior, 2 (rarely 1) -celled ; ovules 1—2, erect. Indusium of the style cup-shaped, enclosing the truncate or divaricately 2-lobed stigma. Fruit a drupe ; exocarp fleshy, succulent or thinly membranous ; endocarp woody or bony, rarely thin and crustaceous.—DISTRIB. Species about 60, of which about 50 are Australian, 8 Polynesian, and 2 Asiatic.

Leaves 4½—8 in. long; calyx-lobes linear-lanceolate enlarged in fruit; drupe white	1. *S. Kœnigii.*
Leaves 1½—3 in. long; calyx truncate or obscurely lobed; drupe purple	2 *S. Lobelia.*

1. **Scævola Kœnigii,** *Vahl, Symb. Bot.* v. 3 (1794) p. 36. A shrub 4—10 ft. high ; stem 6—7 in. in diam., branches stout, cylindric, glabrous, pale-green. Leaves 4½—8 by 1½—3½ in., alternate, obovate, obtuse, numerous, sessile, entire, glabrous on both sides, base long-tapering, with a tuft of white wool in its axil ; midrib stout, main nerves slender. Flowers white, in short axillary dichotomous cymes much shorter than the leaves, with small woolly bracts in their axils at the bifurcations ; buds clavate, obtuse ; pedicels short, pubescent. Calyx ¼—⅜ in. long, pubescent ; lobes 5, rather distant, ⅛—3/16 in. long, linear-lanceolate or linear-obovate, often enlarged in fruit. Corolla pubescent or glabrous outside, 1—1¼ in. long ; tube hairy inside ; lobes ⅜—½ in. long, spreading, elliptic-obovate, the central portion of the lobe thick and stiff, prolonged into a stout apiculus, the margins thin, membranous, irregularly toothed and ciliate. Style exceeding ¾ in. long, curved, very hairy, protruded through the split back of the corolla-tube ; cup round the stigma (*indusium*) ⅛ in. deep, hairy, ciliate. Drupe about ¾ in. in diam., subglobose, somewhat lobed, very succulent, white when ripe, crowned by the persistent calyx-lobes ; stone rough, bony. Fl. B. I. v. 3, p. 421 ; Trim. Fl. Ceyl. v. 3, p. 54 ; Talb. Trees, Bomb. ed. 2, p. 201 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 484. *Scævola Taccada,* Roxb. Hort. Beng. p. 15 ; Grah. Cat. p. 103 ; Dalz. & Gibs. p. 134. Wight, Ill. t. 137.—Flowers: June—Dec. VER. *Bhadrák ; Bhadraksh.*

Grows on the sea-coast; sometimes cultivated in gardens, Bombay. KONKAN : *Lambert* ! ; Rari Fort, *Dalzell & Gibson* ; near Ratnagiri on the sea-coast, *Talbot, Woodrow.* SIND : *Dalzell* !—DISTRIB. Sea-shores of India ; Ceylon ; Tropical East Asia, Australia, Polynesia.

2. **Scævola Lobelia,** *Murr. Syst.* ed. 13 (1774) p. 178. A small shrub decumbent (*Stocks*), branched from the base. Leaves 1½—3 by

¾—1¼ in., elliptic or obovate, subsessile, fleshy, glabrous, narrowed at the base and with entire margins ; nerves inconspicuous. Flowers usually in small axillary cymes of 3, the central one sessile ; bracts small, fleshy ; bracteoles lanceolate. Calyx ⅛—⅓ in. long, truncate or obscurely and obtusely lobed. Corolla ¾ in. long, yellowish ; tube hairy inside ; lobes ¼ in. long, linear-oblong. Drupe globose, smooth, purple, ½ in. in diam. Fl. B. I. v. 3, p. 421 ; Talb. Trees, Bomb. ed. 2, p. 201 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162. *Scævola uvifera*, Stocks, in Wight, Icon. t. 1613 ; Dalz. & Gibs. p. 134. *S. Plumierii*, Vahl, Symb. Bot. v. 2 (1791) p. 36 ; Trim. Fl. Ceyl. v. 3, p. 55 ; Aitch. Pb. & Sind Pl. p. 83.

Very near *S. Kœnigii*, from which it differs by the smaller leaves, the truncate calyx and the drupe which is purple and not white.

KANARA : *Thomson* ! SIND : mouths of the Indus near Karachi, ***Talbot***; sand-drifts of the sea, Karachi, *Vicary* !, *Stocks*, 518 !—DISTRIB. Sea-shores of S. India and Sind, Ceylon ; warm sea-shores of both hemispheres.

ORDER LXXIII. CAMPANULACEÆ.

Herbs, shrubs, or undershrubs, usually with milky juice. Leaves usually alternate (rarely opposite or verticillate), entire or toothed (rarely lobed) ; stipules 0. Flowers hermaphrodite (rarely dicœcious), axillary or terminal, solitary, subpaniculate or racemose ; bracts usually small ; bracteoles 0 (except in *Sphenoclea*). Calyx-tube adnate to the ovary ; limb usually 5-lobed or 5-partite (exceptionally 3—10-partite), usually persistent and enlarging after the corolla withers , the lobes equal or slightly unequal. Corolla gamopetalous, tubular, campanulate, rarely infundibuliform or rotate, straight or oblique ; limb regular, or oblique, or bilabiate ; lobes as many as those of the calyx, short or more or less deeply divided, valvate or induplicate-valvate, rarely 1 or 2 or all the petals free to the base. Stamens as many as the corolla-lobes and alternate with them, usually inserted on the disk, sometimes on the tube of the corolla near the base or higher up and adnate ; filaments free or cohering at the top or throughout their entire length ; anthers linear, oblong or rarely ovate, free or united into a tube, 2-celled, the cells parallel, introrse, dehiscing longitudinally. Ovary inferior, ½-superior or rarely almost superior, 2—5 (rarely 6—10) -celled ; placentas axile or attached to the middle of the septa, stipitate or peltate ; ovules numerous or rarely only 2, at the base or apex of each cell, anatropous, erect, horizontal or pendulous. Style simple, clavate at the apex, papillose, at first enclosed by the anthers, afterwards protruding beyond them ; stigmatic lobes as many as the cells of the ovary. Fruit capsular, baccate or dry (in *Sphenoclea* with circumcissile dehiscence). Seeds numerous, small ; testa thin or coriaceous, smooth or reticulated ; embryo straight in the axis of the albumen ; radicle next the hilum.—DISTRIB. Genera 53 ; species more than 1000, scattered throughout the globe.

Corolla irregular, 2-lipped; anthers connate round the style	1. LOBELIA.
Corolla regular or only slightly oblique; anthers free.	
Capsule dehiscing at the top within the calyx-teeth into as many as there are cells.	
Corolla deeply 5-partite into narrow lobes.	
Slender annuals with minute flowers on long filiform peduncles; lobes of the stigma short and broad	2. CEPHALOSTIGMA.
Corolla with short broad lobes, rarely divided below the middle; lobes of the stigma narrow	3. WAHLENBERGIA.
Capsule with circumcissile dehiscence	4. SPHENOCLEA.
Capsule dehiscing at the base or sides below the calyx-teeth	5. CAMPANULA.

1. LOBELIA, Linn.

Herbs or undershrubs. Leaves alternate. Peduncles 1-flowered, solitary in the axils of leaves or bracts, sometimes in a terminal raceme; bracteoles very small, usually 0. Calyx superior; limb 5-partite, the segments slightly unequal. Corolla oblique, more or less distinctly 2-lipped. Staminal-tube free from the corolla or very rarely adnate at the very base; anthers 2 or all penicillate at the apex. Ovary inferior or ½-superior, 2-celled; placentas ∞-ovulate. Stigma shortly 2-fid. Capsule loculicidally 2-valved within the calyx-lobes. Seeds very many, minute, ellipsoid, compressed or trigonous.—DISTRIB. All temperate and warm regions of the world; rare in Central Europe and East and West Asia; species about 200.

Small herbs not exceeding 18 in. high.	
Seeds trigonous; anthers all penicillate at the tip	1. *L. trigona.*
Seeds ellipsoid, compressed; two of the anthers penicillate at the tip	2. *L. trialata.*
Large erect herb 4—10 ft. high	3. *L. nicotianæfolia.*

1. **Lobelia trigona,** *Roxb. Fl. Ind.* v. 1 (1832) p. 506. Annual, 1½—12 in., or sometimes even more; branches ascending, rooting near the base, more or less trigonous, glabrous. Leaves subsessile, ½—¾ by $\frac{5}{16}$—½ in., ovate, acute, crenate-dentate, glabrous. Flowers axillary; peduncles angular, longer than the leaves, with conspicuous bracts at their base which sometimes appear like stipules. Calyx glabrous; lobes linear, acute, as long as or longer than the tube. Corolla ⅛—¼ in. long, blue or violet; lobes ovate, elliptic. Anthers all penicillate at the apex. Capsule ⅛ by ⅛ in., ellipsoid. Seeds ellipsoid, narrowed at both ends, about $\frac{1}{10}$ in. long, distinctly trigonous. Fl. B. I. v. 3, p. 423; Dalz. & Gibs. p. 133 (exclud. syn.); Wight, Icon. t. 1170; Trim. Fl. Ceyl. v. 3, p. 56; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162; Watt, Dict. Econ. Prod. v. 5, p. 87.—Flowers: Aug.—Oct.

KONKAN: Bombay, *Cooke*!, *Stocks*!; Neral, *Woodrow*! DECCAN: Mahableshwar, *Cooke*!; Kolhapur, *Woodrow*!; Panchgani, *Woodrow*! S. M. COUNTRY: Londa, *Bhíva*!—DISTRIB. More or less throughout India; Ceylon.

2. **Lobelia trialata,** *Buch.-Ham. in Don, Prod. Nep.* p. 157. Annual; stems 6—15 in., often 3-winged, suberect, branched. Leaves subsessile or the lower sometimes shortly petioled, ovate, elliptic or

the upper lanceolate, ½—1 by ⅛—⅜ in., glabrous, the margins crenate-serrate or dentate, base narrowed. Flowers axillary, solitary ; pedicels slender, usually equalling the leaves, with minute bracts at the base. Calyx glabrous, about ¼ in. long in flower ; lobes linear, acute, as long as the tube. Corolla ⅛—¼ in. long, blue or violet. The 2 lower anthers only penicillate at the apex, the 3 upper naked. Capsules ⅛ by ⅛ in. Seeds ellipsoid, compressed, not trigonous. Bentham (Fl. Hongkong. p. 197) unites this with *Lobelia trigona*, but the shape of the seed is sufficient to separate the 2 species. *L. trigona* has moreover all the anthers bearded, while *L. trialata* has 3 of the anthers naked at the tip. Fl. B. I. v. 3, p. 425 ; Woodr. in Journ. Bomb. Not. v. 12 (1898) p. 162.—Flowers : July—Nov.

Not common. KONKAN : Bombay, *Stocks* ! ; Ambeghát, *Woodrow*. DECCAN : Mahableshwar, *Woodrow*.—DISTRIB. India (N. Provinces, W. Peninsula) ; mountains of Ava, Java, Abyssinia.

3. **Lobelia nicotianæfolia,** *Heyne, in Roth, Nov. Pl. Sp.* (1821) p. 143. A very large biennial or perennial herb ; stem stout, hollow, 4—10 ft. high, branched upwards ; branches cylindric, slightly pubescent. Leaves alternate, numerous, sessile or nearly so, light green, the lower sometimes reaching 18 by 2—3 in., the uppermost only about 3 by ¾ in. and then passing into floral leaves or bracts, all oblong-lanceolate, acute, finely serrulate, usually glabrous above, glabrous or pubescent beneath, tapering at the base ; midrib white ; main nerves many, slender. Flowers in terminal racemes sometimes more than 1 ft. long ; pedicels pubescent, each supported by a leaf-like lanceolate bract. Calyx-tube pubescent or glabrous ; lobes ½ in. long, about twice as long as the subglobose tube, linear-lanceolate, acuminate, with toothed and ciliate margins. Corolla 1—1½ in. long, much curved, pubescent or glabrous, white ; lobes long, linear, 3 usually connate throughout. Filaments connate into a tube, ⅝ in. long, curved, dilated at the base ; anthers ¼ in. long, dark-purple, linear, obtusely pointed, curved, glabrous or with a few white hairs on the back, the 2 lower often with a bunch of long white glistening hairs ½ in. long at the tip. Capsule ⅛ in. in diam., subglobose, opening by 2 valves. Seeds very small, ellipsoid, compressed, yellowish-brown, extremely acrid (*Dalzell & Gibson*). A yellow viscid secretion is often found on the peduncles in thick drops. Odor very disagreeable. Fl. B. I. v. 3, p. 427 ; Grah. Cat. p. 102 ; Dalz. & Gibs. p. 133 ; Wight, Ill. t 135 ; Trim. Fl. Ceyl. v. 3, p. 57 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162 ; Watt, Dict. Econ. Prod. v. 5, p. 86.—Flowers : Nov.—Mar. VERN. *Dhaval* ; *Boknal*.

Common on the Western Ghâts. KONKAN : *Stocks* !, *Lambert* ! ; Matheran, Baikra road to Gharbat Point. *Cooke* ! DECCAN : Khandala, *Woodrow* ! ; hills about Párr, abundant, *Graham*. S. M. COUNTRY : Castlerock, *Kanitkar* !—DISTRIB. India (W. Peninsula) ; Ceylon.

2. CEPHALOSTIGMA, A. DC.

Annual slender erect herbs, often hairy. Leaves alternate, sub-sessile. Flowers very small, laxly racemose or paniculate ; pedicels

filiform. Calyx-tube adnate to the ovary ; limb 5-partite. Corolla 5-partite almost to the base, blue or white ; lobes narrow. Stamens free from the corolla ; filaments dilated at the very base ; anthers free. Ovary inferior, 2—3-celled ; placentas many-ovuled ; style shortly conical at the base ; stigma 2—3-fid with short lobes. Capsule conical at the top, 2—3-valved within the persistent calyx-lobes. Seeds very many, small.—DISTRIB. India, Tropical Africa, Brazil ; species 9.

Stem erect, reaching 16 in. long; leaves oblong; seeds much longer than broad	1. *C. Schimperi.*
Stem flexuose, less than 10 in. long, more or less zigzag; leaves broadly ovate; seeds scarcely longer than broad	2. *C. flexuosum.*

1. **Cephalostigma Schimperi,** *Hochst. ex A. Rich. Tent. Flor. Abyss.* v. 2 (1851) p. 2. A slender annual 3-16 in. high ; stem erect, rarely branched near the base and, as well as the branches, angular, hispid with spreading hairs. Leaves ¾—1 by ¼—⅜ in., subsessile, oblong, acute, narrowed at both ends and with undulate crisped subdentate margins, sparsely clothed with rigid hairs above and on the nerves beneath. Flowers in very lax cymes terminating most of the branches ; pedicels filiform, ¼—¾ in. long, pubescent. Calyx ⅛—⅓ in. long ; tube turbinate or subhemispheric, hispidly hairy ; lobes about equalling the tube, erect, triangular, acute, with thickened and prominent margins, glabrous. Corolla divided nearly to the base, blue ; segments lanceolate, acute, ⅓ in. long. Capsule hispid. Seeds much longer than broad, ellipsoid, about $\frac{1}{10}$ in. long, pale-brown, smooth. Fl. B. I. v. 3, p. 428 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162. *Cephalostigma hirsutum,* Hook. f. & Thoms. in Journ. Linn. Soc. v. 2 (1858) p. 9, partly (*not* of Edgew.) ; Dalz. & Gibs. p. 133.—Flowers : Oct.—Dec.

KONKAN : *Stocks* !, *Dalzell* ! DECCAN : Panchgani, *Woodrow* ! S. M. COUNTRY : Belgaum (shady places), *Ritchie,* 1101 !, Dharwar, *Woodrow.*—DISTRIB. India (W. Peninsula, Khasia) ; Ceylon.

2 **Cephalostigma flexuosum,** *Hook. f. & Thoms. in Journ. Linn. Soc.* v. 2 (1858) p. 9. Annual, 5—9 in. high, dichotomously branched ; stem and branches slender, more or less zigzag, angular, hispid with white hairs. Leaves thin, subsessile, ¾—1 by ½—⅝ in., ovate-elliptic, subacute, glabrous or nearly so above, hispid with white hairs on the nerves beneath, margins flat, entire or irregularly crenate-dentate. Flowers in lax cymes terminating most of the branches ; pedicels slender, sometimes 1 in. long. Calyx ⅛—⅓ in. long ; tube densely hispid, turbinate or subhemispheric ; lobes about as long as the tube, lanceolate, acute, apiculate, the margins scarcely thickened. Corolla blue, deeply 5-partite ; segments linear-oblong, slightly exceeding the calyx. Seeds not much longer than broad. Fl. B. I. v. 3, p. 428 ; Dalz. & Gibs. p. 133 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162.—Flowers : Nov.

KONKAN : *Stocks* !, *Dalzell* ! KANARA : Birchi (N. Kanara), *Woodrow.*—**DISTRIB. India (W. Peninsula).**

3. WAHLENBERGIA, Schrad.

Annual or perennial herbs. Leaves alternate (rarely opposite). Flowers usually blue and nodding, solitary or variously paniculate; peduncles terminal, axillary or leaf-opposed. Calyx-tube adnate to the ovary, hemispheric, turbinate or obconic-oblong; limb 5 (rarely 3—4)-partite. Corolla campanulate, infundibuliform, tubular or subrotate, usually 5 (rarely 3—4)-fid to or below the middle. Stamens free from the corolla; filaments usually dilated at the base; anthers free. Ovary inferior or ½-superior, 2—5-celled; ovules numerous; styles cylindric; stigma 2—5-fid with narrow lobes. Capsule inferior or ½-superior, erect, dehiscing loculicidally within the persistent calyx-lobes into as many valves as there are cells. Seeds numerous, small.—DISTRIB. Chiefly in the southern hemisphere, especially S. Africa, a few in Tropical America and the Mediterranean region, one widely dispersed in Western Europe; species about 80.

1. **Wahlenbergia gracilis,** *Schrad. Blumenb.* (1827) p. 38, in obs.; *A. DC. Monogr. Campan.* (1830) p. 142. A perennial herb 6—18 in. high, erect or decumbent, branched from the base; stems and branches glabrous or slightly hairy. Leaves sessile, ½—1½ by $\frac{1}{16}$—⅜ in., linear-oblong, almost entire (except the lower leaves which are often more or less toothed), usually glabrous above, more or less hairy beneath. Flowers in lax cymose panicles; bracts linear, acute; pedicels very long, slender. Calyx ¼—⅜ in. long, usually glabrous; tube turbinate; lobes $\frac{1}{12}$—⅛ in. long, linear from a triangular base, erect, persistent. Corolla blue, ⅛—½ in. long, campanulate, divided below the middle into 5 spreading, oblong, subacute lobes. Filaments much enlarged and pubescent at the base. Capsule ¼—⅓ in. long, tapering into the pedicel, turbinate, crowned with the calyx-lobes. Seeds ellipsoid, slightly compressed, smooth, yellowish-brown. Fl. B. I. v. 3, p. 429; Trim. Fl. Ceyl. v. 3, p. 58; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162. *Wahlenbergia agrestis,* A. DC. Prodr. v. 7, p. 434; Wight, Icon. t. 1175; Dalz. & Gibs. p. 134. *Campanula dehiscens,* Roxb. Hort. Beng. p. 85; Grah. Cat. p. 103.—Flowers: Dec.—Feb. VERN. *Kerdi.*

Not very common, found on the highest Ghâts. KONKAN: **Matheran,** *Nairne.* DECCAN: Mahableshwar, *Cooke!,* in the rocky bed of the Yenna above the fall, *Graham*; Khandala, *Kanitkar!*; Lanoli, *Woodrow!*—DISTRIB. Throughout India; Ceylon, East Asia, Australia, N. Zealand, S. Africa.

4. SPHENOCLEA, Gærtn.

An annual erect glabrous marsh herb. Leaves alternate, quite entire. Flowers small, sessile, 2-bracteolate, in terminal and lateral dense pedunculate cylindric (or when young subconic) bracteate spikes. Calyx-tube adnate to the ovary, hemispheric; limb 5-partite, the lobes triangular-ovate, obtuse. Corolla campanulate, 5-lobed, valvate. Stamens 5, inserted at the very base of the corolla-tube; filaments shortly dilated at the base; anthers short, free. Ovary ½-inferior, 2-celled; ovules many, on stalked placentas; style very short; stigma obscurely 2-lobed. Capsule ½-superior, membranous

and somewhat turbinate and angular below, flat-topped, circumcissilely dehiscing at the margin of the calyx-tube, the operculum deciduous with the calyx-lobes. Seeds very numerous, minute oblong. —DISTRIB. Widely dispersed throughout the warmer regions of both hemispheres; species 1.

1. **Sphenoclea zeylanica,** *Gœrtn. Fruct.* v. 1 (1788) p. 113, t. 24, fig. 5. An erect annual herb 1—3 ft. high; stem stout, succulent, glabrous, slightly branched. Leaves 1—3 by ¼—¾ in., lanceolate-oblong, acute, glaucous-green, glabrous; petiole ⅛—½ in. long. Flowers greenish-yellow, sessile, each with 1 small bract and 2 bracteoles at their base, in dense erect tapering spikes ¾—2 in. long; peduncles of the spikes ½—1 in. long. Calyx glabrous; lobes 1/16 in. long (slightly enlarged in fruit), triangular-ovate, obtuse, with membranous margins, folded over the top of the capsule in fruit. Corolla broadly campanulate, 5-lobed. Capsules chartaceous, flat-topped, crowned with the persistent calyx-lobes, somewhat wedge-shaped and angled downwards from the pressure of the adjacent capsules which are closely packed on the spike. Seeds minute, narrowly oblong, microscopically scabrous. Fl. B. I. v. 3, p. 438; Grah. Cat. p. 248; Trim. Fl. Ceyl. v. 3, p. 59. *Sphenoclea Pongatium*, A. DC. Prodr. v. 7 (1838) p. 548; Wight, Ill. t. 138.—Flowers: Oct.—Dec.

Tolerably common in damp places. KONKAN: in rice-fields, *Graham*; Bassein, *Cooke*!; Kalyan, *Woodrow*; Vingorla, *Kanitkar*! SIND: Bubak, *Woodrow*.—DISTRIB. Throughout India in swampy places; Ceylon; warm regions in both hemispheres.

5. CAMPANULA, Linn.

Perennial (less commonly annual) herbs, erect or decumbent. Leaves alternate or the radical subrosulate. Flowers usually blue, more rarely violet or white, solitary, pedunculate, terminal or axillary, or in a terminal usually pyramidal panicle. Calyx-tube adnate to the ovary, hemispheric, turbinate or obovoid; limb deeply 5-fid or 5-partite, the sinuses sometimes furnished with flattened reflexed appendages. Corolla campanulate, more or less deeply 5-lobed. Stamens free from the corolla; filaments usually dilated at the base; anthers free. Ovary inferior, 3 (rarely 4—5)-celled; ovules numerous in each cell; stigma narrowly 3- or 5-fid. Capsule inferior (rarely ½-superior), crowned with the calyx-lobes, obovoid or elongate, truncate, dehiscing by small valves at the base or on the side outside the calyx-lobes. Seeds usually numerous, small.—DISTRIB. Widely dispersed, chiefly throughout the northern hemisphere, especially in the Mediterranean region; species about 230.

1. **Campanula Alphonsii,** *Wall. Cat.* (1828) 1296. A decumbent herb; stems many from the base, obscurely angled, wiry, softly hairy, reaching 15 in. long. Leaves ⅓—1 by ⅛—½ in., subsessile, ovate-elliptic, subacute, rugose, hairy on both surfaces and with toothed margins. Flowers solitary or in lax terminal cymose panicles; pedicels hairy. Calyx hairy, ¼—5/16 in. long; lobes 3/16 in. long, triangular, acute, sometimes (in the Bombay specimens *usually*) with small

alternating teeth, the margins entire or sometimes toothed. Corolla pubescent outside, reaching nearly ½ in. long, divided about ½-way down ; lobes oblong, subacute. Filaments dilated and finely pubescent at the base. Anthers ⅛ in. long. Style ½ in. long, stout ; stigma with 3 narrow, at length revolute lobes ⅛ in. long. Capsule dehiscing by valves at the base. Seeds oblong-ellipsoid, $\frac{1}{30}$ in. long. Fl. B. I. v. 3, p. 440 ; Wight, Icon. t. 1177 ; Hook. f. & Thoms. in Journ. Linn. Soc. v. 2 (1858) p. 24 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162.—Flowers : Oct.

Very rare. *Dalzell*, without locality in Herb. Kew.! DECCAN : Sinhagad Fort, 12 miles from Poona, *Bhiva*!—DISTRIB. India (W. Peninsula).

A somewhat variable plant. Mr. C. B. Clarke remarks (Fl. B. I. l. c.) that the leaves of Dalzell's single specimen are larger than those of the type. This is also the case in the specimens from Sinhagad Fort in the Deccan, the leaves of which are similar to those of Dalzell's specimen. Wight (Icon. t. 1177) shews the flowers solitary and terminal, although in some of the specimens from his own herbarium they are more or less paniculate. They are paniculate in all the Bombay specimens. Wight's figure also shows a creeping rhizome from which the branches ascend. This is not the case in any of the specimens seen by me, in all of which the stems are tufted.

ORDER LXXIV. **PLUMBAGINACEÆ.**

Herbs or shrubs often maritime. Leaves : radical rosulate ; cauline alternate ; stipules 0. Flowers regular, hermaphrodite, sessile or shortly pedicelled, on simple or branched scapes or peduncles, solitary, capitate or spicate, the spikes solitary or panicled, often unilateral ; bracts usually rigid, dry, with scarious margins. Calyx inferior, gamosepalous, tubular or infundibuliform, 5—10-ribbed, often hyaline between the ribs ; limb more or less distinctly 5-lobed. Corolla hypogynous, gamopetalous, hypocrateriform ; or petals nearly or wholly free, oblanceolate or obovate, imbricate. Stamens as many as and opposite the corolla-lobes or petals, adnate to the tube or base of the claw, or inserted with the petals on a narrow hypogynous ring. Ovary free, 1-celled, often 5-sulcate ; styles 5, free from the base or more or less connate ; ovule solitary, anatropous, suspended from a long basal funicle. Fruit included within the calyx (rarely exserted), dry, dehiscent or indehiscent. Seed filling the cell, pendulous from the apex of the funicle or more or less adnate to it ; testa membranous ; albumen farinaceous, copious, scanty, or 0.—DISTRIB. More or less throughout the world, chiefly maritime or in saline or rocky deserts ; genera 8 ; species about 200.

Styles 5, free from base or nearly so	1. STATICE.
Styles connate throughout their entire length.	
Calyx densely clothed with stalked glands	2. PLUMBAGO.
Calyx eglandular	3. VOGELIA.

1. **STATICE,** Linn.

Herbs or small shrubs. Leaves alternate, often rosulate or fascicled, entire (in the Indian species), spathulate-oblong or obovate. Flowers in unilateral bracteate panicled spikes arranged along the

branches of a leafless peduncle or scape ; bracts subtending the spikes short, squamiform, amplexicaul, coriaceous on the back and with membranous margins ; bracteoles sheathing the flowers. Calyx tubular or infundibuliform ; tube ribbed ; limb scarious, plicate, often colored, spreading in flower, with 5 nerves excurrent into teeth or awns, rarely deeply 5-lobed, or almost obsolete, or reduced to plumose awns, or to 5 recurved mucros. Petals spathulate-oblong, entire or 2-partite, united at the base into a ring with the stamens. Styles 5, distinct, at the angles of the ovary ; stigmas subcapitate. Utricle included in the calyx, indehiscent, or circumciss, or variously fissured. Seed filling the cell, more or less albuminous.—DISTRIB. Cosmopolitan on sea-shores and in salt-marshes ; species about 100.

1. **Statice Stocksii,** *Boiss. in DC. Prodr.* v. 12 (1848) p. 664. A low-branched plant 6—10 in. high, with a woody stem and leafy branches. Leaves $\frac{3}{8}$—$\frac{3}{4}$ by $\frac{1}{6}$—$\frac{3}{8}$ in., flat, fleshy, glabrous or scarcely puberulous, spathulate-oblong, rounded at the apex, much tapering at the base into an obscure petiole, which is dilated into an amplexicaul obliquely truncate sheath at the base. Scapes somewhat angular, bearing a small subsecund panicle ; bracts $\frac{1}{6}$ in. long, elliptic, herbaceous, reddish. Calyx $\frac{1}{8}$ in. long, narrowly infundibuliform, pointed at the base ; tube straight, with red ciliate ribs ; limb white, membranous, one of the ribs of the tube prolonged to the apex of each lobe. Petals longer than the calyx, spathulate-oblong, truncate or slightly emarginate at the apex, pink. Stamens long-exserted. Fl. B. I. v. 3, p. 480 ; Wight, Ill. v. 2, p. 225, t. 178 ; Hook. Icon. Pl. t. 837 ; Aitch. Pb. & Sind Pl. p. 84 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162.—Flowers : Dec.—Mar.

In the Bombay Presidency confined apparently to Kathiawar and Sind. GUJARAT : Veráwal (Kathiawar), *Bhiva* ! SIND : *Stocks*, 436 !, *Cooke* !, *Dalzell*, 69 !; Karachi, *Vicary*; Tata (lower Sind), *Ritchie*, 615 !—DISTRIB. Beluchistan.

2. **PLUMBAGO,** Linn.

Perennial herbs or undershrubs, sometimes scandent. Leaves alternate, membranous, entire (in 1 species absent), amplexicaul and auricled at the base, or with a petiole which is often dilated and amplexicaul. Flowers white, rose-colored, or blue, in terminal spikes ; bracts and bracteoles shorter than the calyx, sometimes minute. Calyx tubular, 5-toothed, clothed with prominent stipitate glands. Corolla hypocrateriform ; tube long, slender ; limb spreading, with 5 equal or slightly unequal entire lobes. Stamens hypogynous, free from the corolla ; filaments dilated at the base ; anthers linear-oblong. Ovary attenuated at the apex into a terminal filiform style which divides above into 5 longitudinally stigmatose branches. Capsule membranous, at length circumciss near the base, the deciduous part often splitting into 5 valves from the base to the apex. Albumen scanty.—DISTRIB. Warmer regions of the world ; species 10.

1. **Plumbago zeylanica,** *Linn. Sp. Pl.* (1753) p. 151. A perennial herb, sometimes, in shady places, subscandent ; stems 2—5 ft. long,

somewhat woody, spreading, terete, striate, glabrous. Leaves thin, 1½—3 by ⅞—1½ in., ovate, subacute, entire, glabrous, somewhat glaucous beneath, reticulately veined, shortly and abruptly attenuated into a short petiole ; petiole narrow, amplexicaul at the base and there often dilated into stipule-like auricles. Flowers in elongate spikes ; rhachis glandular, striate ; bracteoles ovate, acuminate, shorter than the calyx, glandular or not. Calyx ⅜—½ in. long, narrowly tubular, persistent, densely covered with stalked glands ; teeth small, with membranous margins. Corolla white, slender ; tube ¾—1 in. long ; lobes ⅓ in. long, obovate-oblong, acute, apiculate. Filaments as long as the corolla-tube ; anthers exserted just beyond the throat. Capsule oblong, pointed ; pericarp thin below, thick and hardened above. Fl. B. I. v. 3, p. 480 ; Grah. Cat. p. 166 ; Dalz. & Gibs. p. 220 ; Wight, Ill. t. 179 ; Trim. Fl. Ceyl. v. 3, p. 65 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 295.—Flowers : Aug.-Sept. VERN. *Chitrak.*

KONKAN : rocky places, *Dalzell & Gibson*; hills throughout the Konkan, *Graham.* DECCAN : Khandala, *Cooke* !; Bhor Ghát, *Cooke* !; Ahire, west of Poona, *Raoji* !; Deccan hills, *Woodrow* ; Mahableshwar, *H. M. Birdwood.*

The root is largely employed in medicine. Sanskrit writers state that it promotes appetite and is useful in dyspepsia and other diseases. A paste made from the root is employed as a vesicant and applied in leprosy and other skin-diseases as well as in rheumatism. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. Throughout India, much cultivated, wild in the W. Peninsula and probably in Bengal ; Ceylon, Tropics of the Old World.

Plumbago rosea, Linn. Sp. Pl. ed. 2 (1762) p. 215. A shrub 2—3 ft. high. Flowers rosy-scarlet, 1½—2 in. long. A native of Sikkim and Khasia, cultivated throughout India as an ornamental as well as a medicinal plant. Fl. B. I. v. 3, p. 481 ; Grah. Cat. p. 166 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162 ; Gard. in Ind. ed. 5, p. 369 ; Firminger, Man. Gard. ed. 3, p. 514 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 294. *P. coccinea,* Boiss. in DC. Prodr. v. 12, p. 693 ; Dalz. & Gibs. Suppl. p. 71.—Flowers : more or less throughout the year. VERN. *Lál-Chitrak.*

Plumbago capensis, Thunb. Prodr. Capen. (1794) p. 33. A small shrub, a native of the Cape of Good Hope. Leaves arranged in a succession of whorls of 5 unequal lanceolate leaves, ½—2 in. long. Bears a profusion of pale-blue flowers in the hot and rainy seasons and is cultivated in gardens as an ornamental plant. Grah. Cat. p. 166 ; Dalz. & Gibs. Suppl. p. 72 ; Firminger, Man. Gard. ed. 3, p. 514 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162 ; Gard. in Ind. ed. 5, p. 369.—Flowers : May—Dec. VERN. *Kálá-chitrak.*

3. **VOGELIA,** Lamk.

Shrubs or undershrubs more or less scaly. Leaves alternate. Spikes terminal, subpaniculate ; pedicels very short ; bracts and bracteoles small. Calyx eglandular, deeply 5-fid, 5-ribbed, and with 5 broad membranous transversely undulate wings between the ribs on the calyx-tube. Corolla infundibuliform ; tube long, slender ; limb

campanulate, with 5 lobes truncate or emarginate at the apex. Stamens free ; filaments filiform, shortly dilated at the very base ; anthers oblong, small. Ovary oblong-fusiform, more or less 5-gonous, attenuated at the apex ; style filiform, terminal, with 5 branches stigmatose throughout. Capsule included in the calyx, circumciss at the very base, splitting into 5 valves from the base towards the apex. —DISTRIB. Species 3, one S. African, the others Indian and Arabian.

1. **Vogelia indica,** *Gibs. ex Wight, in Calc. Journ. Nat. Hist.* v. 7 (1847) p. 17. An erect undershrub 6—10 ft. high, of a glaucous hue ; stem and branches terete, finely striate, more or less scurfy. Leaves pale-glaucous-green, perfoliate, very thick and coriaceous, the lower ovate, subobtuse, reaching 5 by 3 in., with undulate margins, the upper elliptic, obtuse, or orbicular, 1½—2 by 1—1¾ in., all more or less covered with scurfy scales. Flowers in dense paniculate spikes, closely packed towards the ends of the rhachises ; bracts lanceolate, reddish. Calyx eglandular, persistent, tubular, ⅛—⅜ in. long, strongly 5-ribbed, the tube winged between the ribs, the wings transversely undulate, membranous ; lobes about ½ the length of the calyx, lanceolate, acute, membranous, erect, transversely undulate, the ribs extending to the apex of the lobes. Corolla-tube cylindric, ⅞ in. long ; lobes ⅛—¼ in. long, obovate-oblong, emarginate, apiculate. Stamens included within the corolla, just exserted beyond the throat. Style densely hairy at the base ; branches short, linear. Capsule ¼—$\frac{5}{16}$ in. long, circumciss at the very base, splitting into 5 valves with membranous margins. Seed ⅛ in. long, smooth, pear-shaped ; funicle very long. Fl. B. I. v. 3, p. 481 ; Wight, Icon. t. 1075 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162. *Vogelia arabica,* Boiss. in DC. Prodr. v. 12 (1848) p. 696 ; Dalz. & Gibs. p. 220.—Flowers : Dec.

A rare plant in the Bombay Presidency except in Kathiawar, where it may be found in tolerable abundance both at Rajkot and Porbandar. DECCAN : near Hewra, *Gibson.* KANARA : *Law* ! GUJARAT : Porbandar (Kathiawar), *Cooke* !—DISTRIB. India (W. Peninsula, tolerably abundant below Mount Abu in Rajputana) ; Arabia.

ORDER LXXV. PRIMULACEÆ.

Perennial (rarely annual) herbs. Leaves radical or cauline ; stipules 0. Flowers hermaphrodite, regular. Calyx inferior (except *Samolus*), 5 (rarely 4—9) -cleft. Corolla usually hypogynous (0 in *Glaux*), rotate, campanulate or infundibuliform, 5 (rarely 4—9) -cleft. Stamens inserted on the corolla-tube and opposite to its lobes (hypogynous when there is no corolla) ; filaments usually short ; anthers 2-celled, bursting inwards by slits (rarely by terminal pores), pollen angular. Ovary 1-celled, usually free, ovoid or subglobose ; ovules many, usually amphitropous, on a free central placenta ; style short or long, continuous with the ovary ; stigma undivided. Capsule 1-celled, dehiscing by simple or 2-fid valves or transversely. Seeds few or many, minute, usually angular, often sunk in the placenta ; albumen fleshy or horny ; embryo terete, parallel to the hilum.—

DISTRIB. Temperate and alpine regions of the N. hemisphere, less frequent in the S. hemisphere, rare in the Tropics; genera 21; species about 250.

Corolla 5-partite, exceeding the calyx; filaments villous	1. ANAGALLIS.
Corolla 4—5-partite, shorter than the calyx; filaments glabrous	2. CENTUNCULUS.

1. ANAGALLIS, Linn.

Annual or perennial herbs usually glabrous. Leaves opposite, quite entire. Flowers red or blue (rarely white), on axillary 1-flowered peduncles; bracts 0. Calyx 5-partite; lobes shorter than the corolla, persistent. Corolla hypogynous, rotate or infundibuliform, 5-partite. Stamens 5, inserted at the base of the corolla; filaments filiform, villous. Ovary globose; ovules many, amphitropous; style simple, filiform; stigma obtuse. Capsule globose, operculately dehiscent. Seeds many, plano-convex, peltate.—DISTRIB. Europe, Temperate Asia, N. Africa, S. America; species 12.

1. **Anagallis arvensis,** *Linn. Sp. Pl.* (1753) p. 148. Annual, branched from the base, 5—15 in. high, erect or procumbent; stem and branches 4-gonous, glabrous. Leaves ⅜—1 by ¼—½ in., sessile, opposite, ovate, acute, glabrous, entire, gland-dotted. Flowers axillary, solitary; peduncles ½—1½ in. long, slender, erect in flower, decurved in fruit. Calyx ¼ in. long, divided nearly to the base; segments narrow, lanceolate, acuminate, slightly shorter than the corolla. Corolla rotate, ⅓—½ in. in diam., blue. Filaments villous. Capsule size of a small pea, operculately dividing about the middle, the style persistent on the operculum. Seeds minute, trigonous. This appears to be var. *cærulea* (*A. cærulea* (sp.), Lamk. Fl. Fr. ed. 1, v. 2 (1778) p. 285). Fl. B. I. v. 3, p. 506; Dalz. & Gibs. p. 136; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162; Watt, Dict. Econ. Prod. v. 1, p. 235; Hook. f. Stud. Flor. Br. Isl. ed. 3, p. 265.—Flowers: Sept.—Dec.

Found sparingly throughout the Deccan. DECCAN: *Woodrow*; Panchgani, *Cooke!*, *C. Macnaghten!*—DISTRIB. More or less throughout India; Europe, W. Asia, and introduced into most temperate regions.

2. CENTUNCULUS, Linn.

Very small annual glabrous herbs. Leaves alternate or the lower opposite, sessile or shortly petiolate, quite entire. Flowers minute, solitary, axillary, white or pink; bracts 0. Calyx 4—5-partite; lobes lanceolate, longer than the corolla, persistent. Corolla small, hypogynous, 4—5-fid, urceolate, persistent; tube subglobose; lobes spreading, acute. Stamens 4—5, inserted on the throat of the corolla; filaments short, flattened, glabrous; anthers broadly ovate or cordate. Ovary subglobose; ovules numerous, inserted on a globose placenta, amphitropous; style filiform; stigma obtuse, capitate. Capsule globose, operculately dehiscent. Seeds many, minute, peltate.—DISTRIB. Temperate warm regions of the globe; species 3 or 4.

1. **Centunculus tenellus,** *Duby, in DC. Prodr.* v. 8 (1844) p. 72. An erect branched glabrous annual 2½—8 in. high. Leaves subsessile, ⅛—¼ by ⅛—⅓ in., alternate, broadly ovate or obovate, subacute, apiculate, entire. Flowers axillary, solitary ; peduncles filiform, ¼—⅝ in. long. Calyx ⅛—⅓ in. long, divided to the base ; sepals 4—5, lanceolate, very acute. Corolla white, deciduous, shorter than the calyx ; tube urceolate ; lobes 4—5, ovate-lanceolate. Filaments flattened, glabrous. Capsule membranous, nearly equalling the calyx, operculately dividing about the middle. Seeds numerous, trigonous, black when fully ripe. Fl. B. I. v. 3, p. 506 ; Wight, Icon. t. 2000 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 162.—Flowers : Aug.—Sept.

Rare. DECCAN : Rohe, near Poona, *Bhiva* ! ; Lingmala, Mahableshwar, *Woodrow* !—DISTRIB. India (Central and Western Himalaya, Central India, W. Peninsula) ; Tropical America, Australia.

ORDER LXXVI. MYRSINACEÆ.

Trees or shrubs sometimes climbing. Leaves alternate, simple, usually gland-dotted ; stipules 0. Flowers small, often with resinous glands, regular, hermaphrodite or polygamo-dicœcious. Calyx free (in *Mœsa* more or less adnate to the ovary), 4—6 (usually 5) -fid or -partite ; segments usually ciliate and persistent. Corolla usually gamopetalous, rotate (rarely campanulate or tubular) ; segments or petals 4—6 (very rarely 3 or 7), usually contorted or imbricate (rarely valvate). Stamens opposite the corolla-lobes and isomerous with them ; filaments short (rarely elongate), free or more or less connate with one another ; anthers attached at the back near the base, dehiscing by longitudinal slits (very rarely by pores). Ovary globose or ovoid, superior (in *Mœsa* ½-inferior), 1-celled, usually attenuated into the style ; ovules few or many, on a free central usually globose placenta ; style simple ; stigma acute, truncate or capitate (rarely shortly lobed). Fruit usually pisiform, 1- or few- or many-seeded, indehiscent (except in *Ægiceras*), often sub-baccate and colored, 1-many-seeded. Seeds usually globose, excavated at the base ; albumen fleshy or horny, smooth or ruminate (0 in *Ægiceras*) ; embryo transverse.—DISTRIB. Throughout the warmer regions of both hemispheres, almost all tropical ; genera 32 ; species 928 according to Mez, in Engl. Pflanzenreich, v. 4 (1902).

Fruit globose ; seeds albuminous.		
Calyx thickened, enclosing the fruit ; seeds numerous.	1	MÆSA.
Calyx not thickened, free ; seed solitary (rarely 2 in *Embelia*).		
Corolla-lobes imbricate.		
Flowers in axillary fascicles	2.	MYRSINE.
Flowers in racemes or panicles	3.	EMBELIA.
Corolla-lobes twisted	4.	ARDISIA.
Fruit cylindric ; seeds exalbuminous	5.	ÆGICERAS.

1. MÆSA, Forsk.

Glabrous or pubescent shrubs sometimes more or less sarmentose ; branches terete. Leaves entire, toothed, or serrate, usually pellucid-

dotted. Inflorescence sometimes monstrous, the flowers replaced by densely imbricating bracteoles; flowers 2-bracteolate beneath the calyx, small, white, hermaphrodite or sometimes 1-sexual, in axillary racemes or panicles, pedicellate; pedicels bracteate at the base. Calyx-tube adnate to the ovary; lobes 5, persistent, imbricate. Corolla shortly campanulate; lobes 5, imbricate, rounded, with inflexed tips. Stamens 5, inserted on the corolla-tube; filaments short. Ovary partially adnate to the calyx; ovules numerous on a subglobose placenta; style short; stigma small, capitate or shortly 3—5-lobed. Berry globose, of the size of a pepper-corn, usually apiculate by the persistent style, enclosed in the thickened persistent calyx, many-seeded. Seeds numerous, albuminous, angular.—DISTRIB. Throughout the Tropics except America; species 102 (according to Mez, in Engl. Pflanzenreich, v. 4).

1. **Mæsa indica,** *Wall. in Roxb. Fl. Ind. ed. Carey,* v. 2 (1824) p. 230 *in note.* A large much-branched shrub; twigs slender, glabrous, usually covered with numerous small lenticels. Leaves 3—6 by 1½—3 in., ovate-oblong or elliptic-lanceolate, acute or acuminate, regularly or irregularly serrate-dentate, thin, glabrous and shining above, glabrous or with a few scattered hairs on the nerves beneath, base usually acute; main nerves 8—10 pairs, conspicuous beneath; petiole ½—1 in. long, glabrous or slightly hairy. Flowers very small, faintly fragrant, numerous, in compound, panicled, usually glabrous racemes; pedicels filiform, $\frac{1}{20}$—$\frac{1}{12}$ in. long; bract 1 below the pedicel, narrowly ovate, acute, glabrous; bracteoles 2, about $\frac{1}{20}$ in. long, narrowly ovate, acute, not ciliate. Calyx $\frac{1}{16}$ in. long, divided rather more than ½-way down; lobes rotund-ovate, obtuse, not or sometimes faintly ciliate, glabrous on the back, marked with dark lines; tube enlarged in fruit, enclosing the berry, rugose and obscurely ribbed outside. Corolla white, $\frac{1}{10}$ in. long, marked with colored lines, divided to the middle; lobes rotund-ovate, somewhat abruptly and shortly contracted at the very base and with slightly crenulate margins, spreading. Berry globose, creamy-white, about ⅛ in. in diam., covered almost to the apex by the persistent calyx and tipped with the short style. Seeds black. Fl. B. I. v. 3, p. 509; Grah. Cat. p. 105; Dalz. & Gibs. p. 136; Bedd. For. Man. in Flor. Sylvat. p. cxxxvii, t. 18, fig. 4; Trim. Fl. Ceyl. v. 3, p. 67; Talb. Trees, Bomb. ed. 2, p. 202; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163; Mez, in Engl. Pflanzenreich, v. 4 (1902), p. 29; Watt, Dict. Econ. Prod. v. 5, p. 106.—Flowers: Nov.—Jan. VERN. *Atki.*

Common along the Ghâts, *Dalzell & Gibson.* DECCAN: Mahableshwar hills, *Law!*, *Cooke!*; hills about Pár, *Graham*; Korinda near Khandala, *Arbuckle* ex *Graham.* S. M. COUNTRY: Párva Ghât, *Ritchie,* 1827! KANARA: abundant in the evergreen forests of the Sirsi and Siddapur talukas of N. Kanara, *Talbot.*—DISTRIB. Throughout India; Malaya, Africa.

Graham and Dalzell both state that the fruit is used to poison fish, and Talbot says that the leaves are used in curries in N. Kanara.

VAR. *dubia.* Tips of the young branches, main nerves of the leaves beneath, petioles, rhachis of the inflorescence, bracts and bracteoles clothed (more or less densely) with usually rust-colored hairs; calyx-lobes ciliate and, as well as the corolla-lobes, strongly

lineate. *Mæsa dubia* (sp.), Wall. in Roxb. Fl. Ind. ed. Carey, v. 2 (1824) p. 235 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 510 ; Grah. Cat. p. 105 ; Talb. Trees, Bomb. ed. 2, p. 202 ; Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 39. *M. indica,* var., Bedd. For. Man. in Flor. Sylvat. t. 18, fig. 4, n. 1 *only*.

Except the hairiness I can find no appreciable difference between this and *M. indica,* and it seems doubtful if it deserves even the rank of a variety. The difference in the length of the filaments relied on by Mez (Engl. Pflanzenreich, v. 4, p. 20) as a distinctive character is not at all a constant one. I have found the anthers in both plants sessile as well as stipitate, and the length of the filament would often seem to be a question of age. Beddome (For. Man. in Flor. Sylvat. p. cxxxvii) in his description of *M. indica* says that some forms are quite glabrous, others densely pubescent, particularly on the under surface of the leaves and the petioles. It does not seem unlikely that the difference in hairiness may be due to climatic conditions, as the specimens of *M. dubia* appear to be chiefly from the plains of the Konkan and Kanara, while those of *M. indica* are from the hills.

KONKAN : *Law* !, *Stocks* !, *Talbot*. KANARA : *Talbot, Law* ! ; Kasarli, *Ritchie,* 1827 !

Mæsa velutina, Mez, in Engl. Pflanzenreich, v. 4, p. 35. Of this I have seen no specimens ; there are none in Herb. Kew. According to Mez (*l. c.*) the plant grows in the Presidency of Bombay, from which specimens from Dr. Gibson are in Herb Leiden. Mez describes the fruit as subacute at th apex ; otherwise the description would apply to *Mæsa indica,* var. *dubia.*

2. **MYRSINE,** Linn.

Trees or shrubs usually glabrous. Leaves coriaceous, usually entire. Flowers small, sessile or shortly pedicellate, polygamous or often dicœcious, in sessile or shortly pedunculate axillary fascicles ; bracts often imbricate, deciduous. Calyx small, 4—5-fid, persistent. Corolla 4—5-partite or -petalled, white ; segments spreading, imbricate (rarely valvate), not contorted in bud, resinous-dotted. Stamens 4—5, inserted at the base of the corolla-lobes ; anthers short. Ovary free, globose or ovoid, 1-celled ; ovules few or many, immersed in the placenta ; style short or almost obsolete ; stigmas 2—5, erect or spreading, sometimes sessile. Fruit small, globose, dry or subfleshy, red or purple. Seed solitary ; albumen more or less pitted, scarcely ruminate ; embryo elongate, cylindric, often curved or sigmoid.

The genus has been divided by Mez [Engl. Pflanzenreich, v. 4 (1902)] into 2 genera, viz. *Myrsine* (4 species) in which the filaments and styles are distinctly visible, and *Rapanea* (136 species) in which the anthers and stigmas are sessile. I have adhered to the genus as defined in the 'Genera Plantarum' of Bentham and Hooker.—DISTRIB. Chiefly tropical ; species 140 in the combined genera of Mez.

1. **Myrsine capitellata,** *Wall. in Roxb. Fl. Ind. ed. Carey,* v. 2 (1824) p. 295. A shrub or small much-branched tree ; branchlets thick, dark-brown, marked with the scars of fallen leaves ; young

parts glabrous. Leaves coriaceous, 3—6 by ¾—2¼ in., elliptic-lanceolate or narrowly obovate, subacute, entire, glabrous, pellucido-punctate, reticulately veined, narrowed at the base ; petioles ⅜—½ in. long. Flowers small, sessile or on slender glabrous pedicels ½—⅝ in. long, in dense rounded fascicles, on nodules in the axils of fallen leaves ; bracts ovate, imbricate. Calyx resinous-dotted, 5-toothed ; teeth triangular, about 1/10 in. long, minutely gland-ciliate. Corolla divided almost to the base ; lobes ⅛—⅛ in. long, ovate-oblong, subacute, resinous-dotted and with minutely ciliate margins, spreading or reflexed. Anthers very large, sessile or nearly so in the ♀ flowers, on short filaments in the ♂ flowers. Fruit globose, ⅛—¼ in. in diam., purple and shining when ripe. Fl. B. I. v. 3, p. 512 ; Wight, Icon. t. 1211 ; Bedd. Flor. Sylvat. t. 234 ; Trim. Fl. Ceyl. v. 3, p. 68 ; Talb. Trees, Bomb. ed. 2, p. 202 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 5, p. 315. *Rapanea capitellata*, Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 356.—Flowers : Oct.—Dec.

Rare. KANARA : evergreen forests of N. Kanara from Ainshi southwards, not common, *Talbot* ; Santaveri, *Woodrow* !—DISTRIB. India (Nipal, Bhotan, Assam, Khasia hills, W Peninsula) ; Ava, Ceylon.

3. **EMBELIA,** Burm.

Large shrubs usually climbing. Leaves alternate, entire or toothed ; petiole often margined. Flowers small, whitish, hermaphrodite or polygamo-dioecious, in axillary or terminal simple or compound racemes or panicles. Calyx free, persistent, 4—5-fiid, or -partite ; lobes rounded or ovate. Petals 4—5, free or slightly cohering at the base, erecto-patent or reflexed, elliptic, imbricate (rarely contorted). Stamens 4—5 ; filaments more or less adnate to the petals, sometimes 0 ; anthers ovate-oblong. Ovary ovoid or globose (rarely conical-beaked) ; ovules few, inserted on a subglobose placenta ; style short ; stigma capitellate. Fruit small, globose, 1 (rarely 2) -seeded. Seeds globose, excavated at the base ; albumen pitted or subruminate ; embryo curved, transverse.—DISTRIB. Tropical Asia, Africa and Australia, New Caledonia and the Sandwich Islands ; species 92, according to Mez (Engl. Pflanzenreich, v. 4, 1902).

Flowers 5-merous.	
Leaves oblong-lanceolate ; inflorescence terminal or in the upper axils	1. *E. Ribes.*
Leaves broadly elliptic ; inflorescence axillary	2. *E. robusta.*
Flowers 4-merous	3. *E. viridiflora.*

1. **Embelia Ribes,** *Burm. Fl. Ind.* (1768) p. 62, t. 23. A large scandent shrub ; branches long, slender, flexible, terete, with long internodes, the bark studded with lenticels. Leaves coriaceous, 2—3½ by ¾—1½ in., elliptic or elliptic-lanceolate, shortly and obtusely acuminate, entire, glabrous on both sides, shining above, paler and somewhat silvery beneath, the whole surface covered with scattered minute reddish sunken glands (conspicuous in the young leaves), base rounded or acute ; main nerves numerous, slender (more or less

obscure in fresh specimens) ; petioles $\frac{1}{4}$—$\frac{3}{8}$ in. long, more or less margined, glabrous. Flowers 5-merous, numerous, small, in lax panicled racemes which are terminal and from the upper axils ; branches of the panicle often 3—4 in. long with more or less glandular-pubescent rhachises , pedicels $\frac{1}{10}$—$\frac{1}{12}$ in. long, glandular-pubescent ; bracts minute, setaceous, deciduous. Calyx about $\frac{1}{20}$ in. long ; sepals connate about $\frac{1}{3}$ of the way up, the teeth 5, broadly triangular-ovate, ciliate. Petals 5, greenish-yellow, free, $\frac{1}{6}$ in. long, elliptic, subobtuse, pubescent on both sides. Stamens 5, shorter than the petals, erect ; filaments inserted a little below the middle of the petals. Fruit globose, $\frac{1}{8}$—$\frac{1}{6}$ in. in diam., smooth, succulent, black when ripe, like a pepper-corn when dried, tipped with the persistent style. Fl. B. I. v. 3, p. 513 ; Grah. Cat. p. 104 ; Dalz. & Gibs. p. 137 ; Trim. Fl. Ceyl. v. 3, p. 69 ; Talb. Trees, Bomb. ed. 2, p. 203 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 3, p. 242 ; Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 303. *Embelia glandulifera,* Wight, Icon. v. 4, p. 7 ; Dalz. & Gibs. p. 137.—Flowers : Feb. VERN. *Vaivarang* ; *Kárkanni.*

Hilly parts of the Presidency. KONKAN : *Law* ! ; Ghâts, *Dalzell & Gibson, Woodrow.* DECCAN : Mahableshwar, *Graham, Cooke* ! KANARA : evergreen forests near the Gairsoppa Ghât, *Talbot.*—DISTRIB. Throughout India ; Ceylon, Malaya, S. China.

The fruit is sold in the bazars and used to adulterate black pepper which it much resembles.

2. **Embelia robusta,** *Roxb. Hort. Beng.* (1814) p. 16. A rambling shrub or small tree ; branches glabrous or the very young ones sometimes rusty-tomentose. Leaves 2½—4½ by 1½—2¼ in., broadly elliptic, suddenly and shortly acuminate, gland-dotted, the margins entire or sometimes irregularly toothed, glabrous above, paler, often reddish beneath and more or less rusty-pubescent on the nerves, base rounded or subacute ; main nerves slender, conspicuous beneath, with reticulate veins between ; petioles $\frac{3}{8}$—$\frac{3}{4}$ in. long, rusty-pubescent. Flowers 5-meous, pale greenish-yellow, in axillary rusty-puberulous racemes shorter than the leaves ; pedicels $\frac{1}{8}$ in. long ; bracts minute, subulate. Calyx $\frac{1}{16}$ in. long ; sepals shortly connate at the base, ovate, subacute, gland-dotted and with minutely-glandular margins. Petals free or nearly so, $\frac{1}{8}$ in. long, elliptic-oblong, subacute, puberulous and usually with a few glands outside, densely papillose inside. Filaments in the male flowers $\frac{1}{24}$ in. long ; anthers not apiculate. Fruit globose, apiculate with the style, red when ripe. Fl. B. I. v. 3, p. 515 ; Bedd For. Man. in Flor. Sylvat. p. cxxxvii, t. 19, fig. 2 ; Trim Fl. Ceyl. v. 3, p. 70 ; Talb. Trees, Bomb. ed. 2, p. 203 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 319 ; Watt, Dict. Econ. Prod. v. 3, p. 243. *Embelia Tsjeriam-cottam,* A. DC. in Trans. Linn. Soc. v. 17 (1837) p. 131 ; Grah. Cat. p. 104 ; Wight, Icon. t. 1209. *E. Basaal,* A. DC. in Trans. Linn. Soc. l. c.; Dalz. & Gibs. p. 136.—Flowers : Apr.—July. VERN. *A'mbati.*

KONKAN : Vingorla, *Stocks* ! ; *Dalzell* ! ; Pâl jungles, *Gangaram* ! DECCAN : hills near Kârli, *Woodrow* ! ; Kartriz Ghât, *Woodrow.* S. M. COUNTRY : Belgaum, *Ritchie,* 1102 !

The fruit is used in medicine and also as an adulterant for black pepper. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. Throughout the greater part of India; Ceylon.

3. **Embelia viridiflora,** *Scheff. Myrs. Arch. Ind.* (1867) p. 45. An extensive climber ; branches much warted. Leaves 3—5 by 1½—2½ in., elliptic, acute, obtuse or acuminate, glabrous, punctate on both sides with opaque dots, margins narrowly recurved, base acute or rounded ; main nerves numerous, slender, uniting within the margin, with reticulate veins between ; petioles ½—⅞ in. long, channelled. Flowers 4-merous, in short cylindric racemes from the axils of fallen leaves ; pedicels ⅛—⅒ in. long , bracts broadly ovate, acuminate, about 1/20 in. long, often with 2 small, rather obscure lateral teeth. Calyx divided nearly to the base ; segments triangular-ovate, acute, gland-dotted, 1/20—⅛ in. long, with minutely glandular-ciliate margins. Petals free, ⅛—¼ in. long, elliptic-oblong or slightly obovate, obtuse, conspicuously gland-dotted outside, gland-dotted and papillose inside. Stamens at first scarcely exceeding the petals, afterwards elongating ; filaments connate with the petals to about ½ the length of the petals from the base ; anthers oblong, rounded or slightly apiculate at the apex, sometimes glandular at the back with dark-colored glands. Fruit globose, ¼ in. in diam., tipped with the persistent style, smooth, red when ripe. Fl. B. I. v. 3, p. 516 ; Trim. Fl. Ceyl. v. 3, p. 70 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 327. *Embelia basaal,* Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 328, fig. 54 (*not* of A. DC.). *Embelia tetrandra,* Grah. Cat. Bo. Pl. p. 105. *Samara Rheedei,* Wight, Icon. t. 1591.—Flowers : Dec.—Jan. VERN. *A'mbat.*

Confined to the higher hills of the Presidency. DECCAN : Mahableshwar, very common, *Cooke* !, *Graham.* KANARA : *Law* !—DISTRIB. India (hills of the W. Peninsula); Ceylon, Malaya.

4. ARDISIA, Swartz.

Shrubs or small trees. Leaves alternate, sessile or petiolate, usually entire. Flowers usually hermaphrodite, white or rosy, in terminal or terminal and axillary (rarely altogether axillary) panicles, umbels, or corymbs. Calyx 5 (rarely 4) -lobed or -partite ; lobes contorted or imbricate. Corolla rotate, 5 (rarely 4—6) -partite ; segments short or long, twisted to the right. Stamens 5, attached to the base of the corolla (rarely higher up) ; filaments short or almost 0, free, rarely elongate ; anthers elongate, usually sagittate, acute, acuminate or apiculate, rarely obtuse, dehiscing introrsely and longitudinally. Ovary ovoid, pyramidal or subglobose ; ovules few or many, immersed in a globose placenta ; style short or elongate ; stigma minute, punctiform. Fruit globose or subglobose, usually apiculate with the persistent style ; endocarp crustaceous or bony. Seed solitary, globose ; albumen usually horny ; embryo cylindric, transverse. —DISTRIB. Abundant in Tropical Asia, rare in Tropical Africa, America, and Australia ; species 235 according to Mez [Engl. Pflanzenreich, v. 4 (1902)].

Flowers ⅛ in. across; corolla pink, spotted; fruit black.	1. *A. solanacea.*
Flowers ¼ in. across; corolla white, not spotted; fruit red.....	2. *A. parviflora.*

1. **Ardisia solanacea,** *Roxb. Cor. Pl.* v. 1 (1795) p. 27, t. 27. A large much-branched shrub or tree, sometimes 30 ft. high (*Talbot*); branchlets stout, glabrous, marked with the scars of fallen leaves. Leaves scattered, 4—6 by 2—2¾ in., subcoriaceous, obovate or lanceolate, obtuse or shortly subacuminate, often twisted at the apex, glabrous, punctulate; main nerves slender, numerous, with obscure reticulate veins between; base gradually tapering and decurrent on the petiole; petioles ¼—½ in. long, stout, channelled. Flowers in axillary (often from the axils of reduced leaves) corymbs, shorter than the leaves; pedicels ½—1 in. long, slightly thickened at the apex; buds ¼—⅓ in. long. Calyx divided to the base; sepals imbricate, ⅛ in. long, rotund-ovate, densely gland-dotted and with membranous ciliate margins. Corolla rose-colored, divided almost to the base; petals ⅜ in. long, ovate-elliptic, acute, marked with dark lines. Stamens shorter than the petals; filaments very short, attached to the base of the petals; anthers large, ⅛ in. long, lanceolate, acute. Ovary ovoid, glabrous. Fruit depressed-globose, ¼ in. in diam., purple-black. Willd. Sp. Pl. v. 1 (1797) p. 1063; Bot. Mag. v. 40 (1814) t. 1677; Roxb. Hort. Beng. (1814) p. 16; Fl. Ind. v. 1 (1832) p. 580; Wall. Cat. (1828) 2283, A.—K; Grah. Cat. p. 104; Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 132 and p. 128, fig. 20 F—K. *Ardisia humilis,* A. DC. in Trans. Linn. Soc. v. 17 (1837) p. 118 (*not* of Vahl); Wight, Icon. t. 1212; Dalz. & Gibs. p. 137; C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 529 (exclud. some syn.); Talb. Trees, Bomb. ed. 2, p. 204; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163; Watt, Dict. Econ. Prod. v. 1, p. 290. *A. elliptica,* Bedd. For. Man. in Flor. Sylvat. p. cxxxviii (*not* of Thunb.).—Flowers: Apr.—June. VERN. *Dikna*; *Bugdi.*

KONKAN: common on the Ghâts to the South, *Dalzell & Gibson*, Amboli Ghât, *Cooke*!; Goa districts, *Dalzell*! S. M. COUNTRY: Castlerock, *Bhide*! KANARA: evergreen forests, usually on the banks of streams, common, *Talbot*; Tinai (N. Kanara), *Ritchie*!; Waguli, *Ritchie*!—DISTRIB. Throughout India, China, Malaya.

Note.—A. De Candolle (Trans. Linn. Soc. l. c.) makes this conspecific with *Ardisia humilis,* Vahl. Vahl, in his description (Symb v. 3, p. 40), gives salt-marshes in Siam, Malacca, and Ceylon as the habitat of *A. humilis,* and further describes the inflorescence as being *terminal* in compound racemes, with a corolla-tube almost as long as the calyx. *A. solanacea,* Roxb., is common throughout India, with flowers in *axillary* corymbs and a very short corolla-tube (Mez, in Engl. Pflanzenreich, v. 4, p. 128, fig. 20). Beddome who, while recognizing the identity of the plant with *A. solanacea,* Roxb., has adopted Thunberg's name *A. elliptica* (Bedd. For. Man. p. cxxxviii), is quite clear as to the existence of *A. humilis* as a separate species. In For. Man. p. cxxxix he says that *A. humilis* is an undershrub found in the Madras Presidency and Ceylon. It seems therefore justifiable to regard the *large* shrub or small tree with flowers in axillary corymbs, which is common throughout India, as *A. solanacea,* Roxb., and the *small* shrub, with flowers in terminal panicles, which is found near the sea-coast in Madras and Ceylon, as *A. humilis,* Vahl.

2. **Ardisia parviflora,** *Talbot, Trees & Shrubs, Bomb.* ed. 2 (1902) p. 204. A small, erect, branched shrub. Leaves coriaceous,

3—4½ by 1—1⅝ in., obovate, acute, distantly crenate, pellucido-punctate, base cuneate ; petioles ¼ in. long. Flowers small, ⅓—½ in. across, in simple pedunculate axillary or terminal umbels about ½ as long as the leaves. Corolla small, white, not pink nor spotted. Fruit size of a pea, globose, not striate, red when ripe.—Flowers in the rainy season.

KANARA : in the evergreen scrub jungles near the coast in the Karwar subdivision of N. Kanara, *Talbot*.

I have seen no specimens of this plant; there are none in Herb. Kew. But that Mr. Talbot describes the leaves as crenate and the corolla as white without spots, it might be the true *Ardisia humilis* of Vahl.

5. ÆGICERAS, Gærtn.

Maritime shrubs or small trees ; branches cylindric. Leaves alternate, quite entire, glabrous. Flowers large for the Order, white, pedicellate, in terminal leaf-opposed or axillary sessile or subsessile (rarely shortly pedunculate) umbels ; bracts 0. Flowers hermaphrodite, 5-merous. Calyx 5-partite ; segments obliquely imbricate, twisted towards the right in bud. Stamens 5, on the corolla-tube ; anthers versatile, attached at the middle or a little below the middle of the back, dehiscing longitudinally, cells transversely septate. Ovary glabrous, fusiform, narrowed into a slender style ; ovules many, immersed in a globose placenta ; stigma punctiform. Fruit cylindric, curved, acute, coriaceous, 1-seeded, at length dehiscing longitudinally. Seed conform to the fruit, elongate, erect, germinating within the pericarp ; albumen 0 ; embryo cylindric curved, thick ; cotyledons short ; radicle short, inferior.—DISTRIB. Muddy sea-coasts and salt-water creeks of Tropical Asia and Australia, growing along with the mangroves ; species 2 according to Mez [Engl. Pflanzenreich, v. 4 (1902) p. 55], who rehabilitates the species *Æ. floridum*, Rœm. & Schultz, which is included under *Æ. majus* by Mr. C. B. Clarke in Hook. f. Fl. B. I. v. 3, p. 533.

1. **Ægiceras majus,** *Gærtn. Fruct.* v. 1 (1788) p. 216, t. 46. A shrub or small tree 5—20 ft. high, with milky juice ; branches glabrous. Leaves 2—3¼ by 1¼—1⅝ in., obovate, obtuse, sometimes retuse, glabrous on both sides, pale-green above, somewhat glaucous beneath, base cuneate ; midnerve strong, the lateral nerves numerous, slender ; petiole very short, stout. Flowers fragrant, in sessile or shortly pedunculate terminal, leaf-opposed or rarely axillary umbels ; pedicels ¼—½ in. long, glabrous. Calyx ¼ in. long, persistent, glabrous, divided nearly to the base ; segments broadly oblong, obtuse, much imbricate, the upper part membranous. Corolla ½ in. long, thick, white ; tube ⅓ in. long ; lobes triangular-oblong, very acute, reflexed, twisted in bud. Filaments densely woolly at the base, exserted. Fruit 1—2½ in. long, falcately curved, very sharply pointed, closely surrounded at the base by the enlarged persistent cup-like calyx, glabrous, cinnamon-brown. Fl. B. I. v. 3, p. 533 ; Dalz. & Gibs. p. 137 ; Bedd. For. Man. in Flor. Sylvat. p. cxxxix, t. 19, fig. 3 ; Aitch. Pb. & Sind Pl. p. 85 ; Trim. Fl. Ceyl. v. 3, p. 74 ; Talb. Trees, Bomb. ed. 2, p. 204 ; Woodr. in Journ. Bomb. Nat.

v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prodr. v. 1, p. 116. *Ægiceras fragrans*, Kœn. Ann. Bot. v. 1, p. 129, t. 3 ; Grah. Cat. p. 104. *Æ. corniculata*, Blanco, Fl. Filip. ed. 1 (1837) p. 79 ; Mez, in Engl. Pflanzenreich, v. 4 (1902) p. 55.—Flowers : Feb. VERN. *Kájlá*.

KONKAN : sea-coast near Bombay, *Law* !, *Cooke* ! ; Mumbra near Tanna, *Cooke* !, *Woodrow* ! ; in salt-marshes in company with the different species of mangrove, *Dalzell & Gibson*. KANARA : sea-coast and along creeks, *Talbot*. SIND : mud-forests, *Stocks*, 373 ! ; Karachi, *Ritchie*, 456 !

ORDER LXXVII. SAPOTACEÆ.

Trees, less commonly shrubs, with milky juice. Leaves alternate, usually coriaceous, entire ; stipules 0, or rarely small and caducous. Flowers small, regular, usually hermaphrodite, axillary ; pedicels minutely bracteate or altogether ebracteate ; bracteoles beneath the calyx rare. Calyx-lobes 4—8, deep, imbricate or in 2 rows with the outer valvate, persistent. Corolla gamopetalous ; tube short, campanulate or urceolate (rarely elongate) ; lobes as many or 2—4 times as many as the calyx-lobes. Stamens inserted on the corolla-tube, as many as the corolla-lobes and opposite to them, or 2—3 times as many, 1—3-seriate ; filaments usually short ; anthers oblong-lanceolate, the connective often produced beyond the cells. Staminodes when present alternating with the stamens. Ovary superior, sessile, 2—8-celled ; ovules solitary in each cell ; style shortly conical or elongate-subulate, glabrous ; stigma usually punctiform. Berry indehiscent, 1—8-seeded. Seeds ellipsoid or if more than 1 often compressed, albuminous or not ; hilum long, conspicuous ; testa smooth shining ; radicle inferior.—DISTRIB. Tropics of the world ; genera about 24 ; species about 320.

Calyx-segments 1-seriate.
  Calyx-segments 5—6, stamens 5—6.
    Staminodes 0 ..... 1. CHRYSOPHYLLUM.
    Staminodes 5 ..... 2. SIDEROXYLON.
Calyx-segments 2-seriate.
  Calyx-segments 4.
    Stamens 8 ..... 3. ISONANDRA.
    Stamens 12 or more ..... 4. BASSIA.
  Calyx-segments 6—8.
    Staminodes 0 ..... 5. PALAQUIUM.
    Staminodes 6 or 8 ..... 6. MIMUSOPS.

1. CHRYSOPHYLLUM, Linn.

Trees with milky juice. Leaves coriaceous ; stipules 0. Flowers small, in axillary fascicles, pedicellate or subsessile. Calyx 5—6-partite ; lobes subequal, imbricate. Corolla-lobes 5—6, entire, imbricate. Stamens as many as the corolla-lobes and opposite to them, attached to the tube or the base of the lobes ; filaments subulate or filiform ; anthers ovate or triangular ; staminodes 0. Ovary villous, 5—6 (rarely 7—10) -celled ; style glabrous, short or long. Berry fleshy or coriaceous, globose. Seeds 5—6 (or fewer) ; testa coriaceous,

dull or shining ; hilum elongate. —DISTRIB. Chiefly Tropical American, a few species in Africa, Asia, and Australia ; species about 60.

1. **Chrysophyllum Roxburghii,** *G. Don, Gen. Syst.* v. 4 (1837) p. 33. A slender tree reaching 40—50 ft. high ; branches horizontal ; bark smooth, grey ; young parts clothed with fulvous pubescence. Leaves 3—5 by 1½—2 in., distichously spreading, oblong-lanceolate, caudate-acuminate, glabrous, shining ; main nerves very numerous, nearly perpendicular to the midrib, fine, conspicuous, uniting within the margin, so close as to give the leaves a striate appearance ; petioles ¼ in. long. Flowers numerous, in rounded clusters ; pedicels ⅛ in. long, recurved. Calyx $\frac{1}{16}$ in. long, broadly campanulate ; lobes equalling the tube, rounded, densely ciliate. Stamens included. Ovary densely hairy ; style short, conical, glabrous. Fruit 1—1½ in. in diam., globose, obscurely 5—6-angled (strongly so when dry), tomentose when young, afterwards smooth, yellowish-green, edible. Seeds 5—6, ellipsoid, compressed, ½—¾ by ¼—⅜ in., the inner edge straight, the outer curved, highly polished, very hard, brownish-yellow. Fl. B. I. v. 3, p. 535 ; Dalz. & Gibs. p. 138 ; Talb. Trees, Bomb. ed. 2, p. 205 ; Watt, Dict. Econ. Prod. v. 2, p. 273. *Chrysophyllum acuminatum,* Roxb. Fl. Ind. v. 1, p. 599 ; Grah. Cat p. 105. —Flowers : Apr.—May. VERN. *Tarsi.*

KONKAN : *Stocks* ! ; evergreen forests, *Talbot* S. M. COUNTRY : Chorla Ghât (Belgaum districts), *Ritchie* !, *Stocks* !, *Dalzell & Gibson.* KANARA : evergreen forests of N. Kanara, common, *Talbot.*

The fruit, which is called the *Star Apple,* is pulpy and glutinous, and is eaten by the natives though not very palatable.—DISTRIB. India (Assam, Khasia, Silhet, W. Peninsula) ; Ceylon, Malacca.

Chrysophyllum Cainito, Linn. Sp. Pl. (1753) p. 192. A tree, a native of the West Indian islands, occasionally though rarely cultivated in India. A tree is to be found at Khandala in the Poona districts. Leaves 3—5 by 1½—2½ in., elliptic-oblong, obtuse or shortly acuminate, glabrous and shining above, densely silky with golden or rufous pubescence beneath, base shortly acute ; main nerves numerous, slender, nearly perpendicular to the strong midnerve ; petioles ¼—½ in. long. Pedicels slender, fascicled, ¼ in. long, rufous-tomentose. Corolla campanulate, silky, 2—3 times as long as the calyx. Ovary 7—10-celled ; stigma 7—10-radiate. Fruit spherical, as large as a small apple, edible. Griesbach, Fl. Brit. W. Ind. Isl. p. 398 ; Mart. Fl. Bras. v. 7, p. 94 ; Woodr. Gard. in Ind. ed. 5, p. 372. *C. Roxburghii,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 (*not* of G. Don).—Flowers : Aug.

2. SIDEROXYLON, Linn.

Trees (rarely shrubs). Leaves coriaceous, alternate ; stipules 0. Flowers small, in axillary fascicles, sessile or pedicellate. Calyx-segments 5 (rarely 6), much imbricate, subequal. Corolla campanulate ; lobes 5 (rarely 6), shorter or longer than the tube, imbricate. Stamens 5 (rarely 6), attached to the tube or the base of the corolla-lobes and opposite to them ; filaments short or elongate ; anthers

ovate or lanceolate ; staminodes 5, lanceolate. Ovary usually villous, 5 (rarely 2—4)-celled ; style short or long ; stigma small (rarely sublobate). Berry ovoid or globose. Seeds usually solitary (sometimes 2—5) ; testa coriaceous or hard and shining ; albumen fleshy ; cotyledons flat, broad, foliaceous or fleshy ; radicle short.—DISTRIB. Chiefly tropical, a few extra-tropical ; species about 60.

1. **Sideroxylon tomentosum,** *Roxb. Cor. Pl.* v. 1 (1795) p. 28, t. 28. A small or moderate-sized tree with cracked bark ; lateral twigs often becoming sharp spines ; young parts pubescent or tomentose. Leaves 2—4 by 1—2 in., numerous, subcoriaceous, elliptic or elliptic-obovate, subacute or sometimes rounded, rarely retuse at the apex, tomentose when young, glabrous when mature, dark-green above, paler beneath, base acute ; main nerves 10—12 pairs ; petioles ¼ in. long, pubescent. Flowers small, slightly fragrant, in rounded axillary clusters ; pedicels ¼ in. long, drooping, fulvous-pubescent. Calyx campanulate, ¼ in. long, fulvous-pubescent ; lobes 5, acute, longer than the tube, much imbricate. Corolla white, ¼—⅓ in. long ; segments 5, narrowly lanceolate, very acute. Staminodes linear-lanceolate, hairy. Ovary densely hairy ; style exserted about ⅜ in. beyond the flower, glabrous. Berry ¾—1 by ½—⅔ in., pubescent when young, afterwards glabrous, yellowish-green. Seed usually solitary (sometimes 1—5), ½ in. long, smooth, polished and shining. Fl. B. I. v. 3, p. 538 ; Grah. Cat. p. 105 ; Trim. Fl. Ceyl. v. 3, p. 77 ; Talb. Trees, Bomb. ed. 2, p. 206 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 687. *Sapota tomentosa,* A. DC. Prodr. v. 8, p. 175 ; Dalz. & Gibs. p. 139. *Sapota elengoides,* A. DC. Prodr. v. 8, p. 176 ; Wight, Icon. t. 1218. *Achras elengoides,* Bedd. Flor. Sylvat. t. 235. *Achras tomentosa,* Bedd. For. Man. in Flor. Sylvat. p. cxlii.—Flowers : Oct.—Jan. VERN. *Kunvalá* ; *Kumbal.*

A common tree throughout the Presidency. KONKAN : *Stocks* !, *Law* !, *Graham;* Devale (Ratnagiri districts), *Kanitkar* ! ; Matheran, *Cooke* !, *H. M. Birdwood.* DECCAN : Khandala, *Cooke* ! ; Mahableshwar *Woodrow* ! ; bottom of Rotunda Ghát, below Mahableshwar, *Graham.* S. M. COUNTRY : Rámghát, *Ritchie,* 1104 ! ; Belgaum (south), *Ritchie,* 1104 ! KANARA : evergreen forests of N. Kanara, common, *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon, Pegu, Martaban (*fide* Kurz).

3. ISONANDRA, Wight.

Trees with milky juice. Leaves coriaceous with prominent primary nerves. Flowers small, in axillary clusters, subsessile or shortly pedicellate. Calyx-segments 4, 2-seriate. Corolla deeply 4-fid ; lobes broad, imbricate. Stamens 8, subequal, attached at the base of the corolla, 1-seriate ; filaments erect ; anthers oblong-lanceolate ; staminodes 0. Ovary hispid, 4-celled ; style subulate. Berry ellipsoid. Seed usually solitary ; testa crustaceous, shining ; hilum lateral ; albumen fleshy ; cotyledons flat.—DISTRIB. India (W. Peninsula), Ceylon ; species 6.

1. **Isonandra Candolleana,** *Wight, Icon.* t. 1220. Leaves 2—3½ by 1—1½ in., obovate-oblong, bluntly acuminate, glabrous on both

sides. Flowers in rounded nearly sessile fascicles with small bracts at their base. Calyx ⅛ in. long, divided almost to the base; segments 4, broadly ovate, very unequal, the exterior much larger, hairy and ciliate. Corolla deeply 4-partite; lobes obovate-oblong, emarginate, longer than the tube. Stamens much shorter than the corolla-lobes; anthers pubescent at the apex. Ovary densely hairy; style much exserted. Berry ¾ by ½ in. Fl. B. I. v. 3, p. 539; Dalz. & Gibs. p. 139; Talb. Trees, Bomb. ed. 2, p. 206.—Flowers: Mar.—May.

On the Ghâts, not uncommon, *Dalzell & Gibson.*

This species is included on the authority of Dalzell & Gibson (*l. c.*). I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew. Woodrow does not include the plant in his list, and Talbot has never seen it nor have any of the Poona plant-collectors found it. Dalzell & Gibson say that it is *not uncommon*, but as it has not been met with by any other botanists, I think its existence in the Bombay Presidency more than doubtful.—DISTRIB. Nilghiri mountains.

Isonandra Stocksii, C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 539, is stated in the Fl. B. I. to occur in the Konkan, but it has never, so far as I know, been found there by any botanists. Neither Talbot nor Woodrow have seen it. There are 2 specimens in Herb. Kew., the tickets on which are *printed* ones on which appear the words "Hab. Malabar, Concan &c. Coll. Stocks, Law &c."

There is therefore no certainty as to the locality from which these specimens came, and they are not authenticated by the signatures of either Law or Stocks.

4. **BASSIA,** Kœnig ex Linn.

Trees with milky juice. Leaves coriaceous, clustered near the ends of the branches; stipules caducous. Flowers fascicled, crowded near the apices of the branches among the leaves, or from the axils of fallen leaves, pedicellate, often nodding. Calyx-segments 4, much imbricate, 2-seriate, the 2 outer enclosing the 2 inner. Corolla campanulate; tube broad; lobes 6—12, erect, subcontorted in bud. Stamens at least twice as many as the corolla-lobes, 12—40 (usually 16-20); filaments usually short; anthers lanceolate, acute, the connective often produced, staminodes 0. Ovary usually villous, 4—12-celled; style subulate, often elongate. Berry globose or ovoid, fleshy, 1—3 (rarely 4—5) -seeded. Seeds ellipsoid, more or less compressed; testa crustaceous, shining; hilum long, oblong or linear; albumen 0; cotyledons thick, fleshy; radicle very short.—DISTRIB. East Indies, Ceylon, Malayan Archipelago; species 30.

Anthers 20—30 in 3 series	1.	*B. latifolia.*
Anthers 16—20 in 2 series.		
Corolla-tube glabrous inside and outside; ovary hairy; fruit hairy when young	2.	*B. longifolia.*
Corolla-tube hairy inside and outside; ovary glabrous; young fruit glabrous	3.	*B. malabarica.*

Note.—The genus *Bassia* was established by Kœnig (Linn. Mantiss. p. 555). In his description of *Bassia longifolia*, Linnæus (Mantiss. p. 563) mentions that Kœnig (MS.) had given *Illipe* as a name of the plant. This name (*Illipe*) is the Tamil name of the tree and Kœnig evidently intended to explain that it was the *Illipe* of the inhabitants of the Malabar coast (*Illipe malabarorum*). F. von Mueller (Select Extra-Trop. Pl. ed. 5, p. 181) under the mistaken

notion that Kœnig, notwithstanding his having already established the genus *Bassia*, had changed the name of that genus to *Illipe*, called *Bassia latifolia* by the name *Illipe latifolia*. Engler (Engl. & Prantl, Pflanzenf. v. 4, part 1, p. 133) follows Mueller in his mistake and gives the name *Illipe*, Kœnig, to the genus. Kœnig has nowhere published the genus as *Illipe*, and the only name possible to recognize for it is *Bassia*.

1. **Bassia latifolia,** *Roxb. Cor. Pl.* v. 1 (1795) p. 20, t. 19. A deciduous tree reaching 40-50 ft. high ; bark thick, dark-colored, cracked, the inner bark red, milky ; trunk short ; branches numerous, spreading, forming a thick shady head (branched like an oak, *Dalz. & Gibs.*). Leaves clustered near the ends of the branches, 3—9 by 1½—4½ in., coriaceous, hard and firm, elliptic or elliptic-oblong, shortly acuminate, pubescent or tomentose when young, at length glabrous, base rounded or acute ; main nerves 10—14 pairs, ¼—½ in. (or in large leaves ¾ in.) apart, with closely reticulate veins between ; petioles 1—1½ in. long, at first pubescent, ultimately glabrous or nearly so ; stipules ¼—⅜ in. long, subulate, densely pubescent, very caducous. Flowers in dense fascicles near the ends of the branches, below the terminal leaf-bud ; pedicels 1—1½ in. long, drooping, fulvous- or rusty-pubescent or -tomentose. Calyx ⅝ in. long, divided nearly to the base ; segments ovate, subacute, rusty-tomentose, usually 4 (rarely 5), the two outer subvalvate and enclosing the others. Corolla cream-colored, rather more than ½ in. long ; tube ⅓ in. long, fleshy, rugose when dry ; lobes 7-14 (usually 8—9), ovate-lanceolate, acute, erect. Stamens 20—30 (usually 24—26) ; anthers in 3 series, acuminate, hairy at the back. Ovary hirsute ; style 1 in. long or more, hairy at the base. Berry 1—2 in. long, fleshy, ovoid, greenish. Seeds 1—4. Fl. B. I. v. 3, p. 544 ; Grah. Cat. p. 107 ; Dalz. & Gibs. p. 139 ; Bedd. Flor. Sylvat. t. 41 ; Talb. Trees, Bomb. ed. 2, p. 206 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 1, p. 406.—Flowers : Jan.—Apr. VERN. *Mohá ; Mhowá.*

Throughout the Konkans, plentiful in Gujarat, *Graham, Dalzell & Gibson.* KONKAN : *Law* ! ; Malabar Hill (Bombay), *Graham* ; Matheran Ghát, *H. M. Birdwood.* DECCAN : Khandala, *Woodrow* ! ; Peint Taluka, *Woodrow.* S. M. COUNTRY : Belgaum, *Ritchie,* [illegible] ; Padshapur, *Ritchie,* 1105 ! KANARA : forests of N. Kanara but nowhere abundant, *Talbot.*

A most useful tree. An oil is extracted from the kernels of the fruit, which is eaten and used for soap-making. The flowers are largely eaten either raw or cooked and a spirit is distilled from them from which a large revenue accrues to Government. For a full description see Watt, Dict. Econ. Prod. l. c.—DISTRIB. India (Central Provinces, Central India, Oude, Birma, W. Peninsula), cultivated and often self-sown.

2. **Bassia longifolia,** *Linn. Mantiss.* v. 2, App. (1771) p. 563. A large tree ; branches numerous ; bark thick, dark brown, scaly, the inner dark red, milky ; young parts pinkish-white, silky-pubescent. Leaves thin, clustered near the ends of the branches, 3—5 by 1—1¾ in., linear-lanceolate, acute, glabrous when mature, much tapered towards the base ; main nerves 10—12 pairs ; petioles ½—¾ in., long, slender ; stipules ½ in. long, linear-subulate, hairy, caducous. Flowers appearing with the young leaves, in dense clusters near the ends of the branches below the leaves ; pedicels 1½—2½ in. long, glabrous, erect at first, afterwards more or less drooping. Calyx ⅝—¾ in. long, divided nearly to the base, densely rusty-pubescent ; segments usually

4, ovate-oblong, acuminate. Corolla ½—⅝ in. long ; tube fleshy, inflated, glabrous, rugose when dried ; lobes 6—12, about as long as or a little shorter than the tube, lanceolate, subobtuse, glabrous. Stamens 16—20, in 2 rows one above the other, subsessile ; anthers hairy, cordate at the base, the connective produced to a point. Ovary densely hairy ; style 1—1⅛ in. long. Berry oblong, the size of a plum, hirsute when young ultimately nearly glabrous, yellowish when ripe. Seeds 1—2, compressed, straight on one side, curved on the other. Fl. B. I. v. 3, p. 544 ; Dalz. & Gibs. p. 139 ; Bedd. Flor. Sylvat. t. 42 ; Wight, Ill. t. 147 ; Trim. Fl. Ceyl. v. 3, p. 79 ; Talb. trees, Bomb. ed. 2, p. 207 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 1, p. 415.—Flowers : Nov.—Jan. VERN. *Mhová ; Ippi.*

Southern districts of the Presidency, where it takes the place of *Bassia latifolia* of the Northern districts. Dalzell & Gibson say that it does not come further north than the latitude of Dharwar. KANARA : *Stocks* !, *Law* !, common, *Dalzell & Gibson* ; Kála naddi, common, *Ritchie*, 1830 !, *Talbot* ! ; Supa, *Ritchie*, 1830 ! ; Suligeri, *Woodrow* ; Santgul, *Talbot* !—DISTRIB. India (southern portion of the Western Peninsula) ; Ceylon.

The economic uses of this tree in the south of India are the same as those of *Bassia latifolia* in the Central table-land. See Watt, Dict. Econ. Prod. l. c.

3. **Bassia malabarica,** *Bedd. For. Man. in Flor. Sylvat.* (1872) p. cxl. A middle-sized tree ; bark dark-colored, scaly. Leaves 3—8 by 1—2¼ in., very coriaceous, oblong to lanceolate, subobtuse, glabrous, darkgreen and shining, base tapering ; main nerves 15—25 pairs, very slender with closely reticulate veins between ; petioles ¼—½ in. long. Flowers crowded towards the ends of the branches in dense fascicles ; pedicels ½—¾ in. long. Calyx ⅜ in. long, divided nearly to the base ; segments 4, ovate, subacute, the 2 outer glabrous or nearly so, the 2 inner hairy. Corolla ½ in. long ; tube densely rufous-hairy both inside and outside, slightly shorter than the lobes ; lobes 6 (rarely 7), oblong, obtuse, fulvous-hairy outside. Stamens 16—18 in 2 rows ; filaments densely rufous-hairy ; anthers glabrous or with a very small tuft of hairs between the basal lobes, cordate at the base, the connective much produced. Ovary glabrous ; style ¾ in. long. Berry oblong-lanceolate, glabrous when young. Fl. B. I. v. 3, p. 544 ; Talb. Trees, Bomb. ed. 2, p. 207 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Icon. Prod. v. 1, p. 416. —Flowers : Nov.—Jan.

In the southern districts of the Presidency. KANARA : southern parts of N. Kanara along the banks of rivers and in moist forests from near the sea-level to 2000 ft., *Talbot* ; Sampkhand (N. Kanara), *Woodrow*.

5. **PALAQUIUM,** Blanco (1837).

DICHOPSIS, Thwaites (1864).

Trees with milky juice. Leaves coriaceous, often minutely tomentose beneath. Flowers fascicled, axillary or on the naked branches below a terminal tuft of leaves, pedicellate. Calyx-segments 6 in 2 series, subequal, the 3 exterior subvalvate, enclosing

the 3 imbricate interior ones. Corolla-lobes 6 in 2 series, usually acute, imbricate or contorted. Stamens 12—18 (usually 12), attached to the base of the corolla, 1-seriate or the alternate ones attached a little higher up; filaments rather long or the alternate shorter; anthers lanceolate, dehiscing subextrorsely, acute, obtuse, emarginate or bifid, the connective produced beyond the cells; staminodes 0. Ovary villous, 6-celled; style subulate. Berry fleshy, ellipsoid or ovoid. Seed solitary (or 2); testa crustaceous, shining; albumen 0; cotyledons thick, fleshy; radicle very short.—DISTRIB. S. India, Ceylon, and the Malayan Archipelago, 1 species in Samoa; species 30.

1. **Palaquium ellipticum,** *Engler, in Engl. & Prantl, Pflanzenf.* v. 4, part 1 (1897) p. 135. A large tree reaching 100 ft. high; trunk without branches for a considerable height. Leaves 3—4½ by 1½—2¼ in., elliptic or elliptic-obovate, shortly and obtusely acuminate, coriaceous, dark-green above, paler beneath, glabrous on both sides, base acute; main nerves 8—12 pairs; petioles ½—1 in. long, glabrous or faintly puberulous. Flowers axillary; pedicels solitary or 2 or 3 (rarely more) together, pubescent or nearly glabrous, ¾—1½ in. long. Calyx 6-partite, densely villous with fulvous appressed hairs; segments ⅓ in. long, 2-seriate, the 3 exterior broadly ovate, subacute, transversely rugose, the 3 inner lanceolate, acute, narrower and a little longer than the outer. Corolla ½ in. long, dark-red; tube shorter than the lobes, hairy inside; lobes ovate-oblong, subobtuse, silky on the back. Stamens 12—18; filaments very short, hairy; anthers narrowly lanceolate, acute, the connective much produced and bifid at the apex. Ovary villous, style exserted, glabrous. Berry 1½ in. long, oblong, subacute, glabrous. *Dichopsis elliptica,* Benth. & Hook. f. Gen. Pl. v. 2, p. 658; C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 542; Talb. Trees, Bomb. ed. 2, p. 207; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163; Watt. Dict. Econ. Prod. v. 3, p. 102. *Bassia elliptica,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 36; Dalz. & Gibs. p. 139; Bedd. Flor. Sylvat. t. 43.—Flowers: Feb. VERN. *Pánchoti-pálla.*

Western Ghâts from Bombay southwards ascending to 4000 ft. KANARA: *Stocks!, Dalzell!*—DISTRIB. Southern parts of the W. Peninsula of India.

The Indian Gutta-percha Tree. Yields a gummy product known as *pálá* gum, which has been exported to Singapore for the purpose of adulterating gutta-percha, the best quality of which is the product of *Palaquium* (*Dichopsis*) *Gutta.* See Watt, Dict. Econ. Prod. l. c.

6. MIMUSOPS, Linn.

Trees with milky juice. Leaves coriaceous, often with slender parallel nerves. Flowers fascicled or solitary, axillary. Calyx-segments 6—8, in 2 series, the exterior subvalvate, enclosing the interior imbricate ones. Corolla-tube short, broad; lobes 18 or 24, of which 12 or 16 are exterior and 1—2-seriate, 6 or 8 interior 1-seriate. Stamens 6 or 8, attached at the base of the corolla and opposite the lobes of its interior series; filaments short, dilated, free, or connate into a tube with the staminodes: anthers lanceolate, the connective usually produced beyond the cells; staminodes 6 or 8, subpetaloid,

variously toothed or lacerate, alternate with the stamens in the same series, or connate at the base with them. Ovary hirsute, 6—8-celled. Berry globose ; epicarp crustaceous. Seeds few or solitary, obliquely ovate, slightly compressed ; testa crustaceous or hard, shining ; hilum small and basilar or elongate and lateral ; albumen fleshy ; cotyledons flat.—DISTRIB. Tropics of both hemispheres ; species about 30.

Calyx-segments 8; stamens 8; staminodes lanceolate, acuminate, hairy	1. *M. Elengi.*
Calyx-segments 6; stamens 6; staminodes bifid or denticulate at the apex, glabrous	2. *M. hexandra.*

1. **Mimusops Elengi,** *Linn. Sp. Pl.* (1753) p. 349. A large glabrous evergreen tree 40—50 ft. high, with a compact leafy head and short erect trunk ; bark smooth, scaly. Leaves 2½—4 by 1¼—2 in., elliptic, shortly acuminate, glabrous, base acute or rounded ; petioles ½—1 in. long. Flowers white, fragrant, nearly 1 in. across, solitary or in fascicles of 2—6 ; buds ovoid, acute ; pedicels ¼—¾ in. long, appressedly pubescent, often deflexed. Calyx ⅜ in. long, fulvous-pubescent ; segments 8, the 4 outer ovate-lanceolate, acute, the 4 inner narrower than the outer. Corolla longer than the calyx ; tube $\frac{1}{16}$ in. long ; lobes ¼ in. long, about 24, in 2 series, the inner series of 8 the outer of 16 lobes, linear-oblong, acute. Stamens 8, opposite the inner circle of lobes ; filaments short, glabrous ; anthers glabrous, slightly twisted, acuminate ; staminodes 8, alternate with the stamens, lanceolate, acuminate, densely clothed on the back and margins with white hairs. Ovary appressedly silky-pubescent ; style grooved, slightly longer than the corolla. Berry about 1 in. long, ovoid, yellow when ripe. Seed solitary, ovoid, compressed, brown, shining. Fl. B. I. v. 3, p. 548 ; Grah. Cat. p. 106 ; Dalz. & Gibs. p. 140 ; Bedd. Flor. Sylvat. t. 40 ; Wight, Icon. t. 1596 ; Trim. Fl. Ceyl. v. 3, p. 86 ; Talb. Trees, Bomb. ed. 2, p. 208 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt. Dict. Econ. Prod. v. 5, p. 249.—Flowers : Jan.—Mar. VERN. *Borsali* ; *Bakuli* ; *Vávli.*

Often planted round Mahometan tombs as an ornamental tree. KONKAN : Ravines in the Ghâts, *Dalzell & Gibson* ; evergreen forests of the Konkan, *Talbot* ; Matheran, *H. M. Birdwood* ; Máhar, *Graham* ; Bombay, *Cooke* ! DECCAN : Khandala, *Graham.* KANARA : evergreen forests of N. Kanara, ***Talbot***; Divimana Ghát, *Woodrow* ; Kála naddi, below Supa, *Ritchie*, 1103 ! GUJARAT : *Cooke* !—DISTRIB. India (W. Peninsula) ; Ceylon, Malaya ; cultivated in the Tropics.

The fragrant flowers are used for making garlands, and a perfume is distilled from them. The bark is used in native medicine, the wood is valuable, and an oil is expressed from the seeds. See Watt, Dict. Econ. Prod. l. c.

2. **Mimusops hexandra,** *Roxb. Cor. Pl.* v. 1 (1795) p. 16, t. 15. A large evergreen glabrous tree 50—60 ft. high, with a shady head ; trunk erect without branches for a considerable height ; bark blackish-grey, deeply furrowed. Leaves coriaceous, 2—4½ by 1—2 in., obovate or oblong, rounded or emarginate at the apex, glabrous on both sides, dark green and polished above, paler beneath, base acute ; main nerves 12-20 pairs, not conspicuous ; petioles ⅜—½ in. long, channelled above, glabrous. Flowers whitish, axillary, solitary or in

fascicles of 2—6 ; pedicels ¼—½ in. long, glabrous or nearly so. Calyx rusty-tomentose outside ; segments 6, reflexed, ovate, subacute, ⅛ in. long, the 3 inner rather narrower than the 3 outer, ciliate. Corolla-tube $\frac{1}{20}$ in. long ; lobes usually 18, about ⅛ in. long, 2-seriate, the 6 inner oblanceolate, shortly clawed, a little longer or almost equal to the outer, the 12 outer linear, acute. Stamens 6 ; filaments as long as the acute (not acuminate) anthers ; staminodes 6, alternate with the stamens, bifid or denticulate at the apex, glabrous. Ovary silky-pubescent, 12-celled. Berry usually 1 (rarely 2) -seeded, of the size and shape of an olive, reddish-yellow when ripe. Seed ovoid, reddish-brown, shining. Fl. B. I. v. 3, p. 549 ; Grah. Cat. p. 106 ; Dalz. & Gibs. p. 140 ; Bedd. For. Man. in Flor. Sylvat. p. cxli ; Trim. Fl. Ceyl. v. 3, p. 86 ; Talb. Trees, Bomb. ed. 2, p. 208 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 5, p. 251. *Mimusops indica*, A. DC. Prodr. v. 8 (1844) p. 205 ; Wight, Icon. t. 1587.—Flowers : Sept.—Nov. VERN. *Kirni* ; *Ráyan*.

Common in the dry forests of the Deccan, Khandesh and Gujarat. KONKAN : *Law* ! ; Malabar hill (Bombay), *Graham*, *Woodrow*. DECCAN : Pál jungles (Khandesh), *Kanitkar* ! ; east of Junnar (Poona districts), *Kanitkar* ! ; Imampur, near Ahmednagar, *Graham*. S. M. COUNTRY : Belgaum, *Ritchie*, 1829 ! GUJARAT : *Talbot*, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula, Banda) ; Ceylon ; cultivated in N.W. India.

The wood is tough and used for making sugar-mills, oil presses, &c., and is an excellent wood for turning. The bark is used in medicine, and the fruit is eaten by the poorer classes in times of scarcity. See Watt, Dict. Econ. Prod. l. c.

Mimusops Kauki, Linn. Sp. Pl. (1753) p. 349. A tree with ovate or obovate glabrous leaves and a handsome straight stem, a native of Malaya and Tropical Australia, is occasionally grown. The fruit, which is globose, slightly acid, and about ¾—1 in. in diameter, is known in Goa as *pome* or *fructa d'Adao* (Adam's apple) and is eaten. Fl. B. I. v. 3, p. 549 ; Grah. Cat. p. 106 ; Dalz. & Gibs. Suppl. p. 50 ; Watt, Dict. Econ. Prod. v. 5, p. 252.

Achras Sapota, Linn. Sp. Pl. ed. 2 (1762) p. 470. The *Sapodilla Plum* of the W. Indies, introduced from America and now cultivated more or less throughout India for its fruit. It has white scentless flowers, and the fruit, which is about as large as and of the shape of a hen's egg, ripens from November to March and usually fetches a good price in the market, though not much eaten by Europeans. The tree thrives best near the sea, but grows fairly well in the black soil of the Deccan. Fl. B. I. v. 3, p. 534 ; Grah. Cat. p. 106 ; Dalz. & Gibs. Suppl. p. 50 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Gard. in Ind. ed. 5, p. 372 ; Watt, Dict. Econ. Prod. v. 1, p. 80. VERN. *Chikali*.

ORDER LXXVIII. EBENACEÆ.

Trees or shrubs ; wood often hard and heavy, sometimes black in the centre ; juice not milky. Leaves alternate (rarely opposite), entire, usually coriaceous ; stipules 0. Flowers usually dioecious, axillary, cymose or solitary, usually bracteate ; pedicels articulated

under the flower. Calyx inferior, gamosepalous, often accrescent in fruit; lobes 3—7. Corolla gamopetalous; lobes 3—7, usually contorted, twisting to the right. MALE FLOWERS: Stamens as many or 2—3 times as many as the corolla-lobes or ∞, usually hypogynous; filaments free or paired or variously connate; anthers narrow, erect, basifixed, dehiscing longitudinally (rarely by an apical pore), often apiculate by the produced connective, often hairy. Ovary rudimentary or 0. FEMALE FLOWERS: Staminodes usually fewer than the stamens of the male flowers or 0. Ovary superior, sessile; styles 2—8, free or more or less connate into a 2—8-fid style; cells as many or twice as many as the styles, imperfectly septate; ovules twice as many as the styles, attached to the inner angle of the cells, pendulous, anatropous. Fruit coriaceous or fleshy, indehiscent, 1- or few-seeded. Seeds pendulous, usually oblong, more or less compressed, longitudinally 2—3-furrowed; testa thin or coriaceous, smooth; albumen copious, uniform or ruminate; embryo axile; radicle superior.—DISTRIB. Warmer regions of both hemispheres, a few extra-tropical; genera 5 or 6; species about 250.

Flowers often 3-merous; ovary 3- or 6-celled	1. MABA.
Flowers mostly 4—5-merous; ovary 4—5- or 8—10-celled	2. DIOSPYROS.

1. MABA, Forst.

Trees or shrubs, usually with hard wood. Leaves alternate. Flowers dioecious, axillary, solitary or shortly cymose, usually 3 (rarely 4—6) -merous. Calyx campanulate, sometimes accrescent, 3-fid (rarely truncate or 4—6-fid). Corolla campanulate or tubular; lobes 3 (rarely 4—6), twisted to the right. MALE FLOWERS: Stamens 3—∞ (usually 9), mostly glabrous; filaments distinct or variously connate; anthers oblong or linear-lanceolate, dehiscing by lateral slits. Rudimentary ovary small. FEMALE FLOWERS: Staminodes 0 or fewer than the stamens of the male flowers. Ovary 3-celled, the cells 2-ovulate, or 6-celled, the cells 1-ovulate; styles or style-branches 3. Fruit globose or ovoid, baccate or dry. Seeds 1—6; albumen not ruminate in the Indian species.—DISTRIB. Warmer regions of both hemispheres; species 59.

Calyx 3—4-lobed; ovary hairy	1. *M. nigrescens*.
Calyx truncate; ovary glabrous	2. *M. micrantha*.

1. **Maba nigrescens,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 142. A large shrub or small tree (15—35 ft., *Ritchie*, MS. in Herb. Kew.); young shoots clothed with ferruginous pubescence. Leaves 1½—3 by ½—1 in., coriaceous, oblong-lanceolate, subacute, glabrous above, fulvous-hairy on the midrib beneath, reticulately veined, margins undulate, more or less ciliate; petioles ⅛ in. long, densely fulvous-hairy. MALE FLOWERS 3—4-merous, subsessile, in short cymes of 1—5 flowers. Calyx ⅛—¼ in. long, densely fulvous-hairy; lobes 3—4, triangular, acute, ⅒ in. long. Corolla ⅓ in. long, white; tube about equalling the lobes; lobes 3—4, obovate, obtuse, densely hairy on the back. Stamens in 3-merous flowers 9, in 4-merous flowers

4—6, glabrous, hypogynous ; filaments slender ; anthers $\frac{1}{10}$ in. long, linear, acute. Rudimentary ovary hairy. FEMALE FLOWERS 1—2 together, 3-merous. Calyx $\frac{1}{8}$ in. long, fulvous-hairy ; lobes broadly ovate or suborbicular. Corolla $\frac{1}{4}$ in. long ; lobes oblong, rounded at the apex. Staminodes 0. Ovary hairy, 3-celled. Fruit ellipsoid, clothed when young with fulvous silky hairs ; fruiting calyx cup-shaped, $\frac{1}{3}$ in. wide. Fl. B. I. v. 3, p. 551 ; Hiern, Monogr. Eben. (1873) p. 115 ; Talb. Trees, Bomb. ed. 2, p. 209 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 5, p. 102.—Flowers : Nov.—Feb. VERN. *Rakta-rora*.

Confined in the Bombay Presidency to the Konkan and Kanara. KONKAN : *Law* !; evergreen forests, *Talbot* ; near Goa, *Dalzell* ! ; Amboli Ghát, *Woodrow*. KANARA : evergreen forests on the Ghâts of N. Kanara near Nilkund and the falls of Gairsoppa, *Talbot* ; Kâla naddi, *Ritchie*, 85 ! ; river banks at Mulas, *Ritchie*, $\frac{5}{54}$!—DISTRIB. India (Mysore).

2. **Maba micrantha,** *Hiern, in Trans. Camb. Phil. Soc.* v. 12 (1873) p. 133. A middle-sized tree. Leaves $3\frac{1}{2}$—5 by $1\frac{1}{4}$—2 in., coriaceous, elliptic-oblong, obtusely acuminate, glabrous, acute or somewhat rounded at the base ; petioles $\frac{1}{4}$ in. long, rugose, glabrous. MALE FLOWERS not known. FEMALE FLOWERS axillary, solitary, sessile, $\frac{1}{4}$ in. long. Calyx tubular, entire, truncate, with a few imbricate bifarious scales at the base. Corolla tubular, divided to about the middle, thrice as long as the calyx ; lobes 3, ovate, obtuse, spreading. Staminodes 6, inserted at the base of the corolla-tube, distinct ; filaments twice as long as the barren anthers. Ovary hemispheric, glabrous, 6-celled ; ovules solitary in each cell, pendulous ; styles 3, erect, rather thick, obtuse at the apex. Fl. B. I. v. 3, p. 552 ; Talb. Trees, Bomb. ed. 2, p. 209 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163. *Holochilus micranthus,* Dalz. in Kew Journ. Bot. v. 4 (1852) p. 291 ; Dalz. & Gibs. p. 142.—Flowers : Feb.—Mar.

Southern Ghâts, *Dalzell* !

There is but 1 specimen (in fruit) in Herb. Kew. The description has been taken from that of Dalzell in Kew Journ. Bot. l. c. Dalzell never found the male flowers, and neither Mr. Talbot nor Mr. Woodrow has found Dalzell's plant.

2. DIOSPYROS, Linn.

Trees or shrubs. Leaves alternate (rarely subopposite). Flowers dicœcious (rarely polygamous), in cymes which are axillary or along the old branches, sometimes (the females often) reduced to a single flower. Calyx gamosepalous, 3—7 (usually 4—5) -fid or -partite, pubescent and often accrescent beneath the fruit, rarely truncate. Corolla urceolate, tubular, campanulate or hypocrateriform, more or less pubescent outside ; lobes 3—7 (usually 4—5), twisted to the right. MALE FLOWERS : Stamens 4—∞ (usually 16), attached to the base of the corolla or hypogynous ; filaments in pairs, or variously connate, or free ; anthers linear or lanceolate. Ovary rudimentary or 0. FEMALE FLOWERS : Staminodes 0—16. Ovary conical or globose, 4—10-celled ; ovules solitary (rarely 2) in each cell ; styles or style-branches 1—4. Fruit globose, ellipsoid or ovoid-conic, usually

supported by the enlarged calyx ; the flesh often pulpose or viscid.—DISTRIB. Chiefly tropical ; species 153.

- Albumen of seeds ruminate; leaves sometimes subopposite.
  - Leaves often subopposite.
    - Male corolla more or less tubular ..... 1. *D. Melanoxylon.*
  - Leaves all alternate.
    - Fruiting calyx not much plicate.
      - Male corolla shortly urceolate ..... 2. *D. sylvatica.*
      - Male corolla tubular ..... 3. *D. Candolleana.*
    - Fruiting calyx much plicate ..... 4. *D. crumenata.*
- Albumen of seeds not ruminate; leaves always alternate.
  - Male calyx almost truncate ..... 5. *D. oocarpa.*
  - Male calyx distinctly lobed.
    - Fruit clothed with stinging hairs ..... 6. *D. pruriens.*
    - Fruit not clothed with stinging hairs.
      - Male flowers panicled.
        - Corolla urceolate, clothed outside with black velvety hairs ..... 7. *D. paniculata.*
      - Male flowers in short cymes.
        - Corolla tubular.
          - Fruiting calyx with internal elevated rim at top of its tube ..... 8. *D. Ebenum.*
        - Corolla urceolate or campanulate; stamens 8—22.
          - Anthers dehiscing by apical pores ..... 9. *D. microphylla.*
          - Anthers dehiscing by longitudinal slits.
            - Small or middle-sized trees, often spinescent.
              - Male calyx glabrous outside; staminodes 4 ..... 10. *D. montana.*
              - Male calyx hairy outside.
                - Male calyx pubescent inside; staminodes 12 ..... 11. *D. cordifolia.*
                - Male calyx glabrous inside; staminodes 7—9 ..... 12. *D. Chloroxylon.*
        - Corolla ovoid or oblong, shortly lobed; stamens 40 or more. Tree, not spinescent ... 13. *D. embryopteris.*

1. **Diospyros Melanoxylon,** *Roxb. Cor. Pl.* v. 1 (1795) p. 36, t. 46. A middle-sized deciduous tree reaching 50 ft. in height ; bark dark-grey or black, exfoliating in rectangular scales ; young parts and inflorescence clothed with grey or tawny tomentum. Leaves 2½—6 by 1—2¾ in., alternate or subopposite, coriaceous, elliptic or elliptic-oblong, obtuse or subacute, softly tawny-tomentose on both sides when young, glabrous above and pubescent beneath when mature, base usually acute, rarely rounded ; main nerves 6—10 pairs with reticulate veins between ; petioles ¼—½ in. long. MALE FLOWERS 4—6-merous, 3—12 together, in tawny-tomentose panicled drooping cymes longer than the petioles. Calyx campanulate, ⅛—¼ in. long, hairy on both sides ; lobes 4—6, shorter than the tube, subacute. Corolla more or less tubular, about twice as long as the calyx, pubescent outside, glabrous inside ; lobes 4—6, broadly ovate, acute, about ⅛ in. long. Stamens 12—16 (in pairs when 16) ; anthers linear-oblong, acuminate. FEMALE FLOWERS rather longer than the male, solitary, subsessile, 4—5-merous. Calyx hairy on both sides, 4—5-gonal. Corolla as in the male. Staminodes 8—10. Ovary densely hairy,

4—8-celled ; ovule solitary in each cell ; styles 2, bifid. Fruit yellow when ripe, ovoid or globose, 1—1½ in. long ; fruiting calyx thickly coriaceous, nearly flat, the lobes undulate, often with reflexed margins. Seeds 2—8, compressed, oblong ; testa rugose, shining ; albumen ruminate. Fl. B. I. v. 3, p. 564 ; Hiern, Monogr. Eben. (1873) p. 159 ; Trim. Fl. Ceyl. v. 3, p. 99 ; Talb. Trees, Bomb. ed. 2, p. 212 ; Watt, Dict. Econ. Prod. v. 3, p. 147. *Diospyros Tupru*, Buch.-Ham. in Trans. Linn. Soc. v. 15 (1827) p. 111 ; Hiern, Monogr. Eben. (1873) p. 158 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 563 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164. *D. Wightiana*, Wall. Cat. 4406 ; Bedd. Flor. Sylvat. t. 67. *D. exsculpta*, Buch.-Ham. in Trans. Linn. Soc. v. 15 (1827) p. 110 ; Dalz. & Gibs. p. 142. —Flowers : Feb.—Apr. VERN. *Támrag* ; *Támraj* ; *Temru*.

Common in dry deciduous forests of the Presidency, *Talbot*. KONKAN : *Stocks* ! S. M. COUNTRY : hills N. of Belgaum, *Ritchie*, 1108 !, *Gibson*.

The tree furnishes a good ebony. Mr. Talbot says that he has seen 8 inches of ebony obtained from a 16-inch tree. The fruit, though very astringent, is eaten and much appreciated during the hot season.—DISTRIB. India (W. Peninsula) ; Ceylon, not common.

Note.—I have united *D. Tupru*, Buch.-Ham., with this as has been done by Sir D. Brandis [For. Fl. (1874) p. 295]. The only distinguishing character given in Hook. f. Fl. B. I. (*l. c.*) is that the leaves of *D. Melanoxylon* are narrowed at both ends, while those of *D. Tupru* are obtuse. The leaves vary considerably, and the difference between young and mature leaves is often remarkable. There are at present in Herb. Kew. two specimens collected by Dr. Ritchie at two different seasons of the year, both from the same locality (the hills north of Belgaum) and possibly from the same tree, as both specimens bear the same number (1108 and 1108 *bis*). Of these specimens, one has been named by Mr. Clarke *D. Tupru*, and the other *D. Melanoxylon*. Mr. Talbot, who has an intimate knowledge of the tree, admitted the species *D. Tupru* in the first edition of his 'Trees and Woody Climbers,' remarking, however, that he did not know the tree as distinct from *D. Melanoxylon*, but in his second edition he unites the two species.

2. **Diospyros sylvatica,** *Roxb. Cor. Pl.* v. 1 (1795) p. 37, t. 47. A medium-sized tree reaching 60 ft. (*Talbot*) ; bark-colored, thin, smooth, the inner bark yellow. Leaves alternate, 3—5 by 1—2½ in., elliptic, acute or acuminate, membranous, glabrous and shining above, paler beneath, base usually acute ; petioles ¼—⅜ in. long. MALE FLOWERS 3—5 (usually 4) -merous, in axillary, 6—10-flowered cymes which are ¼—½ in. long ; peduncles bracteate at the base, ⅛ in. long. Calyx very small, about $\frac{1}{20}$ in. long, pubescent ; lobes short, rounded. Corolla urceolate, $\frac{1}{10}$ in. long ; lobes equalling the tube. Stamens 13—22, usually in pairs. FEMALE FLOWERS larger than the male, 3—4 (usually 4) -merous, solitary ; pedicels ¼—⅓ in. long. Calyx much longer than in the male, ⅜ in. long ; lobes ovate-oblong, acute, ⅓ in. long. Corolla ⅓ in. long. Staminodes 4, inserted on the corolla and alternate with its lobes. Ovary 6—8-celled ; ovule 1 in each cell ; styles 3 or 4. Fruit ½—¾ in. in diam., globose, smooth, dark-green ; fruiting calyx much enlarged, flat, spreading, foliaceous. Seeds 2—8, oblong, nearly ½ in. long, rugose, shining, brown ; albumen ruminate. Fl. B. I. v. 3, p. 559 ; Bedd. Icon. Pl. Ind. Or. t. 121 ; Hiern, Monogr. Eben. (1873) p. 161 ; Trim. Fl. Ceyl. v. 3, p. 98 ; Talb. Trees, Bomb. ed. 2, p. 211 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 3, p. 155.—Flowers : Jan.—Feb.

KONKAN: *Law*!; Matheran, *Dalzell*!, *Woodrow*; evergreen forests in the Konkan, *Talbot*. KANARA: evergreen forests of the Yellapur and Siddapur subdivisions of N. Kanara. *Talbot*.—DISTRIB. India (W. Peninsula); Ceylon.

3. **Diospyros Candolleana,** *Wight, Icon.* tt. 1221 & 1222. A small tree 36 ft. high (*Ritchie*); young shoots pubescent, the hairs usually medifixed. Leaves 4—6 by 1¾—2¼ in., coriaceous, elliptic-oblong, shortly and obtusely acuminate, glabrous on both sides when mature, base narrowed or rounded, often shortly cuneate; midrib strong beneath, depressed on the upper surface; lateral nerves and veins inconspicuous: petioles ⅜—½ in. long, rugose, glabrous. MALE FLOWERS sessile, in dense axillary, fulvous-pubescent clusters. Calyx ⅛—⅓ in. long, fulvous-silky-hairy on both sides; lobes 4—5, ovate-oblong, acute or subobtuse, 1/10—⅛ in. long. Corolla more than twice as long as the calyx, tubular, fulvous-hairy outside, glabrous inside; lobes 5, shorter than the tube. Stamens 10, in pairs; anthers lanceolate, very acute, glabrous. FEMALE FLOWERS larger and thicker than the male, in short axillary 2—10-flowered cymes. Calyx ⅜ in. long, hairy; lobes ¼ in. long, subacute, with reflexed margins. Staminodes 4—5 (10 in the form *canarica*, Bedd.), glabrous. Ovary 4-celled; styles 2—5, short. Fruit globose or ellipsoid, pinkish (*Ritchie*), glabrous; fruiting calyx flat or shallowly cupuliform, the lobes triangular with reflexed margins. Seeds 3—4, usually compressed; testa thin, brown; albumen ruminate. Fl. B. I. v. 3, p. 566; Dalz. & Gibs. p. 142; Bedd. For. Man. in Flor. Sylvat. p. cxliv; Talb. Trees, Bomb. ed. 2, p. 213; Watt, Dict. Econ. Prod. v. 3, p. 137 (*not* of Thwaites). *Diospyros canarica*, Bedd. Icon. Pl. Ind. Or. t. 134. *D. hirsuta*, Hiern, Monogr. Eben. (1873) p. 163 (*partly*).—Flowers: Feb.—June. VERN. *Karigida*.

Throughout the Konkan and Kanara in evergreen forests. KONKAN: *Stocks*!; near Vingorla, *Dalzell*!; near Goa, *Dalzell*! DECCAN: Phunda Ghát, *Ritchie*, ♀! S. M. COUNTRY: Rámghát, *Ritchie*, 96! KANARA: common near the coast at Karwar, *Talbot*.—DISTRIB. India (W. Peninsula).

4. **Diospyros crumenata,** *Thwaites, Enum. Ceyl. Pl.* (1860) p. 179. A very large tree with cylindric trunk, reaching 100—150 ft. high (*Talbot*); bark thin, scaly, cinereous; young branches glabrous. Leaves coriaceous, 2—5 by 1—2 in., elliptic-oblong, shortly and abruptly acuminate, finely reticulately veined, glabrous, base rounded or slightly narrowed; midrib depressed on the upper side; petioles ¼—⅓ in. long, channelled above. MALE FLOWERS in short 3—5-flowered hairy cymes. Calyx tubular, ⅛—¼ in. long, hairy outside, glabrous and shining inside; teeth very short (scarcely 1/20 in. long), triangular, acute. Corolla cream-white, tubular, coriaceous, about ½ in. long, clothed outside with appressed hairs; lobes 4, about ½ the length of the tube, recurved. Stamens about 12, subequal, glabrous, hypogynous; filaments very short; anthers linear-lanceolate, very acute. FEMALE FLOWERS solitary, larger than the male; pedicels stout, hairy, ¼ in. long. Calyx ⅓ in. long, hairy on both sides, plicate; lobes 4, broad, rounded and apiculate, with large and deep pouches between them. Corolla cream-white, tubular, fulvous-hairy outside, slightly longer than the calyx; lobes 4, tomentose on both sides and with undulate margins. Staminodes 8, inserted at the base of the corolla-

tube. Ovary hairy, 8-celled ; stigmas 4. Fruit subglobose, 1½—2 in. in diam., at length glabrous ; fruiting calyx thickened, spreading, 1½ in. in diam. Seeds black, shining, 1 by ½ in. ; albumen ruminate. Fl. B. I. v. 3, p. 567 ; Bedd. For. Man. in Flor. Sylvat. p. cxlv ; Hiern, Monogr. Eben. (1873) p. 169 ; Bedd. Icon. Pl. Ind. Or. t. 126 ; Trim. Fl. Ceyl. v. 3, p. 102 ; Talb. Trees, Bomb. ed. 2, p. 212 ; Watt, Dict. Econ. Prod. v. 3, p. 138.—Flowers : Mar.—May.

Apparently confined to Kanara, where it is common in the evergreen forests between the Gairsoppa and Dodmune Ghâts, *Talbot*; Dodmune (N. Kanara), *Talbot*, 3560!—DISTRIB. Ceylon.

5. **Diospyros oocarpa,** *Thwaites, Enum. Ceyl. Pl.* (1860) p. 180. A small or moderate-sized tree with thin smooth bark ; young shoots pubescent. Leaves alternate, subcoriaceous, 3—4½ by 1½—2¼ in., ovate-elliptic, obtusely acuminate, glabrous and shining, base usually rounded ; nerves and veins inconspicuous ; petioles ¼—⅜ in. long, somewhat flattened, rugulose. MALE FLOWERS 3—7 together, subsessile, in axillary fulvous-silky cymes ; bracts rounded, concave, silky-hairy. Calyx ⅛—⅙ in. long, cylindric, silky, subtruncate at the apex, rounded or subtruncate at the base. Corolla thick, ¼—⅓ in. long, pubescent outside ; lobes 3—4, about equalling the tube, ovate-oblong, subacute, much imbricated in bud. Stamens 9-12, unequal. FEMALE FLOWERS 1—3 together, similar to and slightly larger than the male. Ovary 6—8-celled. Fruit ¾—1 in. long, cylindric when young, ellipsoid when ripe, rounded at the top, apiculate, 6-celled, seated on the slightly enlarged funnel-shaped persistent calyx. Seed oblong ; albumen not ruminate. Fl. B. I. v. 3, p. 560 ; Hiern, Monogr. Eben. (1873) p. 171 ; Trim. Fl. Ceyl. v. 3, p. 97 ; Talb. Trees, Bomb. ed. 2, p. 210 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p 164 ; Watt, Dict. Econ. Prod. v. 3, p. 153.—Flowers : Jan.—Mar.

KONKAN : *Talbot, Dalzell*! ; Wari, *Dalzell*! ; S. Konkan *Law*! KANARA : evergreen forests of N. Kanara, common on the Ghâts from Karwar to Ainshi, *Talbot*; Ainshi Ghât, *Talbot*! ; Divimana (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula) ; Ceylon.

6. **Diospyros pruriens,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 110. A small tree ; young parts softly hirsute ; bark dark-colored, scaly. Leaves thinly subcoriaceous, 2—4 by ¾—1¾ in., elliptic-oblong, subacute or usually shortly and obtusely acuminate, fulvous-hairy on both sides, often glabrescent above except the depressed midrib, base usually rounded, sometimes subcordate ; petioles ⅒—¼ in. long, densely hirsute. MALE FLOWERS : Peduncles ⅛—⅓ in long, close together in the upper axils, usually 1—2-flowered ; pedicels 0—¼ in. long, articulated at the base ; bracts small, ovate, caducous, glabrous inside. Calyx ¼ in. long, divided nearly to the base, fulvous-hairy on both sides ; segments 4, linear-oblong. Corolla ½—¾ in. long, silky-hairy outside, glabrous inside ; lobes 4, ovate-oblong, obtuse, about as long as the tube. Stamens 13—14, glabrous, unequal hypogynous, connate at the base, shorter than the corolla-tube ; filaments as long as the anthers. Rudimentary ovary densely hairy. FEMALE FLOWERS solitary, crowded in the upper axils ; peduncles ⅒—⅛ in. long. Calyx ¼ in. long, 4—5-partite ; segments oblong, spreading, hairy on

both sides. Corolla ⅜—½ in. long, 4-fid, constricted about the middle. Staminodes 4, small. Ovary fulvous-hairy, 4-celled ; ovule 1 in each cell ; styles 2, short, almost concealed by the hairs on the ovary, bifid at the apex. Fruit ovoid-conical, ⅝—1 in. long, 4-celled, 4-seeded, densely clothed with fulvous stinging hairs, supported by the persistent deflexed non-accrescent calyx-lobes. Fl. B. I. v. 3, p. 553 ; Dalz. & Gibs. p. 141 ; Bedd. Icon. Pl. Ind. Or. t. 129 ; For. Man. in Flor. Sylvat. p. cxliv ; Hiern, Monogr. Eben. (1873) p. 185 ; Trim. Fl. Ceyl. v. 3, p. 95 ; Talb. Trees, Bomb. ed. 2, p. 210 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 3, p. 153.—Flowers : Nov.—Feb.

Southern parts of the Presidency. S. M. COUNTRY : Chorla Ghât, *Dalzell* !, *Ritchie*, 1833 !, *Woodrow*. KANARA : evergreen forests of the southern Ghâts of N. Kanara, common, *Talbot*.—DISTRIB. India (southern Ghâts of the Western Peninsula).

7. **Diospyros paniculata,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 109. A middle-sized tree with cylindric tall stem ; bark smooth, dark-colored ; branches glabrous, somewhat angular. Leaves alternate, 3½—9 by 1⅜—3 in. (Dalzell l. c. says the leaves of the female tree are twice as large as those of the male), subcoriaceous, oblong, obtusely acuminate, glabrous, finely reticulately and conspicuously veined, base rounded or very shortly narrowed ; petioles ½ in. long, wrinkled and usually transversely striate, glabrous. MALE FLOWERS ½—¾ in. long, numerous, in panicled cymes 1—1½ in. long—the axils of fallen leaves ; panicles, pedicels and buds pubescent with sooty-velvety hairs. Calyx ⅜ in. long, divided to the base, shortly nigro-pubescent on both sides ; segments foliaceous, reticulately veined, broadly elliptic, obtuse, with a thick hard internal keel and widely reflexed margins. Corolla ⅝ in. long, clothed outside with sooty-velvety hairs, glabrous inside ; tube pentagonal ; lobes ⅜ in. long, elliptic-oblong, obtuse. Stamens 20, inserted in pairs at the base of the corolla-tube, glabrous ; filaments short ; anthers linear, acute. Rudimentary ovary 0. FEMALE FLOWERS solitary, axillary ; pedicels ½—⅝ in. long, bracteate about the middle with large ovate caducous bracts. Calyx glabrescent. Ovary 4-celled ; ovule 1 in each cell. Fruit ovoid, ¾—1¼ in. long, rounded at the apex, tipped with the remains of the style, clothed with ferruginous glandular hairs ; fruiting calyx 5-lobed, enlarged, more or less plicate ; lobes ½—⅝ in. long, much widened, auricled and imbricate at the base. Cotyledons foliaceous. Fl. B. I. v. 3, p. 570 ; Dalz. & Gibs. p 141 ; Bedd. Icon. Pl. Ind. Or. t. 125 ; Hiern, Monogr. Eben. (1873) p. 190 ; Talb. Trees, Bomb. ed. 2, p. 213 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 3, p. 153.—Flowers : Nov.—Dec. VERN. *Kuri-kumar*.

S. M. COUNTRY : Chorla Ghât, *Dalzell* !, *Woodrow*. KANARA : Talaveri (N. Kanara Ghâts), *Ritchie*, 1884 ! ; Divimana, *Woodrow* ; frequent in the forests near the Nilkund and Gairsoppa Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula).

8. **Diospyros Ebenum,** *Kœnig, in Phys. Salsk. Hendl.* v. 1 (1776) p. 176. A large or moderate-sized tree with an erect trunk and leafy head ; bark thin, grey ; branchlets glabrous. Leaves

subcoriaceous, 2—6 by ¾—2½ in., glabrous, elliptic-oblong or oblong-lanceolate, obtuse or shortly and bluntly acuminate, bright-green and shining above, somewhat paler beneath, reticulately veined; petioles ⅛—½ in. long. MALE FLOWERS 3—12 (very often 3) together, subsessile, in shortly peduncled cymes; peduncles ¼ in. long; buds linear, tapering; bracts small, caducous. Calyx ⅒—⅛ in. long, infundibuliform, glabrous or slightly hairy; lobes 4, very short, rounded, ciliate. Corolla pale greenish-yellow, tubular, ⅜ in. long before expansion; lobes 4, ovate, equalling or slightly shorter than the tube. Stamens 16 or more, very unequal, often connate in twos, threes, or sometimes fours; filaments more or less pubescent; anthers linear-lanceolate, acuminate. FEMALE FLOWERS solitary, larger than the male; pedicels short, 2-bracteate. Calyx much longer than in the male, deeply divided, with an elevated 4-lobed marginal ring at its mouth; lobes 4, ovate, acute. Staminodes 8, with double anthers. Ovary glabrous, 8-celled; style 1; stigmas 4. Fruit ¾ in. in diam., subglobose; fruiting calyx a hemispheric woody cup which receives the fruit, the 4 ovate acute thickened calyx-lobes spreading outwards. Seeds 3—8, dull-back, ⅜ in.; albumen not ruminate. Fl. B. I. v. 3, p. 558; Grah. Cat. p. 108; Wight, Icon. t. 188; Bedd. Flor. Sylvat. t. 65; Hiern, Monogr. Eben. (1873) p. 208; Trim. Fl. Ceyl. v. 3, p. 94; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164; Watt, Dict. Econ. Prod. v. 3, p. 138. *Diospyros assimilis*, Bedd. Madras For. Rep. (1866-67) p. 20, t. 1; C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 558; Talb. Trees, Bomb. ed. 2, p. 210; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164. *D. nigricans*, Dalz. in Kew Journ. Bot. v. 4 (1852) p. 110 (*not* of Wall. nor Bedd.); Dalz. & Gibs. p. 141. —Flowers: Feb.—Mar. VERN. *Abnus*; *Malyá*; *Kare*.

Confined to the southern districts of the Presidency. S. M. COUNTRY: Chorla Ghát, *Dalzell & Gibson*. KANARA: evergreen forests, *Talbot*.

The wood furnishes the Ebony used for wood-carving in Kumpta and Honávar (N. Kanara). The quality is good, but large pieces are rare (*Talbot*).—DISTRIB. India (W. Peninsula, Assam); Ceylon, Malaya.

I have followed Hiern in uniting *D. assimilis*, Bedd., with this; indeed Beddome (Flor. Sylvat. t. 65) is doubtful as to their being separate species. I have not seen any authenticated specimens of Beddome's plant; there are none in Herb. Kew. Trimen (*l. c.*) points out that in the moist regions of Ceylon the leaves of *D. Ebenum* agree in form and venation with *D. assimilis*, Bedd., from S. Kanara.

9. **Diospyros microphylla,** *Bedd. For. Man. in Flor. Sylvat.* (1872) p. cxlv. A large tree 80—100 ft. high (*Talbot*), with a straight trunk, unbranched for a considerable height, buttressed at the base; bark dark, scaly; young branches verticillate, hirsute with long yellowish hairs; the older branches glabrous. Leaves ¾—2 by ½—⅞ in. (resembling those of the box tree), coriaceous, ovate-elliptic, acute or obtusely acuminate, glabrous above, sparingly hairy beneath when young, afterwards glabrous except the midrib, base tapering; petioles ½—⅛ in. long. MALE FLOWERS small, about ⅒—⅛ in. long, 4-merous, 1—4 together in subsessile minute axillary cymes. Calyx ½ in. long, densely fulvous-hairy outside; lobes 4, rounded. Corolla 4-cleft; lobes rounded, apiculate, with a line of hairs on the back. Stamens 16, united by their filaments in pairs, the inner the shorter; anthers

ovate, dehiscing by apical pores. Rudimentary ovary minute, hairy. FEMALE FLOWERS solitary, subsessile. Calyx and corolla as in the male. Staminodes 0. Ovary 4-celled, pubescent; ovule 1 in each cell; style short, 2-partite. Fruit ½—¾ by ½—⅔ in., cylindric or oblong, pointed, glabrous. Seed 1 (rarely 2); albumen not ruminate. Fl. B. I. v. 3, p. 559; Bedd. Icon. Pl. Ind. Or. (1874) t. 133; Talb. Trees, Bomb. ed. 2, p. 212; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164; Watt, Dict. Econ. Prod. v. 3, p. 150. *Diospyros buxifolia*, Hiern, Monogr. Eben. (1873) p. 218.—Flowers: Mar. VERN. *Dula; Kare-kunchal.*

KONKAN: *Stocks!*, *Law!* KANARA: *Law!*, *Gibson!*; Yellapur, ***Gibson!***; evergreen forests of N. Kanara, common on the Yellapur Ghâts, ***Talbot, 375.*** —DISTRIB. India (W. Peninsula); Malacca, Penang, Singapore, Java, Borneo.

10. **Diospyros montana,** *Roxb. Cor. Pl.* v. 1 (1795) p. 37, t. 48. A small or middle-sized tree, sometimes armed; young branches softly pubescent. Leaves 2½—4 by 1—2 in., ovate-oblong or elliptic, subacute or obtusely acuminate, more or less softly puberulous or tomentose when young, at length glabrous; base rounded, acute, or sometimes truncate; petioles ⅛—⅜ in. long. MALE FLOWERS in short, few-flowered panicles; pedicels bracteate at the base; bracts ovate, acute, strongly ciliate; buds ovoid, acute. Calyx ⅛ in. long, 4-lobed, glabrous outside and inside; lobes ⅒ in. long, broadly ovate, acute, ciliate, much enlarged in fruit. Corolla white, urceolate, about 3 or 4 times as long as the calyx; lobes a little shorter than the tube. Stamens 16, in 2 rows of 8, in opposite pairs united at the base, the outer the longest; anthers about ⅛ in. long (including the awn), lanceolate, usually with a long slender awn, glabrous. Rudimentary ovary fleshy, with 4 acute teeth at the apex. FEMALE FLOWERS axillary, solitary; pedicels nodding, stout, ⅛—⅓ in. long, with 2 small ovate bracts a little above the middle. Calyx ⅓ in. long, glabrous; lobes ¼ in. long, glabrous inside, ovate-oblong, obtuse. Corolla as in the male. Staminodes 4. Ovary globular, glabrous, 8-celled; ovule solitary in each cell; styles 4, bifid at the apex, glabrous. Fruit globose, 1—1½ in. in diam., supported by the persistent calyx whose lobes are slightly enlarged and reflexed, reddish-brown. Seeds 2—8. Fl. B. I. v. 3, p. 555 (in part); **Grah. Cat. p. 107; Dalz. & Gibs.** p. 142; Wight, Icon. t. 1225; Trim. Fl. Ceyl. v. 3, p. 92 (in part); Talb. Trees, Bomb. ed. 2, p. 211 (in part); Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163; Watt, Dict. Econ. Prod. v. 3, p. 150 (in part). VAR. *montana proper*, Hiern, Monogr. Eben. (1873) p. 222. *Diospyros Goindu*, Dalz. in Kew Journ. Bot. v. 4 (1852) p. 111; Dalz. & Gibs. p. 141.—Flowers: Jan.—Apr. VERN. *Goindu.*

KONKAN: *Stocks!*; hills eastward of Panwell, *Graham*, *Woodrow*; Karanja hill, *Dalzell!* S. M. COUNTRY: hills north of Belgaum, *Ritchie*, 972! KANARA: Mandele (N Kanara), *Ritchie*, 972!; Kála naddi, *Ritchie*, 972!; N. Kanara Ghâts, *Talbot*.—DISTRIB. Throughout India; Ceylon, Malaya, Tropical Australia.

11. **Diospyros cordifolia,** *Roxb. Cor. Pl.* v. 1 (1795) p. 38, t. 50. A small tree with strong often branched thorns scattered over the trunk and larger branches. Leaves 1½—2¾ by ⅝—¾ in., oblong, obtuse,

velvety on both sides, base rounded, cordate, or subtruncate ; petioles ⅛—¼ in. long. MALE FLOWERS axillary ; peduncles bearing usually 3 flowers at their apex ; pedicels 1/16 in. long. Calyx ⅛ in. long, hairy outside ; lobes ⅛—⅛ in. long, elliptic, obtuse or subacute, pubescent inside and with ciliolate margins. Corolla white, ⅛ in. long, slightly pubescent outside ; lobes ⅛ in. long, ovate-oblong, subacute. Stamens 16, in 2 rows of 8, in opposite pairs united at the base ; anthers 1/10 in. long, linear-oblong, obtuse or subobtuse, not awned, pubescent. FEMALE FLOWERS solitary ; pedicels ¼ in. long ; bracteoles 1/16 in. long, oblong, obtuse, hairy and ciliate. Calyx ¼—⅓ in. long, glabrous or puberulous on both sides, deeply divided ; lobes ⅛—¼ in. long, oblong, obtuse. Corolla white, ¼—⅓ in. long ; lobes obtuse. Staminodes 12 in a single row, lanceolate ; filaments long. Ovary globose, glabrous ; styles 4, erect, bifid. Fruit ½—1 in. in diam., globose, yellow when ripe. Bedd. For. Man. in Flor. Sylvat. p. cxliii. *D. montana,* C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 555 (in part). *D. montana,* var. *cordifolia,* Hiern, Monogr. Eben. (1873) p. 222.—Flowers : Mar.—Apr.

KANARA : tolerably common in N. Kanara ; Mandgod (N. Kanara), *Talbot* ! ; N. Kanara, *Kanitkar* !—DISTRIB. India (W. Peninsula) ; Ceylon.

Hiern (Monogr. Eben. p 222) unites this with *D. montana,* Roxb., of which he makes it a variety. The points of difference between the two plants are however, I think, sufficient to maintain them as separate species. *D. cordifolia* differs from *D. montana* in the leaves, the number of staminodes, the male inflorescence (which is paniculate in *D. montana* and consists of 3 shortly-pedicelled flowers at the apex of the peduncle in *D. cordifolia*), the male calyx (which is hairy in *D. cordifolia* and glabrous in *D. montana*), and in the anthers of the fertile stamens, which in *D. montana* are lanceolate, glabrous, and usually awned, while in *D cordifolia* they are linear, hairy, obtuse, and awned.

12. **Diospyros Chloroxylon,** *Roxb. Cor. Pl.* v. 1 (1795) p. 38, t. 49. A small tree, sometimes spinescent ; bark deeply cracked ; branchlets tomentose. Leaves alternate, thinly coriaceous, 1—2¼ by ½—1¼ in., elliptic, obovate or elliptic-oblong, obtuse or subacute, more or less pubescent above, rusty-tomentose or fulvous-pubescent beneath ; base acute or obtuse ; nerves inconspicuous ; petioles 1/10—¼ in. long, densely hairy. Inflorescence densely fulvous-pubescent ; flowers white, 4-merous. MALE FLOWERS 4—10 together, subsessile on a short hairy peduncle 1/12 in. long ; bracts small, elliptic. Calyx subglobose, 1/10 in. long, densely fulvous-hairy, deeply divided ; segments 4, rounded, apiculate, ciliate, glabrous inside. Corolla 4-fid ; lobes acute, with a line of hairs on the back of each lobe. Stamens 16, glabrous, in 2 rows, the inner smaller ; anthers ovate, acute, as long as the longer filaments. FEMALE FLOWERS solitary, sessile, 4-merous. Calyx ⅛ in. long, fulvous-hairy ; lobes twice as long as the tube. Corolla as in the male but longer. Staminodes 7—9, glabrous, 1-seriate. Ovary glabrous, 8-celled ; styles 4, erect, glabrous. Fruit globose, ⅓ in. in diam., glabrous, edible ; fruiting calyx nearly flat, ⅓ in. in diam. Seeds 2—3 ; albumen not ruminate. Fl. B. I. v. 3, p. 560 ; Dalz. & Gibs. p. 140 ; Hiern, Monogr. Eben. (1873) p. 233 ; Talb. Trees, Bomb. ed. 2, p. 212 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 3, p. 137. *Diospyros*

capitulata, Wight, Icon. tt. 1224, 1588 (*bis*).—Flowers: June. VERN. *Ninai*; *Nensi*.

DECCAN: Nasik, *Dalzell & Gibson*; Peint road 6 miles N. of Nasik, *Woodrow*. GUJARAT: common about Surat on the north side of the river, *Dalzell & Gibson*.—DISTRIB. India (Central and Southern India, Orissa, Carnatic).

13. **Diospyros embryopteris**, *Pers. Syn.* v. 2 (1807) p. 624. A small or middle-sized tree, glabrous except the very young parts and the inflorescence; branches numerous, spreading, forming a dense shady head; bark smooth, thick, blackish, flaking off in large pieces. Leaves variable in size, numerous, distichously spreading, coriaceous, 4—11 by 1—3½ in., oblong or oblong-lanceolate, obtuse or subacute, glabrous and shining, reticulately veined, the veins prominent in dried specimens, obscure in fresh ones, base usually tapering; petioles ⅜—¾ in. long, stout, wrinkled. MALE FLOWERS in shortly-peduncled, fulvous-pubescent, racemose, axillary, drooping cymes containing 2—7 flowers. Calyx ¼ in. long, hairy outside; lobes 4, broadly ovate, ⅛ in. long, pubescent inside and with ciliate margins. Corolla ⅜ in. long; lobes ⅛—⅛ in. long, very thick, rounded at the apex and with a pubescent patch on the back of each lobe, imbricate. Stamens 24—64 (usually 40) in pairs, inserted at the base of the corolla-tube or on the receptacle beneath it; filaments hairy, about $\frac{1}{16}$ in. long; anthers ¼ in. long, nearly equal, linear with a line of hairs up the middle. Rudimentary ovary a lobed fleshy disk. FEMALE FLOWERS larger than the male, 1 in. across, usually solitary, axillary, drooping; pedicels very short. Calyx deeply divided, glabrous or pubescent; segments 4, erect, broadly ovate, acute, dilated and subcordate at the base. Corolla ½ in. long, campanulate, deeply divided; lobes 4, cordate, obtuse, recurved. Staminodes 1—12, hairy, usually inserted at the base of the corolla-tube (sometimes perhaps true stamens). Ovary glabrous or hairy, 8-celled; styles 4; stigmas lobed and undulate. Fruit large, 1½—3 in. in diam., usually solitary, subglobose, yellow, covered with a rusty easily detachable scurfiness, 8-celled, supported on the much enlarged persistent spreading or reflexed calyx; pericarp thin; pulp viscid and glutinous. Seeds 4—8, flattened, smooth, reddish-brown. Fl. B. I. v. 3, p. 556; Bedd. Flor. Sylvat. t. 69; Hiern, Monogr. Eben. (1873) p. 257; Trim. Fl. Ceyl. v. 3, p. 93; Talb. Trees, Bomb. ed. 2, p. 211; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163; Watt, Dict. Econ. Prod. v. 3, p. 141. *Diospyros glutinosa*, Kœnig, ex Roxb. Hort. Beng. (1814) p. 40; Grah. Cat. p. 107.—Flowers: Mar.—May. VERN. *Temburi*.

Near creeks and backwaters along the coast of the Konkans and N. Kanara, also in evergreen forests of the Ghâts and in the beds of rivers and streams, *Talbot*. KONKAN: hilly parts of Salsette, *Graham*, *Woodrow*; without locality, *Ritchie*, 1831!—DISTRIB. Throughout India; Ceylon, Siam, Malayan Archipelago.

The unripe fruit is very astringent and an extract is employed in medicine.—It is also used as a tan for fishing-nets. The viscid pulp is used as glue for bookbinding and also as tar for caulking the seams of boats. See Watt, Dict. Econ. Prod. l. c.

Diospyros Kaki, Linn. f. Suppl. (1781) p. 439. A native of the Khasia hills, China and Japan, occasionally, though rarely, cultivated in Bombay for its edible fruit, which is yellow, about as large as an orange, and known as the *Chinese Fig* or *Chinese Plum*. Fl. B. I. v. 3, p. 555 ; Grah. Cat. p. 107 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 163 ; Watt, Dict. Econ. Prod. v. 3, p. 145.—VERN. *Káki*.

ORDER LXXIX. **STYRACACEÆ.**

Trees or shrubs. Leaves alternate, simple ; stipules 0. Flowers usually white (rarely red), regular, hermaphrodite (in the Indian species), usually in axillary or terminal simple or compound spikes or racemes ; bracts usually small, sometimes obsolete. Calyx gamosepalous ; tube more or less adnate to the ovary ; limb 5 (rarely 4) -lobed or truncate, persistent. Corolla-tube reduced to a mere ring ; petals 5 (rarely more), almost free, imbricate (in the Indian species). Stamens adnate in one or more series to the petals, double their number or indefinite ; filaments free or connate ; anthers round or linear. Ovary more or less inferior, 2—5-celled ; ovules usually 2 on the inner angle of each cell, pendulous ; style undivided, filiform or rather thick ; stigma capitate, entire or lobed. Fruit drupaceous, usually 1 (rarely 2—3) -seeded. Seeds albuminous ; embryo straight or curved.—DISTRIB. Warmer regions of Asia, Australia, and America ; genera 7 ; species about 350.

1. **SYMPLOCOS**, Linn.

Trees or shrubs, usually glabrous. Leaves often turning yellow when dry, alternate, coriaceous or membranous, toothed or entire. Flowers usually white, in axillary spikes or racemes, sometimes reduced to few-flowered fascicles or to a single flower ; bracts usually solitary at the base of each pedicel, caducous ; bracteoles 1—3 beneath the flower. Calyx-tube adnate, short when in flower, often enlarged in fruit ; lobes 5, imbricate. Petals 5 in 1 series, or 6—10 in 2 series, free almost or entirely to the base, or obscurely connate (rarely connate into a tube), imbricate. Stamens usually numerous, ∞ -seriate, adnate to the corolla-tube or to the petals, the outer the longer ; filaments filiform or flattened at the base ; anthers short, dehiscing longitudinally. Ovary inferior (in the Indian species), 3 (rarely 2 or 4) -celled ; ovules 2, pendulous from the inner angle of each cell ; style usually filiform ; stigma capitate or small, scarcely lobed. Drupe ellipsoid or subglobose ; stone usually woody, often ribbed, 1—3-seeded. Seeds oblong ; embryo terete, straight or curved, in the centre of fleshy albumen ; cotyledons much shorter than the radicle.—DISTRIB. Warmer regions of Asia, Australia, and America ; species about 280.

Fruit ⅛—¼ in. in diam., globose; bracteoles 3, minute. 1. *S. spicata*.
Fruit ½ in. long, ovoid-oblong; bracteoles 2, ovate, acuminate, ⅛ in. long, shorter than the ovate bract... 2. *S. Beddomei*.

Fruit 1¼ in. long, ovoid; bract and bracteoles not known. ..... 3. *S. kanarana.*
Fruit unknown; bracteoles lanceolate, as long as the ovate bract..... 4. *S. Stocksii.*

1. **Symplocos spicata,** *Roxb. Hort. Beng.* (1814) p. 40. A small or middle-sized tree or large shrub ; young parts glabrous except the inflorescence. Leaves variable in form and texture, 3—6 by 1¼—2¾ in., coriaceous or chartaceous, elliptic or elliptic-lanceolate, acute or acuminate, glabrous and shining, crenate, serrate or subentire (sometimes leaves with all 3 kinds of margin on the same plant), base acute ; main nerves 6—8 pairs, not conspicuous ; petioles ¼—½ in. long. Flowers yellowish-white, fragrant, sessile, in long (often branched) axillary glabrous or pubescent spikes, which are solitary or 2—3 from the same axil and 2—6 times as long as the petiole ; bracteoles 3, beneath and embracing each flower, 1/20 in. long, ovate, pubescent. Calyx 1/10 in. long, glabrous ; lobes rounded, about equalling the tube. Corolla divided almost to the base ; petals ⅛ in. long, oblong, rounded at the apex. Stamens about 40. Style slender, without a ring of hairs at the base. Fruit ⅓—½ in. long, globose, surmounted by a very short cylindric tube which is scarcely 1/10 in. high. Stone fluted. Wight, Ill. t. 150 ; Bedd. For. Man. in Flor. Sylvat. p. cxlix ; Gürke, in Engl. & Prantl, Pflanzenf. v. 4, part 1, p. 169, fig. 88, H ; Trim. Fl. Ceyl. v. 3, p. 104 ; Talb. Trees, Bomb. ed. 2, p. 214 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 400. *Symplocos spicata,* var. *laurina,* C. B. Clarke, in Hook. f. Fl. B. I. v. 3, p. 573. *S. laurina* (sp.), Wall. Cat. 4416 ; Grah. Cat. p. 104. *Hopea spicata,* Dalz. & Gibs. p. 140.—Flowers : Sept.—Dec. VERN. *Mirjoli.*

KONKAN : *Dalzell* !, *Law* !, *Stocks* ! S. M. COUNTRY : Castlerock, *Cooke* ! ; Rámghát, *Ritchie,* 953 !, *Law* ex *Graham.* KANARA : *Law* ! ; evergreen forests of N. Kanara Ghâts, common, *Talbot* ; Kála naddi, *Ritchie,* 953 ! ; Jagalbet, *Ritchie,* 953 !—DISTRIB. Throughout a great part of India in the hilly country ; Ceylon, China, Japan, Australia.

The stones of the fruit are strong as beads to make necklaces ; the leaves are used in the Darjeeling hills to give a yellow dye (*Gamble*).

2. **Symplocos Beddomei,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 3 (1882) p. 582. A moderate-sized very beautiful tree with a shady head ; bark often marked with white patches. Leaves crowded at the ends of the branches, subcoriaceous, 4—6 by 1¾—2½ in., elliptic-oblong, acute or acuminate, glandular-serrate, crenate, or subentire, glabrous on both sides, polished and shining above, base narrowed ; nerves 6—10 pairs ; petioles ⅜ in. long. Flowers sessile or shortly pedicelled, white, fragrant (having the odor of hawthorn), in pubescent spikes or racemes 2—5½ in. long, each flower embraced in bud by a large broadly ovate acute foliaceous hairy and ciliate reticulately veined deciduous bract ⅓—½ in. long ; bracteoles 2, foliaceous, ovate, acuminate, hairy, ciliate, ⅓ in. long. Calyx ⅛ in. long, glabrous ; lobes 5, ovate, 1/10 in. long, subacute. Corolla divided to the base, the segments scarcely connate ; petals ¼ in. long, oblong, obtuse, either 5 in one series or 6, 7 or even 8 in two series. Filaments united in bundles attached to the very base of the petals. Style thick, with a ring of hairs and orange-colored glands at the base. Fruit ovoid-

oblong, ½ by ¼ in., dark-blue (becoming dirty-yellow when dry), surmounted by the distinct calyx-lobes. Talb. Trees, Bomb. ed. 2, p. 214 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164. *Symplocos reticulata*, C. B. Clarke, in Hook. f. Fl. B. I. 1. c. (a misprint for *Symplocos racemosa*) ; Brand (*Symploc.*), in Engl. Pflanzenreich (1901) p. 59. *S. racemosa*, Grah. Cat. p. 104 (*not* of Roxb.). *Hopea racemosa*, Dalz. & Gibs. p. 140.—Flowers : Nov.—Jan. VERN. *Lenda.*

KONKAN : *Stocks* !, *Law* ! ; Amboli Ghát, *Kanitkar* ! DECCAN : Mahableshwar, *H. M. Birdwood*, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Belgaum, *Law* ! ; Chorla Ghát, *Dalzell* ! ; Castlerock, *Bhiva* ! KANARA : *Law* ! ; Supa, *Ritchie*, 1826 ! ; N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula).

In the 'Flora of British India' there is an evident misprint, *S. reticulata* having been erroneously substituted for *S. racemosa*, which is Graham's citation (*l. c.*). Both the 'Index Kewensis' and Brand, in Engl. Pflanzenreich (*l. c.*), have adopted the erroneous citation, and have given *S. reticulata*, J. Grah. Cat. Bo. Pl. p. 104, as a species, whereas no such species exists.

3. **Symplocos kanarana,** *Talb. in Journ. Bomb. Nat. Hist. Soc.* v. 11 (1897) p. 238, t. 9. A small tree. Leaves 3—6 by 1—2½ in., ovate, long-acuminate, crenate-serrate, chartaceous, glabrous, shining above ; main nerves 5 pairs ; petioles ⅓ in. long. Flowers in short axillary spikes. Fruit ovoid, smooth, ridged, 1¼ by ½ in. ; stone 1 in. long, with 6 very deep longitudinal furrows and sharp narrow ridges between, rough, surrounded by a copious olive-green pulp ; when dry the fruit turns yellow and becomes obtusely angled. Talb. Trees, Bomb. ed. 2, p. 214.

KANARA : evergreen forests of Sirsi subdivision of N. Kanara, in fruit in May, *Talbot*, 3673 !

There is but 1 specimen of the plant (in fruit) in Herb. Kew. The deep furrows of the stone are remarkable. The description has been taken from that by Mr. Talbot (*l. c.*), who has not as yet found a flowering specimen.

4. **Symplocos Stocksii,** *Brand* (*Symploc.*), *in Engl. Pflanzenreich* (1901) p. 59. A tree ; young branches hirsute. Leaves 4—6 by 1½—2¼ in., elliptic, serrate, quite glabrous on both sides, shortly apiculate, base cuneate. Spikes rusty-pubescent, 4—6 times as long as the petiole. Bracts hirsute, the middle one ovate, the lateral lanceolate, all of the same length and equalling or overtopping the calyx. Calyx glabrous ; lobes rounded, slightly longer than the tube. Corolla twice as long as the calyx, 5—6-partite. Stamens about 80, scarcely longer than the corolla. Ovary puberulous. Fruit unknown.

Brand described this species from a specimen collected by Stocks in the Konkan and ticketed *S. Gardneriana*. There are no specimens in Herb. Kew., and the fruit has not been seen by Brand. From Brand's description the plant seems to be very close to if not actually *S. Beddomei*, the corolla of which is often 6-partite, and of which Brand had apparently seen only 1 specimen.

ORDER LXXX. OLEACEÆ.

Trees or shrubs, the latter often scandent. Leaves opposite (rarely alternate or verticillate), simple or 3-few-foliolate, entire or toothed ; stipules 0. Flowers hermaphrodite, often dimorphous (rarely dicecious or polygamous), regular, in terminal or axillary

cymes or panicles (rarely fascicled or racemose). Calyx free (rarely 0), usually small, campanulate, truncate or 4 (sometimes 5—9) -lobed. Corolla usually gamopetalous (rarely 4—9-petalled or 0); tube long or short; lobes or petals 4—12, imbricate or induplicate-valvate in bud. Stamens usually 2 (in Indian species), inserted on the corolla or (in the polypetalous or apetalous genera) hypogynous; filaments usually short; anthers rather large, ovate-oblong (rarely linear), dehiscing on the margin or subextrorsely. Ovary free, 2-celled; ovules 1—2 (rarely 3—4) in each cell, attached to the inner angle near the apex or base; style usually short; stigma simple or 2-lobed. Fruit capsular, loculicidally 2-valved or indehiscent, or a berry or a drupe. Seeds solitary or 2 in each cell, erect or pendulous; testa usually thin; albumen fleshy or horny, often oily or 0; embryo straight; radicle inferior or superior.—DISTRIB. Throughout the tropical and temperate regions of the world; genera 18; species about 280.

Corolla-lobes imbricate.	
Seeds erect; radicle inferior.	
Shrubs usually scandent; fruit of 2 berry-like carpels, one carpel sometimes wanting.....	1. JASMINUM.
An erect large shrub or small tree; fruit a bipartite compressed capsule.....	2. NYCTANTHES
Seeds pendulous, winged; radicle superior.	
Fruit a woody pyriform loculicidally dehiscent capsule	3. SCHREBERA.
Corolla-lobes valvate.	
Corolla of distinct petals, free or connate in pairs.	4. LINOCIERA.
Corolla tubular or 0; inflorescence axillary.....	5. OLEA.
Corolla infundibuliform; inflorescence terminal...	6. LIGUSTRUM.

1. **JASMINUM,** Linn.

Branched shrubs, erect or scandent. Leaves opposite (rarely alternate), simple, 3-foliolate or imparipinnate. Flowers often handsome, in cymes at the ends of the branches (rarely solitary). Calyx 4—9-toothed or -lobed or almost -partite. Corolla hypocrateriform, white, pink or yellow; tube narrow; lobes 4—12, spreading, imbricate in bud. Stamens 2, included in the corolla-tube; filaments very short; anthers attached at the back near the base, the connective usually mucronate. Ovary 2-celled; ovules usually 2 in each cell, attached near the base; style cylindric; stigma at length usually 2-fid. Berry didymous or often by suppression simple; carpels globose, ellipsoid or elongate. Seed usually solitary in each carpel, erect; albumen 0; cotyledons plano-convex; radicle inferior.—DISTRIB. Asia, Africa, and Australia, 1 species indigenous in S. Europe, many species cultivated in various countries; species about 90.

Leaves simple.	
Calyx pubescent.	
Calyx-teeth in flower twice the length of the tube or longer.	
A suberect shrub	1. *J. Sambac.*
Climbing shrubs.	
Bracts linear-subulate	2. *J. malabaricum.*
Bracts foliaceous.	
Velvety-pubescent; bracts green or 0.....	3. *J. pubescens.*
Fulvous hairy; bracts white.....	4. *J. Rottlerianum.*

Calyx-teeth in flower less than twice as long as the tube.
Calyx-teeth linear, subclavate ..... 5. *J. arborescens.*
Calyx-teeth minute, narrowly triangular..... 6. *J. Roxburghianum.*
Calyx glabrous; tube more or less ribbed..... 7. *J. Ritchiei.*
Leaves compound (trifoliolate).
Lateral leaflets very small, sometimes wanting..... 8. *J. auriculatum.*
Lateral leaflets nearly as large as the terminal..... 9. *J. flexile.*

1. **Jasminum Sambac,** *Ait. Hort. Kew.* v. 1 (1789) p. 8. A suberect shrub, scarcely climbing; young branches pubescent. Leaves opposite, membranous, 1½—4½ by ⅞—2½ in., variable in shape, usually broadly ovate or elliptic, acute, obtuse or acuminate, entire, glabrous or nearly so, base rounded or subcordate, rarely acute; main nerves 4—6 pairs; petioles ⅛—¼ in. long, hairy. Flowers white, very fragrant, solitary or usually in 3-flowered (many-flowered in cultivation) terminal cymes; bracts linear-subulate; pedicels ¼ in. long, hairy. Calyx ⅜—½ in. long, hairy; teeth 5—9, linear-subulate, ¼—⅜ in. long. Corolla-tube ½ in. long; lobes as long as the tube, narrowly oblong, acute or obtuse (in cultivation orbicular, *Clarke*). Ripe carpels 1—2, subglobose, ¼ in. in diam., black surrounded by the suberect calyx-teeth. Fl. B I. v. 3, p. 591; Grah. Cat. p. 110; Dalz. & Gibs. p. 137; Wight, Icon. t. 704; Talb. Trees, Bomb. ed. 2, p. 216; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164; Watt, Dict. Econ. Prodr. v. 4, p. 544.—Flowers more or less throughout the year. VERN. *Bat-mogará*

Throughout the Presidency, widely cultivated, doubtfully wild. Often found in waste places near villages.

The plant, of which the flowers are much valued for their fragrance, is known as the *Arabian* or *Tuscan* Jasmine. It becomes somewhat variable under cultivation.—DISTRIB. Cultivated throughout India and in the tropics of both hemispheres.

2. **Jasminum malabaricum,** *Wight, Icon.* t. 1250 (1850). A large climbing shrub; stem sometimes as thick as a man's arm. Leaves opposite, membranous, 3—4½ by 2—2½ in., broadly ovate, acuminate, entire, glabrous, base rounded, sometimes cordate; main nerves about 8 or 9 pairs; petioles ½—1 in. long, jointed a little above the base, glabrous. Flowers white, fragrant, in lax trichotomous compound many-flowered (sometimes 40—50) terminal cymes; bracts ¼—⅜ in. long, linear-subulate; pedicels ⅛—¼ in. long, pubescent. Calyx ½ in. long, pubescent; teeth 5—7, subulate from a slightly broader base, usually reflexed, ⅓ in. long, hairy. Corolla glabrous; tube ¾—⅞ in. long; lobes 6—10, oblong or lanceolate, ¾ in. long, very acute. Fl. B. I. v. 3, p. 594. *Jasminum arborescens,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164. *J. latifolium,* Grah. Cat. p. 110; Dalz. & Gibs. p. 138 (*not* of Roxb.). *J. arborescens,* var. *latifolia,* Talb. Trees, Bomb. ed. 2, p. 216 (*not* of C. B. Clarke).—Flowers: Mar.—May. VERN. *Kusar.*

KONKAN: *Law!*; Matheran, *Cooke!*; Elephanta, *Graham*; Kanheri jungles, *Graham.* DECCAN: Mahableshwar, common, *Cooke!*, *Graham.* KANARA: moist forests of N. Kanara, common, *Talbot.*—DISTRIB. India (W. Peninsula).

This plant has been long considered in Bombay to be the *Jasminum latifolium* of Roxburgh, but a comparison of Wight's figure of that plant (t. 703) with that of *J. malabaricum* (t. 1250) will at once shew the difference

between the two. The mistake appears to have originated with J. Graham, who assumed the Bombay plant to be *J. latifolium*, Roxb. Wight at the time (1839) had not described *J. malabaricum*, which he did in 1850. Dalzell & Gibson perpetuated Graham's mistake, which has hitherto remained uncorrected.

3. **Jasminum pubescens,** *Willd. Sp. Pl.* v. 1 (1797) p. 37. A scandent shrub ; young branches clothed with velvety pubescence or tomentum. Leaves opposite, 1½—2¾ by ⅝—1½ in., ovate, acute, often mucronate, softly pubescent or tomentose on both surfaces, often at length glabrate above, base rounded or often cordate ; main nerves 4—6 pairs ; petioles ¼—⅜ in. long, densely villous. Flowers white, sessile, in dense terminal capitate cymes often at the extremities of short axillary branches ; bracts large, ovate, acute, foliaceous, green. Calyx ½—⅝ in. long, densely fulvous-villous ; teeth ⅛—½ in. long, subulate, fulvous-hairy. Corolla glabrous ; tube ¾—⅞ in. long ; lobes 6—9, elliptic-oblong, acute, often mucronate, ½ in. long. Carpels 1—2, grobose, ¼ in. in diam., black, surrounded by the suberect calyx-teeth. Fl. B. I. v. 3, p. 592 ; Grah. Cat. p. 110 ; Dalz. & Gibs. p. 138 ; Talb. Trees, Bomb. ed. 2, p. 216 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 4, p. 544. *Jasminum hirsutum,* Willd. l. c. p. 36 ; Wight, Icon. t. 702. *J. bracteatum,* Roxb. Hort. Beng. p. 3 ; Dalz. & Gibs. p. 138.—Flowers : Dec.—Feb. VERN. *Rán-mogará.*

KONKAN : *Nimmo* ex *Graham, Dalzell & Gibson*; Mumbra near Tanna, *Cooke*!, *Woodrow*. S. M. COUNTRY : near Belgaum, *Ritchie,* 1838! KANARA : moist forests of N. Kanara, *Talbot*.—DISTRIB. Throughout India, often cultivated in gardens; China.

4. **Jasminum Rottlerianum,** *Wall. Cat.* 2865. A scandent fulvous-hairy shrub ; branches terete, velvety. Leaves opposite, 1¾—4 by 1—1¾ in., elliptic, acute or acuminate, softly hairy on both surfaces or glabrate above, base usually rounded ; main nerves about 6 pairs ; petioles ⅛—¼ in. long, jointed in the middle, densely villous. Flowers white, in terminal cymes ; peduncles hairy, usually 3, each bearing a small fascicle of flowers at the apex ; pedicels ¼—½ in. long, stout, hairy ; bracts white, ⅜—⅝ in. long, lanceolate, acuminate, more or less pubescent, ciliate. Calyx ⅓ in. long, hairy ; teeth ¼ in. long, subulate, hairy. Corolla glabrous ; tube ¾—1 in. long ; lobes 5—7, oblong, obtuse, apiculate, ½ in. long. Fruit ellipsoid, ½ by ⅓ in., smooth, black. Fl. B. I. v. 3, p. 593 ; Dalz. & Gibs. p. 138 ; Wight, Icon. t. 1249 ; Talb. Trees, Bomb. ed. 2, p. 216.—Flowers : Jan.—Mar.

KONKAN : Sivapur jungles, Wari country, *Dalzell & Gibson.* KANARA : common in the evergreen forests of N. Kanara, *Talbot*; 10 miles west of Supa, *Ritchie,* 1837!—DISTRIB. India (W. Peninsula).

5. **Jasminum arborescens,** *Roxb. Hort. Beng.* (1814) p. 3. A large shrub (climbing in the var. *latifolia*) ; branchlets hairy. Leaves opposite, 3—4½ by 1½—2 in., ovate, acute or acuminate, pubescent or tomentose when young, often glabrous when mature, base rounded or cordate, sometimes truncate ; main nerves 6—8 pairs ; petioles ¼—½ in. long. Flowers white, in lax trichotomous 12—20-flowered terminal hairy cymes ; bracts linear-subulate, ¼—½ in. long ; pedicels ¼—½ in.

long. Calyx hairy ; teeth $\frac{1}{10}$—$\frac{1}{8}$ in. long, linear, subclavate. Corolla glabrous ; tube $\frac{3}{8}$—$\frac{1}{2}$ in. long ; lobes 10 or 12, linear-lanceolate, acute, $\frac{1}{2}$—$\frac{5}{8}$ in. long. Carpels usually solitary, ellipsoid, $\frac{1}{2}$ by $\frac{1}{4}$—$\frac{1}{3}$ in., unsymmetric, black. Fl. B. I. v. 3, p. 594 ; Wight, Icon. t. 699 ; Watt, Dict. Econ. Prod. v. 4, p. 541.

I doubt much if this plant or its var. *latifolia*, C. B. Clarke, is to be found wild within the limits of the Bombay Presidency. It has not, as far as I know, been found there by any plant-collector. There is in Herb. Kew. a specimen collected by Stocks from a *garden* in Sind and another specimen by the same collector marked "Herb. Stocks," but without any locality assigned to it. This specimen may or may not have been obtained from the same place as the former. Again, there is a specimen from Dalzell ticketed "cultivated in Sind," and another scrap from the same collector without any locality assigned.

6. **Jasminum Roxburghianum,** *Wall. Cat.* (1828) 2870. A villous climbing shrub ; branchlets softly pubescent. Leaves opposite, 1—5 by $\frac{7}{8}$—$2\frac{3}{4}$ in., ovate, acute (rarely acuminate), softly pubescent on both sides ; base rounded or shortly subcuneate ; main nerves 6—8 pairs ; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long, densely pubescent. Flowers in lax trichotomous densely villous many-flowered cymes ; bracts subulate, hairy ; pedicels $\frac{1}{8}$—$\frac{1}{2}$ in. long, villous. Calyx $\frac{1}{8}$—$\frac{1}{6}$ in. long, densely villous ; teeth small or minute, marrowly triangular. Corolla glabrous ; tube $\frac{1}{4}$—$\frac{3}{8}$ in. long ; lobes $\frac{3}{8}$—$\frac{1}{2}$ in. long, linear, acute. Carpel usually solitary, $\frac{1}{2}$ by $\frac{1}{4}$ in., ellipsoid, smooth, black. Fl. B. I. v. 3, p. 595 ; Talb. Trees, Bomb. ed. 2, p. 216.—Flowers : Mar.—May.

Perhaps only a villous variety of *Jasminum arborescens*, Roxb.

KANARA : deciduous forests of N. Kanara near Sambrani, Haliyal taluka, *Talbot* ; Kála naddi, *Ritchie*, 1840 !—DISTRIB. India (W. Peninsula).

7. **Jasminum Ritchiei,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 3 (1882) p. 598. A climbing branched shrub, glabrous or nearly so. Leaves opposite, $1\frac{1}{2}$—$4\frac{1}{2}$ by $\frac{3}{4}$—$1\frac{3}{4}$ in., elliptic, acuminate, glabrous above, glabrous or hairy on the nerves beneath, base cuneate ; main nerves 4—5 pairs, often tufted in the axils ; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long. Flowers white, in few (3—9) -flowered, very lax, often subpaniculate cymes ; bracts linear-subulate, $\frac{1}{4}$ in. long ; pedicels $\frac{1}{2}$—1 in. long. Calyx $\frac{1}{8}$ in. long ; tube campanulate, more or less ribbed, glabrous ; teeth $\frac{1}{12}$—$\frac{1}{8}$ in. long, linear or sometimes subtriangular, often ciliate. Corolla glabrous ; tube $\frac{5}{8}$—$\frac{3}{4}$ in. long ; lobes $\frac{3}{8}$—$\frac{1}{2}$ in. long, linear, acute. Carpels solitary, $\frac{1}{3}$ in. in diam., almost accurately spherical. Talb. Trees, Bomb. ed. 2, p. 216 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164.—Flowers : Aug.—Sept.

S. M. COUNTRY : Belgaum, *Stocks* ! ; Belgaum south, *Ritchie*, 444 ! ; Castlerock, *Woodrow*. KANARA : evergreen forests of N. Kanara, common on the Ghâts from Ainshi southwards, *Talbot* ; Chandavar, *Woodrow* ; Supa, *Ritchie*, 1839 !—DISTRIB. India (W. Peninsula).

8. **Jasminum auriculatum,** *Vahl, Symb. Bot.* v. 3 (1794) p. 1 A scandent shrub more or less pubescent or velvety, sometimes nearly glabrous. Leaves 3-foliolate, the 2 lateral leaflets very small, often wanting, the central leaflet $\frac{3}{4}$—$1\frac{1}{4}$ by $\frac{3}{4}$—$\frac{5}{8}$ in., broadly ovate or sometimes nearly orbicular, acute, acuminate, or rounded, often apiculate at the apex, velvety-pubescent or glabrous, base usually rounded ;

main nerves few, inconspicuous ; petioles very short. Flowers white, in compound, many-flowered, pubescent, lax, corymbose cymes ; bracts $\frac{1}{8}$—$\frac{1}{6}$ in. long, linear-lanceolate, acute ; pedicels $\frac{1}{8}$—$\frac{1}{4}$ in. long. Calyx $\frac{1}{6}$ in. long, pubescent ; teeth minute (about $\frac{1}{80}$—$\frac{1}{40}$ in. long), oblong, obtuse. Corolla glabrous ; tube $\frac{1}{2}$ in. long ; lobes 5—7, elliptic-oblong, acute, $\frac{1}{4}$ in. long. Carpel solitary, $\frac{1}{3}$ in. in diam., globose, black. Fl. B. I. v. 3, p. 600 ; Grah. Cat. p. 111 ; Wight, Icon. t. 700 ; Trim. Fl. Ceyl. v. 3, p. 115 ; Talb. Trees, Bomb. ed. 2, p. 217 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164. *Jasminum affine**, Wight, Icon. t. 1255. *J. ovalifolium**, Wight, Icon. t. 1256. —Flowers : July—Oct. VERN. *Jai.*

KONKAN : *Stocks* ! S. M. COUNTRY : Belgaum hills, north-east, *Ritchie*, 439 ! ; Badami, *Bhiva* ! SIND : cultivated (fide *C. B. Clarke*).—DISTRIB. India (W. Peninsula) ; Ceylon.

9. **Jasminum flexile,** *Vahl. Symb. Bot.* v. 3 (1794) p. 1. An extensive climber ; branches quite glabrous. Leaves opposite, 3-foliolate, usually drying yellow ; common petioles $\frac{1}{2}$—$1\frac{1}{8}$ in. long. Terminal leaflets 2—5 by 1—2 in., elliptic-oblong or oblong-lanceolate, acute or acuminate, glabrous, usually with undulate margins, base rounded or subacute ; main nerves about 6 pairs ; petiolules $\frac{3}{4}$—1 in. long. Lateral leaflets somewhat smaller than, but otherwise as the terminal ; petiolules $\frac{1}{8}$—$\frac{1}{4}$ in. long. Flowers large, white, in copious lax paniculate axillary cymes ; bracts $\frac{1}{8}$—$\frac{1}{6}$ in. long, linear, acute ; peduncles glabrous, 1 in. long ; pedicels $\frac{1}{10}$—$\frac{1}{4}$ in. long, glabrous. Calyx glabrous, $\frac{1}{10}$—$\frac{1}{8}$ in. long ; teeth minute, triangular. Corolla-tube 1 in. long ; lobes $\frac{1}{2}$—$\frac{5}{8}$ in. long, elliptic, obtuse or acute. Carpels stalked, broadly ovoid, $\frac{1}{3}$ in. long, dark-purple. Fl. B. I. v. 3, p. 601 ; Wight, Icon. t. 1253 ; Trim. Fl. Ceyl. v. 3, p. 115 ; Talb. Trees, Bomb. ed. 2, p. 217 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164.—Flowers : Mar.

KANARA : evergreen forests of the southern Ghâts of N. Kanara, common, *Talbot* ; road from Kumpta to Sirsi, *Woodrow* ! ; near Honavar, *Kanitkar* !—DISTRIB. India (W. Peninsula), apparently endemic.

Jasminum humile, Linn. Sp. Pl. (1753) p. 7. An erect rigid ramous shrub, not indigenous in the Bombay Presidency though found in Southern India and Ceylon. Cultivated in gardens. The leaves are alternate, trifoliolate or pinnate, the branches angular and the flowers yellow. Fl. B. I. v. 3, p. 602 ; Woodr. Gard. in Ind. ed. 5, p. 374 ; Watt, Dict. Econ. Prod. v. 4, p. 543.—VERN. *Hemapupika.*

Jasminum odoratissimum, Linn. Sp. Pl. (1753) p. 7. A climbing shrub, a native of Madeira, cultivated in gardens. Leaves alternate, ternate and pinnate. Flowers yellow with 5 oblong obtuse corolla-lobes. Grah. Cat. p. 111 ; Dalz. & Gibs. Suppl. p. 51.

Jasminum officinale, Linn. Sp. Pl. (1753), p. 7. The common white Jasmine. Native of Kashmir, Afghanistan, and Persia, cultivated in India, China, Europe, &c. Leaves opposite, pinnate.

* These are dimorphic forms of the plant.

Flowers white, very fragrant ; corolla-lobes 4 or 5. Fl. B. I. v. 3, p. 603 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Suppl. p. 51.—VERN. *Chameli* ; *Jati-Jai*.

Jasminum grandiflorum, Linn. Sp. Pl. ed. 2 (1762) p. 9. A large subscandent shrub, wild in the subtropical North-west Himalayas, often cultivated in gardens throughout India. Very like *J. officinale*, but differing in the equal size of the leaflets and larger flowers. Flowers white, reddish underneath. Fl. B. I. v. 3, p. 603 ; Woodr. Gard. in India, ed. 5, p. 375 , Watt, Dict. Econ. Prod. v. 4, p. 542. *Jasminum aureum*, Don, Prodr. Fl. Nep. p. 106 ; Dalz. & Gibs. Suppl. p. 51.—VERN. *Chameli* ; *Jati-Jai*.

This plant, known as the *Spanish Jasmine*, supplies of the jasmine used in perfumery. It is largely cultivated near Cannes in the south of France. See Watt, Dict. Econ. Prod. *l. c.*

Jasminum calophyllum, Wall. Cat. (1828) 2889. A very beautiful shrub of slightly scandent habit, a native of the Nilghiris. Leaves opposite and alternate, 3-foliolate. Flowers pure white, 1 in. across ; corolla 10-lobed. This plant is grown with fine effect in the Public Park, Baroda (*Woodrow*) Fl. B. I. v. 3, p. 602 ; Woodr. Gard. in Ind. ed. 5, p. 375.

2. NYCTANTHES, Linn.

Shrubs or small trees. Leaves opposite, entire or toothed. Flowers sessile, in pedunculate heads involucrate with ovate bracts ; peduncles axillary and terminal. Calyx narrowly campanulate or subcylindric, truncate or indistinctly toothed, finally splitting or deciduous. Corolla hypocrateriform ; tube cylindric, orange ; lobes 4—8, contorted in bud, spreading. Anthers 2, subsessile near the top of the corolla-tube. Capsule chartaceous, much-compressed, parallel to the partition, separating when ripe into two 1-seeded cells. Seed erect, flattened ; testa thin ; albumen 0 ; cotyledons flat ; radicle inferior.—DISTRIB. Species 2, of which one is East Indian and the other Sumatran.

1. **Nyctanthes Arbor-tristis,** *Linn. Sp. Pl.* (1753) p. 6. A large shrub or small tree rough all over with stiff whitish hairs ; young branches sharply quadrangular, hairy. Leaves opposite, 2—4 by 1—2½ in., ovate, acute or acuminate, rough and scabrous above with short bulbous hairs, densely pubescent beneath with appressed hairs, entire or with a few large distant teeth, base rounded or slightly cuneate ; main nerves few, conspicuous beneath ; petioles ¼ in. long, hairy. Flowers delightfully fragrant, sessile in pedunculate bracteate fascicles of 3—5 ; peduncles 4-angled, slender, hairy, axillary and solitary and in terminal short trichotomous cymes ; bracts broadly ovate or suborbicular, ¼—⅜ in. long, apiculate, hairy on both sides. Calyx ¼—$\frac{5}{16}$ in. long, narrowly campanulate, hairy outside, glabrous inside, truncate or obscurely toothed or lobed, ciliate. Corolla glabrous, rather more than ½ in. long ; tube ¼—$\frac{5}{16}$ in. long, orange-colored, about equalling the limb ; lobes white, unequally obcordate, cuneate. Capsule ¾ in. long and broad, obcordate or nearly orbicular,

compressed, 2-celled, separating into 2 flat 1-seeded carpels, reticulately veined, glabrous. Fl. B. I. v. 3, p. 603 ; Grah. Cat. p. 111 ; Dalz. & Gibs. Suppl. p. 51 ; Bot. Mag. t. 4900 ; Bedd. Flor. Sylvat. t. 240 ; Talb. Trees, Bomb. ed. 2, p. 217 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 5, p. 434.—Flowers more or less throughout the year. VERN. *Har* ; *Shiuli* ; *Párijátak*.

It is doubtful if this plant is truly wild in the Bombay Presidency; indeed Roxburgh says that he has never met it at all except in a cultivated state. Dalzell says he recollects to have seen it wild in the Satpura forests near Arawad in Khandesh, whence it has also been obtained by Woodrow. It is very widely cultivated and is found in most gardens in the Presidency. The flowers come out in the evening and fall off in the early morning. They may be collected in large quantity on the ground beneath the shrubs. They have a delicate honey-like scent The leaves are very rough and used as sandpaper for polishing wood.

3. **SCHREBERA,** Roxb.

Glabrous trees. Leaves opposite, imparipinnate ; leaflets opposite. Flowers in terminal 2—3-chotomous cymes. Calyx campanulate, truncate or unequally 4—6-toothed. Corolla hypocrateriform ; tube ylindric ; lobes 4—7, spreading, imbricate in bud. Stamens 2, inserted near the apex of the tube ; filaments short ; anthers included in the tube or shortly exserted. Ovary 2-celled ; ovules 3—4 in each cell, pendulous from its apex ; style cylindric, elongate ; stigma shortly 2-fid. Capsule woody, obovoid, 2-celled, loculicidally 2-valved. Seeds pendulous, winged ; albumen 0 ; cotyledons fleshy, longitudinally plaited ; radicle short, superior.—DISTRIB. Species 4, of which 1 is East Indian, the others African.

1. **Schrebera swietenioides,** *Roxb. Cor Pl.* v. 2 (1798) p. 1, t. 101. A moderate-sized tree 40—50 ft. high, with erect trunk and numerous branches ; bark ash-colored, scabrous. Leaves opposite or nearly so, imparipinnate, 9—12 in. long (including the common petiole which is 2—3 in. long) ; leaflets 7—9, opposite ; leaf-rhachis pubescent, at length nearly glabrous. Leaflets 2—4 by 1—2 in., the lowest pair often smaller than the others, ovate, acute or acuminate, glabrous when mature, base often unequal-sided ; main nerves 6—8 pairs ; petiolules of lateral leaflets short, those of the terminal leaflets 1—1¼ in. long. Flowers yellowish-brown, fragrant at night (*Roxb.*), numerous, in trichotomous cymes 3—7 in. long and broad ; bracts linear, obtuse, pubescent ; pedicels 0—½ in. long, pubescent. Calyx ⅛ in. long, pubescent ; limb with 5 distinct or obscure teeth, often splitting so as to become 2-lipped. Corolla ½ in. long ; tube ⅓ in. long, glabrous outside ; lobes elliptic-oblong, obtuse, the central portion of each covered inside with brown glandular raised specks, the margins glandular-ciliate. Stamens inserted near the top of the corolla-tube ; filaments very short. Style cylindric, slightly longer than the corolla-tube ; stigma shortly bifid. Capsule pear-shaped, pendulous, 2 in. long, very hard and woody, dotted with white scabrous specks. Seeds 3—4 in each cell, winged ; cotyledons contorted. Fl. B. I. v. 3, p. 604 ; Grah. Cat. p. 112 ; Dalz. & Gibs.

p. 138 ; Bedd. Fl. Sylvat. t. 248 ; Talb. Trees, Bomb. ed. 2, p. 218 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 488.—Flowers : Apr.—May. VERN. *Mokhá ; Mokiri ; Goki.*

KONKAN : *Dalzell* ! ; Thal Ghát near Bhewndi, *Graham*. DECCAN : Bowdhan 8 miles W. of Poona, *Bhiva* ! ; Chattersinghi hill near Poona, *Kanitkar* ! ; Gokak, *Ritchie*, 1865 ! S. M. COUNTRY : Padshapur, *Ritchie*, 1865 ! KANARA : common locally in N. Kanara, *Talbot*.—DISTRIB. India (Tropical Himalaya, Central and S. India and Birma).

The leaves are eaten as a vegetable in time of scarcity. The wood is white, close-grained, and excellent for turners

4. LINOCIERA, Swartz.

Shrubs or trees. Leaves opposite, entire. Flowers in axillary or extra-axillary (rarely terminal) panicles or cymes ; bracts at the divisions small. Calyx small, 4-fid or 4-toothed. Petals 4, long or short, nearly free or cohering in pairs or very shortly connate, induplicate-valvate in bud. Stamens 2 ; filaments short or 0 ; anthers elliptic, dehiscing on the margin. Ovary 2-celled ; ovules 2 in each cell, pendulous from its apex ; style short ; stigma bifid or entire. Drupe ellipsoid ; endocarp bony or crustaceous. Seed usually solitary, pendulous ; testa thin ; albumen fleshy or 0 ; radicle superior.—DISTRIB. Tropics of both hemispheres ; species 40.

Seeds albuminous; petals ¼ in. long; ovary hairy..... 1. *L. malabarica.*
Seeds exalbuminous; petals ⅛ in. long; ovary glabrous. 2. *L. intermedia.*

1. **Linociera malabarica,** *Wall. Cat.* (1828) 2828. A small tree ; bark smooth, shining, grey, covered with raised corky dots. Leaves coriaceous, glabrous, 2—5 by 1—2 in., elliptic-oblong, obtuse or suddenly narrowed to a small blunt acumen, margins more or less revolute, base cuneate ; main nerves inconspicuous ; petioles ¼—½ in. long, channelled above, rugose, glabrous. Flowers yellowish-white with an odor of ripe apples (*Law*), axillary ; peduncles fascicled (rarely paniculate), grey-pilose, each bearing a small fascicle of 1—5 sessile flowers at the apex ; bracts minute, hairy. Calyx $\frac{1}{16}$ in. long, hairy ; lobes about $\frac{1}{32}$ in. long, ovate, acute. Corolla ¼ in. long ; petals cohering at the very base in pairs, linear-lanceolate, acute, glabrous. Anthers sessile, 1 at the base of each pair of connate petals. Ovary hairy ; style scarcely any ; stigma usually shortly bifid. Drupe ⅛—½ by ¼—⅓ in., ellipsoid ; cotyledons flat, in fleshy albumen. Fl. B. I. v. 3, p. 607 ; Grah. Cat. p. 109 ; Dalz. & Gibs. p. 159 ; Wight, Icon t. 1246 ; Talb. Trees, Bomb. ed. 2, p. 218 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164.—Flowers : Nov.—Feb. VERN. *Heddi.*

KONKAN : evergreen forests, *Talbot* ; Ambeghát, *Kanitkar* ! DECCAN : Khandala, *Graham, Dalzell & Gibson* ; Lanoli, *Woodrow*. S. M. COUNTRY : Rámghát, *Law* ex *Graham, Dalzell & Gibson, Ritchie*, 1835 ! ; near Hubli, *Hohenhacker*, 752 ! KANARA : evergreen forests of N. Kanara, *Talbot* ; Gairsoppa, *Dalzell* ! ; Mulas, *Ritchie*, 1835 !—DISTRIB. India (W Peninsula).

2. **Linociera intermedia** VAR. **Roxburghii,** *C. B. Clarke, in. Hook. f. Fl. B. I.* v. 3 (1882) p. 609. A small handsome tree. Leaves 3½—6 by 1¼—2 in., elliptic-oblong, acute or acuminate, glabrous, base very acute, running down into the petiole ; main nerves about 10,

slender, prominent beneath ; petioles ⅜—1 in. long. Flowers white, in axillary or extra-axillary, lax, many-flowered panicles 1½—2½ in. long ; bracts lanceolate ; pedicels $\frac{1}{20}$—$\frac{1}{10}$ in. long. Calyx $\frac{1}{16}$ in. long, glabrous ; lobes ovate. Corolla ⅛ in. long ; lobes 4, linear-oblong, subobtuse, obscurely united in pairs at the base. Ovary glabrous ; stigma deeply 2-fid with divaricate lobes. Drupe ⅜—½ in. long, ellipsoid, purple when ripe. Seed exalbuminous. Talb. Trees, Bomb. ed. 2, p. 218 ; Woodr. in Journ. Bom. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 4, p. 643. *Olea paniculata*, Roxb. Hort. Beng. p. 80 (*not* of R. Br.). *Olea Roxburghii* (sp.), Spreng. Neue Entdeck. v. 3 (1822) p. 78 ; Wight, Icon. t. 735 (*not* of Wall.). *Olea Roxburghiana*, Rœm. & Schult. Mant. v. 1 (1822) p. 77 ; Dalz. & Gibs. p. 159.

KONKAN : common on the Ghâts, *Dalzell & Gibson*. DECCAN : Lanoli, *Woodrow*.

This tree is said by Dalzell & Gibson (*l. c.*) to be common on the Ghâts. It is, however, far from common, but, on the contrary, rare.—DISTRIB. India (Orissa and Circars, Chota Nagpore, Siwaliks, W. Peninsula).

5. OLEA, Linn.

Trees or shrubs. Leaves opposite, entire or toothed. Flowers small, hermaphrodite, dioecious or polygamous, in axillary or extra-axillary (rarely terminal) panicles. Calyx short, 4-toothed or 4-fid. Corolla-tube usually short ; lobes 4, induplicate-valvate, or 0. Stamens usually 2, inserted on the corolla-tube (in male flowers sometimes hypogynous) ; filaments short ; anthers oblong. Ovary 2-celled ; ovules 2 in each cell, attached laterally to the septum or subpendulous ; style short ; stigma capitate or bifid. Drupe ellipsoid or subglobose ; endocarp bony or crustaceous. Seed usually solitary, pendulous ; albumen usually fleshy ; radicle short, superior.—DISTRIB. South Africa, India, Australia, and Polynesia ; species about 35.

1. **Olea dioica,** *Roxb. Hort. Beng.* (1814) p. 3. A small or moderate-sized glabrous tree ; bark grey, smooth. Leaves coriaceous, 3—5 by 1¼—2 in., elliptic-lanceolate, acute or acuminate, entire or distantly and sharply serrate, waved, glabrous, base acute, running down into the petiole ; main nerves 8—10, slender, conspicuous beneath ; petioles ¼—½ in. long. Flowers polygamo-dioecious (male and hermaphrodite) in compound panicles 1—3 in. long, which are axillary or leaf-opposed or from below the leaves, the male panicles rather larger and more dense than the hermaphrodite ones. MALE FLOWERS : Calyx $\frac{1}{12}$ in. long, glabrous ; lobes triangular, acute, $\frac{1}{30}$ in. long. Corolla ⅛ in. long ; lobes $\frac{1}{30}$ in. long, triangular-ovate, subacute. Filaments short. HERMAPHRODITE FLOWERS : Calyx and corolla as in the male ; stamens usually 2 (sometimes 3) ; filaments inserted on the corolla or sometimes on the ovary (*epigynous*). Drupe ½—⅝ in. long, ellipsoid, often slightly pointed, purple and covered with a whitish powdery bloom when ripe. Seed ellipsoid, shortly pointed, rugose, glabrous, intensely bitter to the taste ; testa thin ; cotyledons oblong-elliptic, flat. Fl. B. I. v. 3, p. 612 ; Grah. Cat. p. 109 ; Dalz. & Gibs. p. 159 ; Roxb. Fl. Ind. v. 1, p. 106 :

Wight, Illustr. t. 151 ; Talb. Trees, Bomb. ed. 2, p. 219 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 5, p. 484.—Flowers : Jan.—Apr. VERN. *Párjámb* ; *Karamba.*

Very common all along the Ghâts. KONKAN : *Law* !, *Stocks* ! ; Matheran very common, *Cooke* ! DECCAN : Khandala, *Woodrow* ; Mahableshwar, *Cooke* ; Lanoli, *Graham* ; Phunda Ghât, *Ritchie*, 921 ! S. M. COUNTRY : Castlerock. *Cooke* ! KANARA : evergreen Ghât-forests of N Kanara, common, *Talbot* ; Jagalbet, *Ritchie*, 921 !—DISTRIB. India (lower hills of Assam and Bengal, Western Peninsula).

I have found (as has Kurz) that a corolla is present in the female or hermaphrodite flowers of this tree, of which I have examined many living specimens at Matheran, where it is abundant. Roxburgh (Fl. Ind. l. c.) says that the female is probably hermaphrodite, and if so the corolla with the stamens must have fallen off at a very early period. This is exactly what occurs. The corolla falls off when the ovary is quite minute, taking away 2 (sometimes 3) stamens with it, except where (as is sometimes the case) the stamens are inserted on the ovary itself. Hence the female flowers usually reach Herbaria as small ovaries seated on a calyx without either corollas or stamens.

In the hot season of 1883, when a flight of locusts visited Matheran, the leaves of this tree seemed to possess a greater attraction for them than those of any other tree on the hill.

Olea europœa, Linn. Sp. Pl. (1753) p. 8. The well-known *Olive-tree* of the Mediterranean regions, originally probably a native of Asia Minor and Greece, was apparently first introduced into the Bombay Presidency in 1837 (fide *Graham*). Later, in 1842, Colonel Jervis introduced several varieties of the tree which grew readily and well but rarely flower and never ripen fruit. *Olea sativa*, Hoffmannsegg & Link, Fl. Port. v. 1 (1809) p. 388 ; Grah. Cat. p. 109 ; Dalz. & Gibs. Suppl. p. 50 ; Woodr. Gard. in Ind. ed. 5, p. 373 ; Watt, Dict. Econ. Prod. v. 5, p. 485.

Olea cuspidata, Wall. Cat. (1828) 2817. A bushy tree about 30 ft. high, a native of the N. W. Himalaya, Kashmir, and Beluchistan. The tree grows freely with ordinary treatment and may be transplanted successfully when of large size. The flowers are small and are rarely produced in the plains. Some botanists consider it a variety of the wild Olive (*Olea europœa*). An oil is extracted from the fruit in Afghanistan, and the fruit is sometimes eaten by the natives of the countries where it abounds, though it is not very palatable. Fl. B. I. v. 3, p. 611 ; Woodr. Gard. in Ind. ed. 5, p. 373 ; Watt, Dict. Econ. Prod. v. 5, p. 483.—VERN. *Ráhu* ; *Rán* ; *Shwán.*

6. LIGUSTRUM, Linn.

Shrubs or small trees ; branches often lenticellate. Leaves opposite, quite entire. Flowers usually white, in terminal often thyrsoid panicles. Calyx truncate or 4-toothed. Corolla infundibuliform ; tube short or long ; lobes 4, subinduplicate-valvate. Stamens 2, attached to the tube of the corolla ; anthers included or exserted. Ovary 2-celled ; ovules 2 in each cell, pendulous ; style short or long ; stigma thickened. Drupe 1—3-seeded ; endocarp chartaceous or thin. Seeds pendulous ; testa thin ; albumen fleshy ; cotyledons flat ;

radicle short, superior.—DISTRIB. Europe, temperate and tropical Asia and Australia ; species 25.

1. **Ligustrum neilgherrense** VAR. **obovata,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 3 (1882) p. 615. A large shrub or small tree ; bark of the branches copiously studded with white lenticels. Leaves 1¼—3 by ¾—2 in., elliptic or slightly obovate, acute, acuminate or obtuse, often mucronate, glabrous, usually sprinkled beneath with minute black dots, base acute ; main nerves 5—8 pairs ; petioles ¼—⅜ in. long, channelled above. Flowers white, fragrant, in dense or lax terminal nearly glabrous thyrsoid panicles sometimes reaching 6 in. long and broad ; branches of the panicle subquadrangular ; pedicels 0—$\frac{1}{10}$ in. long ; bracts beneath the pedicels $\frac{1}{16}$—$\frac{1}{10}$ in. long, linear-lanceolate, acute ; buds obovoid. Calyx $\frac{1}{10}$ in. long, glabrous (rugose in dried specimens) ; limb truncate or shortly 4-toothed. Corolla ¼ in. long ; lobes as long as the tube, elliptic-oblong, subacute, reflexed. Stamens inserted on the corolla-tube, exserted beyond the extremity of the corolla-lobes. Style as long as the corolla-tube ; stigma slightly clavate, obtuse, bifid. Drupe obovoid, ⅜ by ⅓ in., dark purple and covered with a powdery bloom when ripe. *Ligustrum neilgherrense,* Dalz. & Gibs. p. 159 ; Talb. Trees, Bomb. ed. 2, p. 219 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 4, p. 640. *Ligustrum obovatum* (sp.), Decaisne, Monogr. Gen. Ligust. & Syringa in Nouv. Arch. du Mus. sér. 2, v. 2 (1879) p. 22. *Phillyrea microphylla,* Grah. Cat. p. 108.—Flowers : Aug.—Nov.

The stamens in the specimens from the Deccan hills, which I have examined, are exserted beyond the corolla-lobes, while in Wight's specimens of *L. neilgherrense,* with which his figure (Icon. t. 1243) agrees, the stamens are not exserted beyond the lobes, but only beyond the tube of the corolla. The stigma, too, of Wight's specimens (correctly shewn in his figure) is more acute than the stigma of the examples from the W. Ghâts.

Higher Ghâts of the Presidency. KONKAN : Amboli Ghât, *Kanitkar!* DECCAN : Mahableshwar, plentiful, *Cooke!, Graham, H. M. Birdwood* ; Harishchandragad, *Gibson* ex *Graham.* S. M. COUNTRY : Párva Ghât, *Dalzell & Gibson.* KANARA : common in moist forests near the Tinai Ghât, *Talbot.*—DISTRIB. India (W. Peninsula).

Osmanthus fragrans, Lour. Fl. Cochinch. v. 1 (1790) p. 29. A shrub with entire or serrate coriaceous glaucous leaves sometimes reaching 7 by 2 in., but usually in cultivated plants much smaller. The flowers are small, white, delightfully fragrant, and the shrub is largely grown in gardens in the Bombay Presidency, where it flowers abundantly during the cold season. It is a native of China and Japan and also of the temperate Himalaya. The flowers are said by Fortune to be used in China to flavor tea. Fl. B. I. v. 3, p. 606 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Gard. in Ind. ed. 5, p. 373 ; Watt, Dict. Econ. Prod. v. 5, p. 654. *Olea fragrans,* Thunb. Fl. Jap. p. 18, t. 2 ; Grah. Cat. p. 109 ; Dalz. & Gibs. Suppl. p. 50.

ORDER LXXXI. SALVADORACEÆ.

Shrubs or trees, usually glabrous, unarmed or spinous. Leaves opposite, entire ; stipules minute or 0. Flowers small, hermaphrodite or dicœcious, in panicled spikes or racemes. Calyx free, campanulate or ovoid, 3—4-toothed or 4-fid. Corolla gamopetalous, or petals free, 4-merous, shortly campanulate, imbricate in bud. Stamens 4, inserted on the corolla-tube or near the base of the petals, alternate with the lobes or petals ; filaments free or connate at the base ; anthers ovate. Disk 0 or of 4 glands alternate with the filaments. Ovary superior, 1—2-celled ; ovules 1—2 in each cell, erect from its base, anatropous ; style short ; stigma 2-fid or subentire. Berry or drupe usually 1-seeded. Seed erect, globose or compressed ; testa thin or cartilaginous ; albumen 0 ; cotyledons fleshy, plano-convex.—DISTRIB. Tropical and subtropical Asia, Africa, Madagascar, and Malaya ; genera 3 ; species 8—9.

Unarmed; corolla gamopetalous; ovary 1-celled.....	1.	SALVADORA.
Armed; petals free; ovary 2-celled.....	2.	AZIMA.

1. SALVADORA, Linn.

Shrubs or trees. Leaves opposite, entire, usually pale. Flowers small, sessile or pedicellate, along the branches of axillary or terminal panicles. Calyx campanulate, 4-fid. Corolla campanulate ; tube short ; lobes 4, obtuse, imbricate in bud. Stamens 4, inserted at the base or in the middle of the corolla-tube ; filaments slightly flattened. Disk of 4 scales or glands between the bases of the filaments or 0. Ovary 1-celled ; ovule solitary ; style very short or almost 0 ; stigma broad, truncate or subpeltate. Drupe globose, supported by the persistent calyx and corolla ; endocarp crustaceous. Seed erect, globose. —DISTRIB. East Africa, Arabia, and India ; species 2.

Leaves ¾ in. and more broad; flowers pedicelled.....	1.	*S. persica.*
Leaves less than ¾ in. broad; flowers sessile.....	2.	*S. oleoides.*

1. **Salvadora persica,** *Linn. Sp. Pl.* (1753) p. 122. A large much-branched evergreen shrub or small tree with soft whitish-yellow wood ; bark of old stems rugose ; branches numerous, drooping, glabrous, terete, finely striate, shining, almost white. Leaves somewhat fleshy, glaucous, 1½—2½ by ¾—1¼ in., elliptic-lanceolate or ovate, obtuse and often mucronate at the apex ; base usually acute, less commonly rounded ; main nerves 5—6 pairs ; petioles ½—⅞ in. long, glabrous. Flowers greenish-yellow, in axillary and terminal compound lax panicles 2—5 in. long, numerous in the upper axils ; pedicels 1/16—⅛ in. long ; bracts beneath the pedicels ovate, very caducous. Calyx 1/20 in. long, glabrous, cleft ½-way down ; lobes rounded. Corolla very thin, ⅛ in. long, deeply cleft, persistent ; lobes 1/16 in. long, oblong, obtuse, much reflexed. Stamens shorter than the corolla, but exserted, owing to the corolla-lobes being reflexed. Drupe ⅛ in. in diam., globose, smooth, red when ripe. Fl. B. I. v. 3, p. 619 ; Grah. Cat. p. 250 ; Dalz. & Gibs. p. 312 ; Trim. Fl. Ceyl. v. 3, p. 120 ; Talb. Trees, Bomb. ed. 2, p. 220 ; Woodr. in Journ. Bomb.

Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 448. *Salvadora Wightiana,* Planch. in Thw. Enum. p. 190 ; Bedd. Flor. Sylvat. t. 247.—Flowers : Nov.—Feb. VERN. *Pilu* ; *Pilvá* ; *Khákan.*

KONKAN : near the sea in both Konkans, *Graham*; along tidal creeks in Thana district, *Ryan* ; Habshi's country, *Dalzell & Gibson.* DECCAN : Bijapur, *Woodrow.* S. M. COUNTRY : Dharwar and Belgaum districts, *Talbot.* KANARA : *Talbot.* GUJARAT : Balsár, *Bhiva* ! ; Ankleshvar, *Kanitkar* ! ; Gogo, *Woodrow.* SIND : *Ritchie,* 1308 !, *Stocks* !, *Cooke* !, *Dalzell,* 325 !—DISTRIB. Drier parts of India, often planted near Mahomedan tombs ; Ceylon, dry regions of W. Asia, Egypt, Abyssinia.

The tree is supposed to be the *Mustard Tree* of Scripture. The small drupes and the leaves have the peculiar pungent flavor of many of the *Cruciferæ.* The latter are a favorite fodder of camels and are eaten as a salad. The root-bark is very acrid and used as a vesicant. The fruit is used in medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Salvadora oleoides,** *Decaisne, in Jacquem. Voy. Bot.* (1844) p. 140, t. 144. A shrub or occasionally a small tree with a short twisted or bent trunk ; branches numerous, stiff, divergent, whitish. Leaves 1½—3 by ⅛—½ in., whitish-green, coriaceous and somewhat fleshy when mature, linear-lanceolate or elliptic-lanceolate, acute or subobtuse, often mucronate, glabrous ; main nerves indistinct ; petioles ⅛—¼ in. long. Flowers greenish-white, sessile, in erect axillary panicled spikes 1—1½ in. long, often clustered. Calyx $\frac{1}{16}$—$\frac{1}{12}$ in. long, cleft about ½-way down ; lobes 4, rounded, obtuse. Corolla a little longer than the calyx, deeply cleft ; lobes obovate-oblong, obtuse. Drupes ⅛—¼ in. in diam., subsessile, globose, yellow when ripe (*Brandis*). Fl. B. I. v. 3, p. 620 ; Aitch. Pb. & Sind Pl. p. 91 ; Talb. Trees, Bomb. ed. 2, p. 220 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 164 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 447. *Salvadora Stocksii,* Wight, Ill. v. 2, p. 229, and Icon. t. 1621.—Flowers : Jan.—Mar. VERN. *Khabbar* ; *Diár.*

In the Bombay Presidency apparently confined to Gujarat and Sind. GUJARAT : Nadiad, *Woodrow* ; Junaghad, *Cooke* ! SIND : *Dalzell* !, *Woodrow* !, *Stocks,* 633 ! ; Khairpur, common, *Brandis.*—DISTRIB. India (Punjáb, Rajputana) ; Aden.

The fruit is sweet and is largely eaten by the natives, forming when dried an article of trade and tasting somewhat like currants (*Brandis*). The leaves are the favorite diet of camels during the first quarter of the hot weather, but other animals will not eat them. See Watt, Dict. Econ. Prod. l. c.

2. AZIMA, Lamk.

Glabrous, much-branched or sarmentose shrubs armed with axillary spines. Leaves opposite, entire. Flowers dioecious, small, crowded in the axils or sessile along the branches of a small slightly branched panicle. Calyx campanulate, 4-fid, or, in the female flowers, irregularly 2—4-partite. Petals 4, free, narrow, imbricate in bud. Stamens 4, alternate with the petals ; filaments slender ; anthers ovate. Scales or glands 0. Ovary 2-celled ; ovules 1 or 2 in each cell, erect from the base ; stigma-subsessile, large. Berry globose. Seeds 1—2, globose ; albumen 0.—DISTRIB. Tropical Asia, tropical and south Africa and Madagascar ; species 3 or 4.

1. **Azima tetracantha,** *Lamk. Encyc. Méthod.* v. 1 (1783) p. 343. A low spinous rigid bush, woody below only ; branches numerous, green, herbaceous, bluntly quadrangular, the younger pubescent. Leaves 1—1¾ by ½—¾ in., elliptic, acute, sharply mucronate, rigid, pale, glabrous, shining, base acute ; petioles ⅛ in. long. Spines often 1¼ in. long, obtusely quadrangular, grooved, very sharp, with an indurated point, slightly pubescent when young, at length glabrous, usually 4, sometimes reduced to 1 and occasionally as many as 7 at a node. Flowers small, greenish-white or yellowish, sessile, in axillary fascicles, the supporting leaves of the upper fascicles reduced to bracts or becoming obsolete, so that the flowering branches end in naked interrupted spikes ; bracts foliaceous, pubescent, ovate, acute, spinous-pointed. MALE FLOWERS numerous, crowded in axillary fascicles. Calyx pubescent, 1/10—⅛ in. long ; lobes 4, ovate, acute, 1/20 in. long. Petals a little exserted beyond the calyx-lobes, linear-lanceolate, acute, ciliolate. FEMALE FLOWERS solitary or in pairs. Calyx pubescent, ⅛ in. long ; lobes usually 2, broadly ovate, apiculate, ⅛ in. long. Petals as in the male. Ovary 2-celled, glabrous ; ovules solitary (rarely 2) in each cell ; stigma nearly sessile, 1/10 in. in diam., 2-lobed. Berry ¼ in. in diam., globose, glabrous, white, edible, usually 1-seeded. Fl. B. I. v. 3, p. 620 ; Dalz. & Gibs. p. 143 ; Wight, Ill. v. 2, t. 152 ; Trim. Fl. Ceyl. v. 3, p. 121 ; Talb. Trees, Bomb. ed. 2, p. 221 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 1, p. 361. *Monetia tetracantha,* Salisb. Prod. (1796) p. 65 ; Grah. Cat. p. 117.—Flowers : Dec.—Mar. VERN. *Sakapat.*

KONKAN : Habshi's territory, *Dalzell & Gibson.* DECCAN : Gokák, *Woodrow.* S. M. COUNTRY : Badami, *Kanitkar!*, *Woodrow*; Dharwar, *Ritchie,* 1868!, *Graham, Dalzell & Gibson, Cooke!*—DISTRIB. India (W. Peninsula); Ceylon, Tropical and South Africa and Madagascar.

Dobera Roxburghii, Planch. in Ann. Sc. Nat. sér. 3, v. 10, p. 191. There is a small scrap of a flowering branch of this in Herb. Kew., on which is a ticket *"Bombay, Capt. Geburne,"* and this seems to be the only specimen obtained from India. Capt. Geburne was an ardent horticulturist in Bombay itself, and used to introduce plants from various places into his garden. No other botanist has found the plant in Bombay, and the inference of its existence there from the solitary specimen referred to seems hardly justifiable. The ticket on the specimen in question is not in Capt. Geburne's but apparently in Planchon's handwriting.

ORDER LXXXII. APOCYNACEÆ.

Trees or erect or twining shrubs, rarely herbs. Leaves simple, opposite or whorled (rarely alternate), quite entire ; stipules 0 or sometimes intrapetiolar glands. Flowers hermaphrodite, regular, in terminal or axillary cymes. Calyx inferior, often glandular inside at the base or at the base of the lobes ; lobes 5 (rarely 4), imbricate. Corolla gamopetalous, usually rotate or hypocrateriform ; lobes 5 (rarely 4), spreading, contorted, and often twisted in bud (very rarely valvate). Stamens 5 (rarely 4), inserted on the corolla-tube, rarely on

its mouth ; filaments usually short ; anthers linear-oblong or sagittate, free or sometimes adhering to the stigma by the connective, cells 2, dehiscing longitudinally, sometimes produced downwards into an empty spur ; pollen granular. Disk sometimes concealing the ovary, annular, cup-shaped or lobed, or of fleshy scales or glands or 0. Ovary 1-celled with 2 parietal placentas, or 2-celled with axile placentas, or of 2 distinct or partially connate carpels ; ovules in each cell 2 or few or many and 2—∞-seriate, rarely solitary ; style 1, simple or divided at the base ; stigma various, usually terminated by an entire or more commonly 2-fid apiculus. Fruit a dry or fleshy drupe, berry or samara, or of 2 drupes, berries or follicles. Seeds various, sometimes winged, sometimes with one or both extremities crowned with a pencil of hairs (*coma*) ; albumen hard, fleshy or scanty or 0 ; embryo straight ; cotyledons flat, concave, convoluted or contorted ; radicle usually superior.—DISTRIB. Chiefly tropical ; genera about 110 ; species more than 900.

Anthers included, free from the stigma, rounded at the base.
- Seeds not comose nor arillate.
  - Ovary of 2 wholly combined carpels.
    - Armed shrubs ..... 1. CARISSA.
  - Ovary of distinct carpels united by the style.
    - Calyx without glands inside.
      - Fruit drupaceous.
        - Leaves whorled ..... 2. RAUWOLFIA.
        - Leaves alternate, scattered (a maritime genus) ..... 3. CERBERA.
      - Fruit follicular ..... 4. LOCHNERA.
    - Calyx glandular inside; fruit follicular.
      - Leaves alternate; erect shrubs..... 5. RHAZYA.
      - Leaves opposite or whorled; climbing shrubs ..... 6. ELLERTONIA.
- Seeds common or arillate.
  - Seeds comose, not arillate.
    - Seeds with a fringe of hairs at each end. 7. ALSTONIA.
    - Seeds with a deciduous tuft of hairs at the apex ..... 8. HOLARRHENA.
  - Seeds arillate, not comose.
    - Seeds with a red or orange aril..... 9. ERVATAMIA.

Anthers included or exserted, conniving in a cone round and adhering to the stigma, each cell produced into an empty spur. Fruit follicular; seeds comose.
- Anthers exserted.
  - Climbing shrubs.
    - Filaments of stamens long, spirally twisted. 10. PARSONSIA.
    - Filaments of stamens short, not spirally twisted ..... 11. VALLARIS.
  - Erect trees or shrubs.
    - Corolla with a corona of scales..... 12. WRIGHTIA.
- Anthers included.
  - Lofty climbers.
    - Corolla very large, 3 in. or more across.
      - Corolla campanulate or infundibuliform ..... 13. BEAUMONTIA.
      - Corolla hypocrateriform ..... 14. CHONEMORPHA.
    - Corolla medium-sized or small, less than 2 in. across.
      - Calyx divided to the base..... 15. AGANOSMA

Calyx not divided to the base.
Follicles stout, tapering ..... 16. ANODENDRON.
Follicles slender, cylindric ..... 17. ICHNOCARPUS.

1. CARISSA, Linn.

Much-branched spinous shrubs, erect, prostrate or climbing. Leaves opposite, small, coriaceous. Flowers in terminal and axillary pedunculate 2—3-chotomous cymes. Calyx 5-partite, rarely glandular within; segments acute. Corolla hypocrateriform; tube cylindric, usually dilated at the top; lobes 5, overlapping to the right in the Indian species. Stamens at the top of the tube, included; anthers obtuse, or apiculate from the produced connective. Disk 0. Ovary 2-celled; ovules 1—4 in each cell, rarely more; style filiform; stigma fusiform or columnar, minutely 2-fid. Berry ellipsoid or globose, 2- or (by suppression) 1-celled. Seeds usually 2, peltately attached to the septum; albumen fleshy; cotyledons ovate; radicle inferior.—DISTRIB. Africa, Tropical Asia, and Tropical Australia; species about 20.

Spines straight.
Fruit ½ in. and more ..... 1 *C. Carandas.*
Fruit less than ½ in. ..... 2. *C. spinarum.*
Spines decurved.
An erect shrub ..... 3. *C. inermis.*
An extensive climbing shrub ..... 4. *C. suavissima.*

1. **Carissa Carandas,** *Linn. Mantiss.* v. 1 (1767) p. 52. A large evergreen shrub with a short stem, glabrous except the inflorescence; bark light-grey, scaly; branchlets usually alternate, with twin stout sharp horizontal glabrous spines 1—1½ in. long at their base; branches usually without spines. Leaves 1½—3 by 1—2 in., coriaceous, elliptic or obovate, obtuse, often shortly mucronate, glabrous and shining, base subacute; petioles ⅛—¼ in. long. Flowers white, scarcely odorous, in pubescent terminal corymbose cymes; peduncles usually ¼—¾ in. long, sometimes almost 0; pedicels very short; bracts linear, pubescent. Calyx pubescent, cleft rather more than ½-way down; lobes $\frac{1}{10}$—⅛ in. long, lanceolate, very acute, ciliate. Corolla-tube about ½ in. long, swollen and pubescent near the top; lobes ⅜ in. long, oblong-lanceolate, acute, often pubescent and ciliolate. Stamens included within the corolla-tube; filaments very short; anthers linear-oblong. Ovary glabrous; ovules 4 in each cell; stigma slightly penicillate at the apex. Fruit ½—1 in. long, ellipsoid, purplish-black when ripe, smooth, 4- or more-seeded. Fl. B. I. v. 3, p. 630; Grah. Cat. p. 116; Dalz. & Gibs. p. 143; Bedd. For. Man. in Flor. Sylvat. p. clvi, t. 19, fig. 6; Wight, Icon. t. 426; Trim. Fl. Ceyl. v. 3, p. 124; Talb. Trees, Bomb. ed. 2, p. 222; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165; Watt, Dict. Econ. Prod. v. 2, p. 165.—Flowers: Jan.—Apr. VERN. *Karvand*; *Karanda.*

KONKAN: *Graham, Talbot, Stocks*!, *Ritchie*, 450! DECCAN: Lanoli, *Gammie*; Khandala, *Cooke*!, *Woodrow*!, *Kanitkar*!; Kadakvasla, *Cooke*! KANARA: N. Kanara, common, *Talbot.*—DISTRIB. Throughout India; Ceylon, Java, Timor.

The fruit is eaten and also made into tarts. It is sold largely in the native markets.

2. **Carissa spinarum,** *Linn. Mantiss.* v. 2 (1771) App. p. 559. A suberect or sometimes prostrate evergreen shrub ; young parts and inflorescence pubescent ; bark light-colored ; branches rigid, often zigzag, terete, divaricate ; spines ½—1¼ in. long, horizontal, very sharp, often bifurcate. Leaves 1—1¾ by ½—¾ in., coriaceous, elliptic, acute or obtuse, shortly mucronate, glabrous or pubescent, base acute ; petioles ⅛—¼ in. long. Flowers white, sometimes tinged with pink, scanted, in few-flowered pubescent corymbose usually terminal cymes, very often in threes on the top of short pubescent peduncles ; pedicels short ; bracts linear, pubescent. Calyx divided almost to the base ; lobes ⅛ in. long, lanceolate, very acute, ciliate. Corolla-tube ¼—⅜ in. long ; lobes slightly shorter than the tube, lanceolate, acute, spreading. Ovary 2-celled ; ovules 2 in each cell. Berry ¼ in. in diam., subglobose, usually 4-seeded, dark purple. Fl. B. I. v. 3, p. 631 ; Grah. Cat. p. 116 ; Trim. Fl. Ceyl. v. 3, p. 125 ; Talb. Trees, Bomb. ed. 2, p. 222 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 2, p. 166. *Carissa diffusa,* Roxb. Fl. Ind. v. 1, p. 689 ; Bedd. For. Man. in Fl. Sylvat. p. clvii ; Wight, Icon. t. 427. *C. hirsuta,* Roth, Nov. Pl. Sp. (1821) p. 128 ; Dalz. & Gibs. p. 143. *C. villosa,* Roxb. Fl. Ind. ed. Carey & Wall. v. 2, p. 525 ; Grah. Cat. p. 116.—Flowers : Jan.—Apr.

Common in the southern districts of the Presidency. S. M. COUNTRY : Badami, *Woodrow* !, *Cooke* !; hills east of Belgaum, *Graham, Dalzell & Gibson*; on dry stony ground in the Dharwar and Belgaum districts, *Talbot.* —DISTRIB. Throughout India; Ceylon.

The fruit is eaten and also made into tarts.—It is said by Talbot to be sweeter than the fruit of *C. Carandas.*

3. **Carissa inermis,** *Vahl, Symb.* v. 3 (1794) p. 43. A large shrub or small tree quite glabrous except the puberulous inflorescence. Spines stout, dark-brown, decurved, simple, 1—1½ in. long. Flowering branches spineless. Leaves coriaceous, drying dark-brown, 2—4 by 1—1¾ in., elliptic or elliptic-lanceolate, acute or acuminate, glabrous, base acute ; petioles ⅛—⅛ in. long. Flowers white, in terminal corymbose puberulous cymes ; peduncles ⅛—½ in. long ; pedicels short ; bracts subulate. Calyx pubescent ; segments ⅛ in. long, lanceolate, very acute, ciliate. Corolla 1—1¼ in. long ; lobes ½ in. long, linear-lanceolate, very acute. Berry ellipsoid, about 1 in. long, in appearance like a plum, purple when ripe. *Carissa macrophylla,* Wall. Cat. (1828) 1679 ; Fl. B. I. v. 3, p. 631 ; Talb. Trees, Bomb. ed. 2, p. 223 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prodr. v. 2, p. 166. *Carissa lanceolata,* Dalz. in Dalz. & Gibs. Bo. Fl. p. 143 (*not* of R. Br.). *C. Dalzellii,* Bedd. For. Man. in Flor. Sylvat. p. clvii.—Flowers : Jan.—Feb.

Southern districts of the Presidency. S. M. COUNTRY : Rámghát, *Dalzell & Gibson, Ritchie,* 443! KANARA : evergreen forests along the N. Kanara Ghâts, abundant near the coast on the hills about Karwar, *Talbot*; hills near Karwar, *Woodrow*; Kála naddi, *Ritchie,* 443—DISTRIB. India (W. Peninsula).

Though the specific name given by Vahl is by no means applicable, it does not seem possible to adopt Wallich's name. As K. Schumann remarks (Engl. & Prantl, Pflanzenf. v. 4, part 2, p. 127), the specific name is unfortunate, but has the sanction of priority.

4. **Carissa suavissima,** *Bedd. ex Hook. f. Fl. B. I.* v. 3 (1882) p. 632. A lofty climber quite glabrous. Spines decurved, stout, ¼—⅜ in. long (in the specimens in Herb. Kew.). Leaves 1¾—3 by 1½—2 in., broadly ovate, acuminate, glabrous, base usually rounded ; petioles ⅛—⅙ in. long. Flowers white, in terminal corymbose glabrous cymes. Calyx glabrous ; segments ⅛ in. long, lanceolate, very acute. Corolla 1—1¼ in. long ; lobes ⅜ in. long, linear-lanceolate, acute. Berry with much milky juice, 1—2 in. long, ellipsoid, edible, black when ripe. Talb. Trees, Bomb. ed. 2, p. 223 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165. —Flowers : Jan.—Feb.

The fruit is said by Beddome to be very delicious, and is described as being nearly 2 in. long by 1¼ in. broad.

Talbot considers the plant to be conspecific with *C. inermis* and to differ only in the glabrous cymes and climbing habit. In the specimens in Herb. Kew. communicated by Colonel Beddome from the Madura district, the leaves are broader than in *C. inermis* and the spines much shorter.

DECCAN : Lanoli Grove, *Gammie.* KANARA : evergreen forests of the N. Kanara Ghâts, *Talbot.*—DISTRIB. India (W. Peninsula).

Carissa arduina, Lam. Encyc. Méthod. v. 1 (1783) p. 555. A dwarf glabrous shrub with twice-forked spines, subsessile cymes, pale-pink sepals, a white corolla and a scarlet berry, a native of S. Africa, is sometimes grown in gardens. Grah. Cat. p. 117 ; Dalz. & Gibs. Suppl. p. 53. *Arduina bispinosa,* Linn. Mantiss. v. 1 (1767) p. 52 ; Woodr. Gard. in Ind. ed. 5, p. 378.

2. RAUWOLFIA, Linn.

Glabrous shrubs. Leaves 3—4-verticillate (rarely opposite). Flowers in few-flowered often umbelliform cymes ; peduncles alternating with the terminal leaves, at length becoming lateral. Calyx short, 5-fid or 5-partite, eglandular inside. Corolla hypocrateriform ; tube cylindric, inflated over the anthers, usually hairy within ; lobes 5, overlapping to the left. Stamens inserted at the middle of the tube or higher up, included ; anthers small, subacute, the cells rounded at the base. Disk cup-shaped or annular, entire or shortly lobed. Carpels 2, distinct or connate ; ovules 2 in each carpel, collateral ; style filiform ; stigma thick, broad and often toothed at the apex, annular or appendiculate at the base, tip shortly 2-fid. Fruit of 2 connate or distinct usually 1-seeded drupes. Seeds ovoid ; albumen fleshy ; cotyledons flat.—DISTRIB. Tropics of both hemispheres, S. Africa ; species about 50.

A small shrub; corolla-tube slender, inflated a little above the middle	1. *R. serpentina.*
A large shrub; corolla-tube wide, inflated below the mouth	2. *R. densiflora.*

1. **Rauwolfia serpentina,** *Benth. ex Kurz, For. Fl. Br. Burm.* v. 2 (1877) p. 171. A small erect shrub (climbing in a rich soil

according to Roxburgh, Fl. Ind. v. 1, p. 694), rarely reaching, in the Bombay Presidency, 3 ft. high ; bark pale, rarely lenticellate. Leaves in whorls of 3, thin, 3—7 by 1—2½ in., lanceolate, acute or acuminate, glabrous, bright green above, pale beneath, base tapering ; main-nerves 8—10 pairs, slender ; petioles ⅛ in. long, somewhat obscure, owing to the blade running down into the petiole. Flowers white, often tinged with violet, in many-flowered irregular corymbose cymes ; peduncles 2—5 in. long ; pedicels stout, ⅛—¼ in. long, bright red ; bracts beneath the pedicels triangular, acute, $\frac{1}{16}$—$\frac{1}{16}$ in. long. Calyx glabrous, bright-red ; segments $\frac{1}{10}$ in. long, lanceolate. Corolla ⅜—½ in. long or rarely a little longer ; tube slender, swollen a little above the middle ; lobes ⅛ in. long, elliptic-oblong, rounded at the apex. Disk cup-shaped, membranous, obscurely lobed. Drupes single, or didymous and connate more or less deeply, about ¼ in. in diam., purplish-black when ripe. The inflorescence of this plant with red pedicels and calyx and white corolla is striking. Sir W. Jones (As. Res. v. 4, p. 308) says that "few shrubs are more elegant, especially when the vivid carmine of the perianth is contrasted not only with the milk-white corolla, but with the rich green berries which at the same time embellish the fascicle ; the mature berries are black and their pulp light-purple." Fl. B. I. v. 3, p. 632 ; Trim. Fl. Ceyl. v. 3, p. 126 ; Talb. Trees, Bomb. ed. 2, p. 223 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 398. *Ophioxylon serpentinum,* Linn. Sp. Pl. (1753) p. 1043 ; Grah. Cat. p. 116 ; Dalz. & Gibs. p. 143 ; Roxb. Fl. Ind. v. 1, p. 694 ; Wight, Icon. t. 849 ; Bedd. For. Man. in Flor. Sylvat. p. clvi.—Flowers : Mar.—May. VERN. *Hadki.*

KONKAN : *Stocks* !, common, *Dalzell & Gibson* ; North and South Konkan, *Law* ! ; jungles near Goa, *Dr. Lush* ex *Graham*. S. M. COUNTRY : Castlerock, *Woodrow, Kanitkar* ! KANARA : moist forests of N. Kanara, *Talbot*.—DISTRIB. India (Sub-himalayan tract from Sirhind eastwards, Birma, Andamans, W. Peninsula) ; Ceylon, Java.

2. **Rauwolfia densiflora,** *Benth. ex Hook. f. Fl. B. I.* v. 3 (1882) p. 633. A shrub reaching 12 ft. high with milky juice ; branches copiously lenticellate. Leaves 3—4 in a whorl near the ends of the branches, very variable in size, 3—9 by 1—3 in., oblanceolate or obovate, acuminate, glabrous, light-green above, paler beneath, base tapering ; main nerves 8—20 pairs, more or less conspicuous ; petioles ½ in. long, somewhat obscure. Flowers white or pink, appearing with the young leaves, in lax few-flowered corymbose cymes ; peduncles several together, ¾—2½ in. long, erect or decurved ; pedicels slender, ¼—⅜ in. long ; bracts minute. Calyx ⅛ in. long, glabrous ; segments $\frac{1}{10}$—⅛ in. long, lanceolate, acute. Corolla ⅜ in. long ; tube stout, slightly longer than the lobes, inflated at the top, throat hairy within ; lobes elliptic-oblong, rounded at the apex. Drupes single or in pairs, free, ellipsoid, ⅓—½ in. long, brownish-purple when ripe. Trim. Fl. Ceyl. v. 3, p. 126 ; Talb. Trees, Bomb. ed. 2, p. 223 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165. *Rauwolfia decurva,* Hook. f. Fl. B. I. v. 3, p. 633. *Ophioxylon neilgherrense,* Wight, Icon. t. 1292 ; Dalz. & Gibs. p. 144.—Flowers : Mar.—Apr.

I have included *Rauwolfia decurva,* Hook. f., with this. The

decurved peduncles are not a constant character. I have found erect and decurved peduncles on the same plant.

KONKAN: *Law*!; Poladpur, *Woodrow*! DECCAN: Lanoli, *Gammie, Kanitkar*!; Mahableshwar, *Cooke*! S. M. COUNTRY: Rámghát, *Ritchie*, 1850! KANARA: common in the forests of the Supa division of N. Kanara, *Talbot*; Ainshi Ghát, *Talbot*, 1190!—DISTRIB. India (Khasia mountains, Western Peninsula); Ceylon.

Rauwolfia canescens, Linn. Sp. Pl. ed. 2 (1762) p. 303. A small shrub with whorled ovate-oblong leaves, small white flowers and dark-red drupes, a native of the West Indies, has been occasionally grown in gardens. Dalz. & Gibs. Suppl. p. 53.

3. CERBERA, Linn.

Small glabrous trees or large shrubs. Leaves alternate or scattered, long; nerves slender, horizontal and parallel. Flowers large, white or red, in terminal cymes. Calyx 5-partite, without glands inside; segments long. Corolla subinfundibuliform; tube short, the throat slightly dilated, ribbed or with pubescent scales inside; lobes 5, broad, spreading, longer than the tube, overlapping to the left. Stamens included; anthers lanceolate, apiculate, the cells rounded at the base. Disk 0. Carpels of the ovary 2, distinct; ovules 4 in each carpel, on both sides of a thick placenta; style filiform; stigma large, ovoid, with 2 truncate points. Fruit usually of 1 (rarely 2) globose ovoid or ellipsoid 1—2-seeded carpels; pericarp very thick, fibrous and woody. Seeds broad, compressed, peltately attached to the enlarged placenta; albumen 0; cotyledons thinly fleshy; radicle very short.—DISTRIB. Madagascar, Tropical Asia, and the Pacific Islands; species 4.

1. **Cerbera Odollam,** *Gærtn. Fruct.* v. 2 (1791) p. 193. A small tree or large shrub with an acrid milky poisonous juice, glabrous; branchlets whorled, stout, marked with leaf-scars. Leaves alternate, closely set at the ends of the branches, 5—10 by 1½—2½ in., coriaceous, black when dry, lanceolate, oblanceolate or oblong-obovate, suddenly acuminate, glabrous, much tapering to the base; main nerves numerous, slender, horizontal, connected by an intramarginal nerve; petioles ¾—1½ in. long. Flowers large, white with a yellow throat, odorous, in terminal peduncled paniculate cymes; peduncles 2—6 in. long; pedicels stout; bracts colored, ½—1 in. long, oblong, acute, caducous. Calyx glabrous; segments ¾—1 in. long, linear-oblong, very acute, recurved. Corolla-tube ½—¾ in. long, the upper part dilated, the throat nearly closed by 5 pubescent projecting wing-like ribs; lobes longer than the tube, broadly elliptic, acute, oblique. Ovary of 2 distinct carpels united by a single style. Fruit (from the suppression of 1 carpel) a drupe 2—4 in. long, subglobose, smooth, green. Seed usually solitary. Fl. B. I. v. 3, p. 638; Grah. Cat. p. 116; Dalz. & Gibs. Suppl. p. 53; Wight, Icon. t. 441; Bedd. For. Man. in Flor. Sylvat. p. clvii; Trim. Fl. Ceyl. v. 3, p. 128; Talb. Trees, Bomb. ed. 2, p. 224; Woodr. in Journ. Bomb. Nat.

v. 12 (1898) p. 165 ; Watt, Dict. Econ. rod. v. 2, p. 256.—Flowers : June—Jan. VERN. *Sukanu.*

Not very common in the Bombay Presidency though abundant to the south on the Malabar coast. KONKAN : salt-swamps in S. Konkan, *Graham*; Anant (S. Konkan), *Woodrow*. KANARA : salt-swamps of N. Kanara, planted in hedges near the sea-coast at Mardeshvar, *Talbot.*—DISTRIB. Throughout India in salt-swamps or on the sea-coast; Ceylon, Malay Archipelago, China, Australia, Islands of the Pacific.

4. **LOCHNERA,** Reichb.

Annual or perennial herbs or undershrubs. Leaves opposite ; axillary glands numerous, in a fringe, the outer long, filiform, the inner minute. Flowers axillary, solitary or in pairs, white or pink. Calyx herbaceous, 5-partite, without glands inside ; segments subulate, scarcely imbricate. Corolla hypocrateriform ; tube slender, cylindric, slightly inflated over the stamens below the constricted mouth ; lobes overlapping to the left. Stamens on the corolla-tube ; filaments very short ; anthers free from the stigma, ovate-lanceolate, acute, shortly and obtusely 2-lobed at the base. Disk replaced by 2 long linear glands alternating with the carpels. Carpels 2, free ; ovules numerous, 2-seriate ; style filiform ; stigma depressed-capitate, with a long hyaline reflexed frill at the base and a minute obtuse 2-lobed apiculus surrounded by a very short erect membranous rim. Follicles cylindric, slightly spreading. Seeds numerous, small ; testa rugose ; hilum lateral ; albumen fleshy ; cotyledons oblong, flat, shorter than the thick radicle.—DISTRIB. Tropical America, India, Madagascar ; species 3.

The genus *Lochnera* has been separated from the genus *Vinca*, under which it is included in Benth. & Hook. Gen. Pl. v. 2, p. 703. In the genus *Lochnera* the filaments are short and slender, the anthers glabrous at the tip, lanceolate, the connective not produced, and the stigma glabrous. In the genus *Vinca* as now adopted, the filaments are clavate, the anthers hairy at the tip, broadly oblong, the connective produced, and the stigma hairy.

1. **Lochnera pusilla,** *K. Schum. in Engl. & Prantl, Pflanzenf.* v. 4, part 2 (1895) p. 145. An erect annual, 6—18 in. high ; branches numerous, spreading from the base, quadrangular. Leaves 1½—3 by ⅓—1 in., lanceolate, acute, glabrous, with rough margins, base tapering ; petioles ⅛—¼ in. long ; axillary glands long, subulate. Flowers white, small, solitary or in pairs, axillary ; pedicels short. Calyx ⅛—⅕ in. long, glabrous ; segments ⅛—⅕ in. long, lanceolate-subulate. Corolla-tube ¼ in. long, slightly enlarged near the top, the mouth narrow, hairy, the throat glabrous inside ; lobes ⅛ in. long, oblong-obovate, obtuse, apiculate. Follicles 1½—2 in. long, very slender, straight, pointed, membranous, glabrous, striate, diverging. Seeds 1/10—⅛ in. long, cylindric, rounded at both ends and with many muriculate ribs, black when ripe. *Vinca pusilla,* Murr. in Nov. Comm. Soc. Reg. Sc. Gott. v. 3 (1773) p. 66, tab. 2, pl. 1 ; Hook. f. Fl. B. I. v. 3, p. 640 ; Dalz. & Gibs. p. 144 ; Trim. Fl. Ceyl. v. 3, p. 130 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 243. *Catharanthus pusillus,* G. Don,

Gen. Syst. v. 4 (1837) p. 95 ; Grah. Cat. p. 116.—Flowers : July—Sept. VERN. *Sankaphi* ; *Sangkhi*.

KONKAN : near Vingorla, *Dalzell & Gibson*. DECCAN : common, *Dalzell & Gibson, Dr. Lush* ex *Graham*; Poona, *Cooke*!, *Woodrow*! S. M. COUNTRY : Padshapur, *Ritchie*, 1849!; Badami, *Woodrow*! KANARA : *Stocks*!, *Law*! GUJARAT : Udwarra, *Cooke*!—DISTRIB. India (W. Himalaya, Upper Gangetic plain; W. Peninsula); Ceylon.

Lochnera rosea, Reichb. Consp. Reg. Veg. (1828) p. 134. A well known garden shrub, often called (though probably a native of the West Indies) the *Madagascar Periwinkle*. It has obovate leaves and rosy or white flowers. It is propagated by seed and spreads freely when introduced into a garden. K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, part 2, p. 157, fig. 57, A—D ; Stapf, in Dyer, Fl. Trop. Afr. v. 4, p. 118. *Vinca rosea*, Linn. Syst. ed. 10 (1759) p. 944 ; Hook. f. Fl. B. I. v. 3, p. 640 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Gard. in Ind. ed. 5, p. 377 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 244. *Catharanthus roseus*, G. Don, Gen. Syst. v. 4 (1837) p. 95 ; Grah. Cat. p. 115 ; Dalz. & Gibs. Suppl. p. 53.—Flowers more or less throughout the year. VERN. *Sadáphuli*.

5. **RHAZYA**, Decaisne.

Erect glabrous shrubs or undershrubs. Leaves alternate, thick ; nerves obscure. Flowers at the ends of the branches, densely cymose, corymbose or subthyrsoid. Calyx short, 5-partite, without glands inside ; segments acuminate. Corolla hypocrateriform ; tube cylindric, slightly dilated above the stamens, with reflexed hairs beneath the stamens within, throat constricted, hairy inside ; lobes 5, short, broad, overlapping to the left. Stamens above the middle of the tube, included ; anthers lanceolate, the cells rounded at the base. Disk shortly annular or obscure. Carpels of the ovary 2, distinct ; ovules many in each carpel, 2-seriate ; style filiform ; stigma broadly thickened, sometimes appendiculate with a reflexed membrane, with a very short 2-globose apiculus. Follicles 2, erect, narrowly cylindric. Seeds many, subterete or angled and compressed, truncate or winged at both ends ; albumen fleshy ; cotyledons oblong, thick ; radicle superior.—DISTRIB. Western Asia and Arabia ; species 2.

1. **Rhazya stricta**, *Decaisne, in Ann. Sc. Nat.* sér. 2, v. 4 (1835) p. 81. A small glabrous leafy shrub reaching 3 ft. high. Leaves yellowish when dried, sessile, numerous, coriaceous, alternate, 3—4½ by ⅜—¾ in., linear-lanceolate or elliptic-lanceolate, acute, glabrous, base tapering ; nerves (except the midrib) obscure. Flowers white, slightly odorous, in terminal and axillary corymbose cymes ; pedicels short, stout ; bracts lanceolate, acute, pubescent, ciliate. Calyx glabrous ; segments $\frac{1}{10}$ in. long, lanceolate, acute. Corolla ½—⅝ in. long ; tube inflated in the upper half, with hairs in the throat and densely silky hairy below the stamens ; lobes $\frac{1}{12}$ in. long, linear-oblong, apiculate. Ovary glabrous, of 2 distinct carpels ; style

slender ; stigma shortly apiculate, the apiculus 2-lobed. Follicles erect, 2—3 by ¼ in., parallel, cylindric, pointed, straight or slightly curved near the top, pale-brown, striately nerved, glabrous. Seeds ⅜ in. long, oblong, angular, compressed, shortly winged at the ends and sometimes slightly on the angles ; testa strongly rugose, with elevated ridges. Fl. B. I. v. 3, p. 640 ; Boiss. Fl. Orient. v. 4, p. 46 ; Aitch. Pb. & Sind Pl. p. 88 ; Talb. Trees, Bomb. ed. 2, p. 224 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 443.—Flowers : Dec. VERN. *Sevar* ; *Sihar* ; *Ishvarg*.

In the Bombay Presidency confined to Sind. SIND : hills of Sind, *Dalzell*, 83!, *Stocks*, 570! ; Boogta hills, *Vicary*! ; Sehwan, *Cooke*! ; Sind frontier, *Cooke*!—DISTRIB. India (Panjáb) ; Beluchistan, Afghanistan, Arabia.

The dried leaves are sold in the bazaars throughout Sind, and their infusion is said to be a good and peculiar bitter tonic. The dried fruit is used throughout Beluchistan for coagulating milk in the manufacture of cheese. See Watt, Dict. Econ. Prod. l. c.

6. **ELLERTONIA,** Wight.

Glabrous climbing shrubs. Leaves opposite, or 3—4-nately whorled, coriaceous. Flowers slender, in subterminal cymes. Calyx small, deeply 5-fid, without glands inside. Corolla hypocrateriform ; tube cylindric, dilated over the stamens, the throat constricted, naked ; lobes 5, narrow, overlapping to the left. Stamens in the middle of the tube, included ; filaments very short ; anthers free, lanceolate, the cells obtuse at the base. Disk 0. Carpels 2, distinct ; ovules numerous in each carpel, 2—∞-seriate ; style filiform ; stigma ovoid or oblong, with a linear 2-fid apiculus. Follicles 2, linear or linear-oblong, divaricate, terete, coriaceous. Seeds 2-seriate, oblong, flattened, peltately attached, winged at both ends ; albumen scanty ; cotyledons flat, foliaceous ; radicle superior.—DISTRIB. Asia and Madagascar ; species about 4.

The genus was named by Wight after Dr. J. Ellerton Stocks.

1. **Ellertonia Rheedei,** *Wight, Icon.* (1850) t. 1295. A climbing glabrous shrub ; branches twining, slender, terete, often with lenticels. Leaves 3—5 by 1—2 in., bluish-grey beneath when dry, coriaceous, elliptic-oblong, acuminate, glabrous, base rounded or subacute ; main nerves 10—12 pairs, slender ; petioles ¼ in. long. Flowers in 2—3-chotomously branched cymes ; peduncles long, few or several together ; bracts small, acute, persistent ; pedicels short, slender. Calyx glabrous ; segments $\frac{1}{10}$ in. long, ovate, acute, with membranous margins. Corolla-tube ½ in. long, very slender, inflated in the middle, without hairs in the throat ; lobes shorter than the tube, linear-lanceolate, acute. Stamens in the middle of the tube ; filaments hairy ; anthers free, lanceolate, apiculate. Carpels of the ovary distinct ; style slender ; stigma with a deeply 2-fid apiculus. Follicles 2—4 in. long, cylindric, divaricate, slightly recurved, pointed at the apex. Seeds 1¼ in. long, with a membranous wing at each end and an elliptic flattened nucleus. Fl. B. I. v. 3, p. 641 ; Dalz. & Gibs. p. 146 ; Talb. Trees, Bomb. ed. 2, p 224.—Flowers : Nov.—Jan.

A rare tree. KONKAN : *Law* !, *Stocks* !, *Gibson* ! ; Wari country, *Dalzell & Gibson*. KANARA : evergreen forests near the Ainshi Ghát at 1000 ft. elevation, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

7. ALSTONIA, R. Br.

Trees or erect shrubs. Leaves usually whorled. Flowers in subterminal corymbose cymes. Calyx 5-lobed or 5-partite, without glands inside. Corolla hypocrateriform ; tube cylindric, the throat naked or more or less closed by a ring of reflexed hairs ; lobes overlapping to the right or left. Stamens near the top of the tube, included ; anthers free, subacute. Disk annular or sometimes obscure, or sometimes truncate or lobed. Carpels 2, distinct ; ovules numerous in each carpel, ∞-seriate ; style filiform ; stigma minute or shortly 2-fid. Follicles 2, linear, slender. Seeds oblong or linear, flattened, peltately attached, often ciliate ; albumen scanty ; cotyledons oblong, flat ; radicle superior.—DISTRIB. Tropical Asia, Malaya, Australia, Polynesia ; species about 30.

Follicles 12–24 in. long	1. *A. scholaris*.
Follicles 3—5 in. long	2. *A. venenata*.

1. **Alstonia scholaris,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 76. A tall tree 40-60 ft. (under favourable circumstances reaching 90 ft.) high with bitter milky juice, glabrous except the inflorescence ; bark grey, rough ; branches whorled ; young branchlets copiously lenticellate. Leaves 4—7 (rarely more) in a whorl, coriaceous, 4—8 by 1½—2½ in., oblong-lanceolate or obovate, obtuse or sometimes shortly and bluntly acuminate, dark-green above, pale and covered with a whitish bloom beneath, base tapering ; main nerves numerous, nearly horizontal, parallel, uniting in an intramarginal nerve ; petioles ¼—½ in. long. Flowers greenish-white, in umbellately branched many-flowered pubescent capitate cymes ; peduncles 1—2 in. long ; pedicels very short ; bracts oblong, pubescent. Calyx $\frac{1}{10}$—⅛ in. long, pubescent ; lobes $\frac{1}{12}$ in. long, oblong, obtuse, ciliate. Corolla-tube ⅓ in. long, villous inside, the mouth with a ring of hairs ; lobes ⅓ in. long, cuneate-oblong, rounded or sub-truncate at the apex, pubescent. Disk 0. Carpels pubescent. Follicles 12—24 in. long by ⅓ in. in diam., cylindric, pendulous in clusters, becoming completely everted after dehiscence. Seeds ¼ in. long, linear-oblong, flattened, rounded and with a fringe of hairs at both ends, the hairs longer than the seed. Fl. B. I. v. 3, p. 642 ; Grah. Cat. p. 115 ; Dalz & Gibs. p. 145 ; Bedd. Flor. Sylvat. t. 242 ; Trim. Fl. Ceyl. v. 1, p. 133 ; Talb. Trees, Bomb. ed. 2, p. 225 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 1, p. 197.—Flowers : Dec.—Mar. VERN. *Sátvin*.

KONKAN : vale of the Savitri river between Poladpur and the Ghâts, *Graham* ; Garbet ridge, Matheran, *H. M. Birdwood*. DECCAN : near Lanoli, *Woodrow*. KANARA : common in the evergreen forests of N. Kanara, *Talbot*. —DISTRIB. Throughout India, often cultivated ; Ceylon, Java, Tropical Africa, Eastern Australia.

The bark, which is known as *Dita bark*, is an article of commerce and employed in medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Alstonia venenata,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 77. A shrub usually 6—8 ft. high, sometimes a small tree 20 ft. in height (*Talbot*), glabrous. Leaves in whorls of 3—6, membranous, 4—8 by ¾—1¾ in., oblong-lanceolate, very finely acuminate, base much tapered ; main nerves numerous, very close, parallel, slender, uniting in an intra-marginal nerve, midrib strong ; petioles ½—¾ in. long, but obscure owing to the decurrent leaf-blade. Flowers white, inodorous, in terminal subumbellate pedunculate cymes, the flowers often racemose on the branches. Calyx ⅒ in. long ; lobes ⅒ in. long, triangular-ovate, acute, ciliate. Corolla-tube ½—⅞ in. long, slender, swollen at the top over the stamens, mouth contracted and closed by a ring of hairs, throat hairy at and below the insertion of the stamens ; lobes ⅓ in. long, oblong, subacute, glabrous. Disk of 2 ligulate glands alternating with the carpels. Follicles 3—5 by ⅓ in., stalked, falcately curved, tapering at both ends, beaked, glabrous, striate. Seeds ⅜—½ in. long, flattened, linear-oblong, with a tuft of hairs at each end, the hairs shorter than the seed. Fl. B. I. v. 3, p. 642 ; Dalz. & Gibs. Suppl. p. 52 ; Wight, Icon. t. 436 ; Bedd. For. Man. in Flor. Sylvat. p. clx ; Talb. Trees, Bomb. ed. 2, p. 226.—Flowers : Nov.—Jan.

Not common. KONKAN : *Stocks* !, *Dalzell* ! KANARA : evergreen forests of N. Kanara near the Nilkund and Divimana Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula).

8. HOLARRHENA, R. Br.

Trees or shrubs. Leaves opposite, membranous. Flowers white, in terminal or subaxillary many-flowered corymbose cymes. Calyx 5-partite or deeply 5-fid, usually glandular inside ; lobes small, narrow. Corolla hypocrateriform ; tube slender, cylindric, slightly dilated over the stamens, the throat contracted, naked ; lobes 5, oblong, overlapping to the left. Stamens near the base of the tube, included ; filaments short ; anthers lanceolate, free from the style, shortly mucronate, cells rounded at the base. Disk 0. Carpels 2, distinct ; ovules many in each carpel ; style short, filiform ; stigma slightly thickened, oblong-fusiform, the tip entire or 2-fid. Follicles 2, elongate, diverging, incurved, terete. Seeds oblong or linear, compressed, concave, tipped with a deciduous coma ; funicle in the concavity ; albumen scanty ; cotyledons broad, complicate ; radicle short, superior.—DISTRIB. Tropical Asia and Africa ; species 7 or 8.

1. **Holarrhena antidysenterica,** *Wall. Cat.* (1828) 1672. A shrub or small tree, glabrous or pubescent ; bark pale. Leaves 4—8 by 2—4½ in., from broadly ovate to elliptic, obtuse or obtusely acuminate, glabrous or more or less pubescent, base usually obtuse ; main nerves 10—14 pairs, conspicuous ; petioles ⅛ in. long, sometimes 0. Flowers white, inodorous, in terminal corymbose cymes 3—6 in. in diam.; pedicels slender ; bracts small, lanceolate, pubescent and ciliate. Calyx-lobes ⅒—⅛ in. long, oblong-lanceolate, acute, ciliate. Corolla puberulous outside ; tube ⅛—½ in. long, slightly inflated near the base over the stamens, mouth not closed with a ring of hairs, throat hairy inside ; lobes about equalling the tube, oblong,

rounded at the apex, more or less pubescent. Follicles 8—15 in. long, ¼—⅓ in. in diam., cylindric, often dotted with white spots. Seeds ⅓ in. long or rather more, linear-oblong, tipped with a spreading deciduous coma of brown hairs ¾—1 in. long. Fl. B. I. v. 3, p. 644 ; Dalz. & Gibs. p. 145 ; Bedd. For. Man. in Flor. Sylvat. p. clx, t. 20, fig. 6 ; Talb. Trees, Bomb. ed. 2, p. 226 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 4, p. 255. *Wrightia antidysenterica,* Grah. Cat. p. 114 (exclud. some syns.).—Flowers : Feb.—June. VERN. *Kudá ; Pándhrá-kudá ; Dolakuda.*

KONKAN : *Law* !, *Stocks* ! ; near Matheran, *Cooke* ! ; the Ghâts and hilly parts of the Konkan, *Graham.* DECCAN : Koina Valley below Mahableshwar, *Cooke* ! ; Deccan hills, *Woodrow.* S. M. COUNTRY : Belgaum, *Ritchie,* 447 ! KANARA : Supa Ghâts, *Ritchie,* 447 !—DISTRIB. More or less throughout India ; Malacca.

The bark and seeds constitute a very important drug in Hindu Materia Medica, the former being considered a valuable remedy in dysentery and known in commerce as *Conessi* bark. Some confusion has arisen owing to the fact that *Wrightia tinctoria* has been mistaken for *Holarrhena antidysenterica,* which it much resembles and is often sold instead of it. See Watt, Dict. Econ. Prod. l. c.

9. **ERVATAMIA,** Stapf, in Dyer, Fl. Trop. Afr. v. 4, p. 126.

Shrubs or small trees, usually glabrous. Leaves opposite ; axillary stipules usually distinct ; axillary glands small, often numerous. Flowers in terminal or pseudo-axillary usually paired corymbose or umbelliform cymes. Calyx small ; lobes 5, free or connate at the base, glandular inside, imbricate. Corolla hypocrateriform ; tube cylindric, slightly enlarged towards the naked mouth, rarely near or below the middle ; lobes overlapping to the left, rarely to the right. Stamens erect, inserted in the inflated part of the corolla, included ; filaments short ; anthers linear, acute, 2-lobed at the base, polliniferous and dehiscing throughout their entire length. Disk 0. Carpels of the ovary 2, sometimes slightly coherent ; ovules numerous in each carpel, many-seriate ; style usually long, filiform ; stigma at the level of the anthers, clavate or oblong-ellipsoid with a slender papillose bifid apiculus. Follicles twin, more or less coriaceous when mature, obliquely ovoid to lanceolate, usually curved and beaked, rounded on the back, usually 1—3-keeled on each side. Seeds few to many, enveloped in an orange-colored or red aril, more or less irregularly ellipsoid, deeply grooved ventrally ; testa crustaceous, finely sulcate ; albumen copious.—DISTRIB. Tropical Asia, Australia, and Polynesia, 1 species in Madagascar ; species about 30.

Dr. Stapf has broken up the genus *Tabernæmontana,* which had become a heterogeneous assemblage, into several new genera, with the result that the genus *Tabernæmontana* proper has been entirely excluded from the Old World (see Stapf, in Dyer, Fl. Trop. Afr. v. 4, p. 25). Most of the Indian species under the genus *Tabernæmontana* in Hook. f. Fl. B. I. will be transferred to the new genus *Ervatamia.*

1. **Ervatamia Heyneana,** *T. Cooke.* A shrub or small tree 8—15 feet high ; bark grey, rough. Leaves 3—8 by 1½—3 in., coriaceous, oblong or oblong-lanceolate, shortly acuminate, glabrous, base acute ; main nerves 12—16 pairs ; petioles ⅓—¾ in. long, dilated at

the base. Flowers in pedunculate many-flowered cymes ; peduncles 1—2 in. long ; pedicels ½—1 in. long ; buds clavate, rounded at the apex. Calyx ⅛ in. long, coriaceous, glabrous ; lobes 1/12 in. long, broadly oblong, obtuse, with membranous margins. Corolla-tube ⅝—1 in. long, inflated near the top ; limb (when expanded) 1 in. across, with obtuse crisped lobes over-lapping to the right. Follicles 1—1¼ by ⅜—½ in., yellow when ripe, subsessile, curved, somewhat boat-shaped, usually with a short beak which is often recurved, and 2 sharp side-ribs. Seeds ⅓ in. long, surrounded by a red pulp. *Tabernæmontana Heyneana,* Wall. Cat. (1828) 1573 ; in Bot. Reg. (1829) n. 7, sub t. 1273 ; Hook. f. Fl. B. I. v. 3, p. 646 ; Talb. Trees, Bomb. ed. 2, p. 226 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165. *T. crispa,* Dalz. & Gibs. p. 144 (*not* of Roxb.) ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165. *T. dichotoma* (?), Grah. Cat. p. 115 (*not* of Roxb.).—Flowers : Mar.—Apr. VERN. *Nágkudá.*

KONKAN : *Law* !, *Stocks* ! ; Matheran, *Cooke* ! S. M. COUNTRY : Rámghát, *Ritchie,* 1848 ! ; Castlerock, *Bhiva* !, *Woodrow* ! KANARA : *Ritchie,* 1848 ! ; N. Kanara in evergreen forests common, *Talbot.*—DISTRIB. India (W. Peninsula) ; apparently endemic.

Ervatamia coronaria, Stapf, in Dyer, Fl. Trop. Afr. v. 4 (1902) p. 127. A well known glabrous much-branched shrub with pale bark, grown largely (especially that with double flowers) in gardens throughout the Bombay Presidency and indeed throughout India. Its native country is not known with certainty, but it is supposed to be indigenous in N. India. Leaves 3—6 by ¾—1½ in., lanceolate or oblong, acuminate ; main nerves 7—9 pairs ; petioles ⅛—⅓ in. long. Flowers snow-white, fragrant at night, inodorous during the day ; corolla-tube ¾—1 in. long, the mouth naked ; lobes overlapping to the left. There is a long- and a short-styled form, the pistil measuring in the first about ½ in. and in the second ¼ in. long. The long-styled form has the anthers in the middle of the corolla-tube, the other at ⅓ its length from the base. *Tabernæmontana coronaria,* Willd. Enum. Hort. Berol. (1809) p. 275 ; Hook. f. Fl. B. I. v. 3, p. 646 ; Grah. Cat. p. 115 ; Dalz. & Gibs. p. 144 ; Wight, Icon. t. 477 ; Bedd. For. Man. in Flor. Sylvat. p. clix ; Trim. Fl. Ceyl. v. 3, p. 133 ; Talb. Trees, Bomb. ed. 2, p. 227 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Gard. in Ind. ed. 5, p. 377 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 401.—VERN. *Tagar.*

10. **PARSONSIA,** R. Br.

Climbing shrubs. Leaves opposite. Flowers small, white, in terminal or axillary dichotomous cymes or thyrses. Calyx 5-partite, glandular or naked or with 5 scales inside. Corolla hypocrateriform ; tube short, cylindric or subglobose, the throat naked ; lobes 5, very slightly over-lapping to the right. Stamens inserted on the tube ; filaments often twisted ; anthers ½-exserted, oblong-lanceolate or linear, acute, conniving round the stigma and adhering to it, the

cells produced at the base into empty rigid appendages. Disk of 5 lobes or scales. Ovary 2-celled ; ovules many in each cell ; style filiform, the top dilated, truncate ; stigma columnar or elongate-conic. Fruit cylindric, the carpels cohering for a long time, at length separating from the 2 placentas. Seeds linear or oblong, attenuated and comose at the apex ; albumen scanty ; cotyledons oblong-linear, flat ; radicle superior.—DISTRIB. Tropical Asia, Australia, and New Zealand ; species about 12.

1. **Parsonsia spiralis,** *Wall. Cat.* (1828) 1631. A perennial twining glabrous shrub. Leaves large, subcoriaceous, 3—6 by 1½—3½ in., elliptic or oblong-lanceolate, acuminate, glabrous, base rounded or acute ; main nerves 6—8 pairs ; petioles ½—¾ in. long. Flowers greenish, in paniculately corymbose axillary cymes 1½—3 in. in diam ; peduncles variable in length, 1—4 in. long ; pedicels ¼—⅜ in. long ; bracts minute, ovate, acute. Calyx ⅛ in. long, glabrous ; lobes ⅛ in. long, ovate-triangular, subacute, each with a scale at the base inside. Corolla ⅜ in. long ; tube pubescent inside ; lobes rather longer than the tube, thick, oblong, obtuse. Disk of 5 triangular lobes. Stamens inserted in the tube near its base ; filaments spirally twisted together, thickened and pubescent at the base ; anthers ½-exserted. Fruit 5—7 by ¾ in., coriaceous, cylindric, sharply pointed, straight, glabrous, the constituent carpels at length separating. Seeds ½—⅝ in. long, linear, slender, narrowed at the tip, glabrous, striate, the hairs of the coma reaching 1½ in. long. Fl. B. I. v. 3, p. 650 ; Trim. Fl. Ceyl. v. 3, p. 134 ; Talb. Trees, Bomb. ed. 2, p. 227 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165. *Heligme Rheedei,* Wight, Icon. t. 1303 ; Dalz. & Gibs. p. 146. *Aganosma concanensis,* Hook. Icon. Pl. t. 841 ; Dalz. & Gibs. p. 147.—Flowers : Apr. VERN. *Nagal-kudá.*

KONKAN : *Stocks* ! ; S. Konkan, *Dalzell* ! ; Banda in the Wari country, *Dalzell & Gibson.* S. M. COUNTRY : Rámghát, *Ritchie,* 435 ! KANARA : southern Ghâts of N. Kanara, common, *Talbot* ; Sirsi *Woodrow* ; Hulikal, *Bhîva* !—DISTRIB. India (Assam, Lower Bengal, Lower Birma, W. Peninsula) ; Ceylon, Malaya, China.

11. VALLARIS, Burm.

Twining shrubs. Leaves opposite, minutely dotted. Flowers white, in axillary or supra-axillary dichotomous cymes, sometimes reduced to fascicles. Calyx 5-partite, glandular or not inside ; segments narrow. Corolla hypocrateriform or subrotate, the throat naked ; lobes broad, overlapping to the right. Stamens inserted at the top of the corolla-tube ; filaments very short or clavate ; anthers exserted, acuminate, conniving in a cone round the stigma and adherent to it, the connective furnished with a more or less conspicuous fleshy tubercle at the back, the cells produced at the base into short rigid appendages. Disk annular or cupular, with 5 lobes or scales. Carpels of the ovary 2, at first connate ; ovules many in each carpel ; style filiform, pubescent ; stigma thick, obscurely annulate near the base. Fruit oblong, acuminate, the carpels at length separating. Seeds 2-seriate, ovate, acuminate or beaked, compressed,

comose at the apex ; albumen scanty ; cotyledons flat, thin ; radicle superior.—DISTRIB. Tropical Asia and Malaya ; species 5 or 6.

1. **Vallaris Heynei,** *Spreng. Syst.* v. 1 (1825) p. 635. A large woody climbing shrub ; bark thick, yellowish-white, smooth. Leaves 2—4½ by 1—1⅛ in., elliptic-lanceolate or oblong lanceolate, acutely acuminate, usually glabrous, pellucid-dotted, base acute ; petioles ⅛—½ in. long, with glands in the axils. Flowers white, fragrant, in axillary 3—10-flowered lax cymes ; peduncles slender, glabrous or pubescent ; pedicels pubescent, often decurved ; bracts linear-lanceolate, acute, pubescent. Calyx pubescent, ⅛ in. long ; lobes ⅒ in. long, ovate-oblong, obtuse or subacute, pubescent, a little shorter than the corolla-tube, ciliate. Corolla finely pubescent outside ; limb nearly ¾ in. across, spreading, divided about ½-way down into 5 obovate obtuse lobes ; corolla-tube ⅜ in. long. Anthers acute, connivent into a sharp cone, exserted ; filaments broad, linear, pubescent. Disk with 5 oblong obtuse ciliate lobes. Ovary hairy ; style hairy ; stigma pointed. Fruit 4—6 by 1½—2 in., straight, somewhat acuminately pointed, fibrously striate. Seeds ½ in. long, ovoid, beaked ; coma ¼ in. long of silvery-white hairs. Fl. B. I. v. 3, p. 650 ; Dalz. & Gibs. p. 144 ; Trim. Fl. Ceyl. v. 3, p. 135 ; Talb. Trees, Bomb. ed. 2, p. 227 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 219. *Vallaris dichotoma,* Wall. Cat. 1621 ; Wight, Icon. t. 438.—Flowers : Dec.—Apr.

KONKAN : *Law* !, *Dalzell & Gibson*. DECCAN : *Dalzell & Gibson* ; S. Deccan, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1114 ! KANARA : N. Kanara often in hedges, *Talbot* ; Jagalbet, *Woodrow*.—DISTRIB. More or less throughout India, often cultivated ; Ceylon.

12. WRIGHTIA, R. Br.

Shrubs or small trees, often with slender cord-like branches. Leaves opposite. Flowers red, white, or yellow, in terminal or pseudo-axillary cymes. Calyx short, 5-partite, with glands or scales inside. Corolla hypocrateriform ; tube cylindric, usually short, with a corona of 5 or 10 erect usually fimbriate scales in the throat which are either distinct or united into a ring ; lobes overlapping to the left. Stamens at the top of the corolla-tube ; filaments short, dilated ; anthers exserted, sagittate, conniving around and adhering to the stigma, the cells with solid spurs at the base. Disk 0. Carpels of the ovary 2, free or connate ; ovules many in each carpel. Follicles connate or distinct. Seeds linear, attenuated at the apex, with a deciduous coma at the lower end ; albumen scanty or 0 ; cotyledons broad, convolute ; radicle short, superior.—DISTRIB. Tropical Asia and Australia, 1 in Natal ; species about 10.

Fruit rough with white tubercles, grooved at the junction of the carpels	1. *W. tomentosa.*
Fruit without white tubercles, not grooved at the junction of the carpels	2. *W. tinctoria.*

1. **Wrightia tomentosa,** *Roem. & Schult. Syst.* v. 4 (1819) p. 414. A small tree reaching 25—30 ft. high, abounding in yellow

milky juice, with opposite divaricate scabrous branches ; bark smooth, yellowish-grey ; branchlets pubescent ; young parts densely tomentose. Leaves 3—6 by 1½—2½ in., elliptic-oblong, acuminate, tomentose on both sides, drying dark-brown, base acute ; main nerves 8—14 pairs ; petioles ¼ in. long. Flowers malodorous, 1 in. or more across, in short dense erect terminal corymbose tomentose cymes, white when on the tree, turning yellow shortly after being gathered. Calyx pubescent outside, glandular inside ; segments ⅛ in. long, broadly ovate, obtuse, with ciliate membranous margins. Corolla-tube ⅕—¼ in. long ; lobes ½—⅝ in. long, oblong, rounded at the apex ; corona orange, of 5—10 oblong, often laciniate scales. Fruit cylindric, 6—12 by ½ in., with a groove on each side at the junction of the carpels, rough with white tubercles. Seeds ½—⅔ in. long, slender, attenuated at the apex, with a deciduous white coma 1—1½ in. long at the lower end. Fl. B. I. v. 3, p. 653 ; Grah. Cat. p. 114 ; Dalz. & Gibs. p. 145 ; Wight, Icon. t. 443 ; Bedd. For. Man. in Flor. Sylvat. p. clix ; Trim. Fl. Ceyl. v. 3, p. 137 ; Talb. Trees, Bomb. ed. 2, p. 228 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 317. *Wrightia Wallichii*, A. DC. Prodr. v. 8, p. 405 ; Dalz. & Gibs. p. 145 ; Wight, Icon. t. 1296.—Flowers : Apr.—June. VERN. *Kála-inderjav* ; *Támbada-kudá*.

KONKAN : in moist forests, *Talbot* ; common in the northern Ghâts, *Dalzell & Gibson* ; Wari country, *Dalzell & Gibson* ; Sawantvadi, *Woodrow*. KANARA : *Ritchie*, 1118 ! ; Supa Ghâts rare, *Talbot* ; Yacombi, *Woodrow*.—DISTRIB. Throughout Tropical India ; Ceylon, Penang.

2. **Wrightia tinctoria,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 74. A small deciduous tree ; bark scaly, smooth ; young parts glabrous or puberulous. Leaves variable, 3—6 by 1—2¼ in., elliptic-lanceolate or oblong-lanceolate, acuminate, glabrous or the young leaves puberulous beneath, base acute or rounded ; main nerves 6—12 pairs ; petioles ⅛—⅙ in. long. Flowers white, fragrant, in lax terminal cymes which are sometimes 5 in. in diam. with slender spreading dichotomous branches ; bracts minute, ovate. Calyx glabrous, glandular inside ; segments ⅒ in. long, oblong, rounded at the apex and with membranous margins. Corolla-tube short, ⅛ in. long ; lobes ⅛ in. long, oblong, obtuse ; corona of numerous linear scales, some inserted with the filaments and some on the corolla-lobes. Fruit of 2 distinct pendulous follicles, 10—20 by ¾—1¼ in., cylindric, slightly tapering to both ends, glabrous, striate, cohering at first at the tip only. Seeds ½—¾ in. long, pointed at the apex, with a deciduous coma often more than 1½ in. long at the base. Fl. B. I. v. 3, p. 653 ; Grah. Cat. p. 114 ; Dalz. & Gibs. p. 145 ; Bedd. Flor. Sylvat. t. 241 ; Talb. Trees, Bomb. ed. 2, p. 228 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 316. *Wrightia Rothii*, G. Don, Gen. Syst. v. 4 (1837) p. 86 ; Wight, Icon. t. 1319.—Flowers : Mar.—May. VERN. *Kálá-kudá*.

KONKAN : *Law* !, *Gibson*, *Stocks* ! ; jungles south of Nagotna, *Dalzell & Gibson* ; Thana, *Woodrow* ; Matheran, *Cooke* ! DECCAN : Khandala, *Cooke* ! ; near Karli village, *Gammie*. S. M. COUNTRY : Badami, *Cooke* !, *Woodrow* !—DISTRIB. India (Rajputana, Central Provinces, W. Peninsula) ; Ceylon, Timor.

The leaves furnish a kind of indigo and have been used by the natives

of S. India for dyeing. The plant somewhat resembles *Holarrhena antidysenterica* a valuable medicinal plant, and some confusion has arisen in consequence of the resemblance. The anthers of *Holarrhena* are included in the corolla-tube which is without a corona at its mouth, while the seeds of *Holarrhena* have the coma of hairs at the apex, those of *Wrightia* having the coma at the base of the seed. See Watt, Dict. Econ. Prod. l. c.

13. **BEAUMONTIA,** Wall.

Lofty scandent shrubs. Leaves opposite. Flowers very large, white, in terminal cymes ; bracts caducous. Calyx 5-partite, glandular or not inside ; segments large, foliaceous. Corolla infundibuliform or campanulate, throat naked ; lobes broad, overlapping to the right. Stamens at the top of the tube, included ; filaments thickened at the top ; anthers sagittate, conniving round and adhering to the stigma, the cells spurred at the base. Disk deeply 5-lobed. Ovary 2-celled ; ovules many in each cell ; style filiform ; stigma oblong-fusiform. Fruit long, thick, woody, at length separating into 2 follicles. Seeds compressed, ovate or oblong, attenuated at the apex and crowned by a coma ; albumen thin ; cotyledons foliaceous or thick ; radicle short, superior.—DISTRIB. India and the Malay Archipelago ; species 4.

1. **Beaumontia Jerdoniana,** *Wight, Icon.* (1850) tt. 1314—15. A large climbing shrub with woody stem ; branches pale, glabrous. Leaves 6—9 by 2—4½ in., coriaceous, oblong-ovate, abruptly and shortly acuminate, glabrous, base acute ; main nerves 8—15 pairs ; petioles ½ in. long. Flowers very large, in terminal rusty-pubescent cymes ; pedicels rusty-pubescent ; bracts ovate, acute, deciduous. Calyx with 10 linear-subulate glands at the base inside, alternate with the segments ; segments ¾—1 in. long, narrowly lanceolate, acute, pubescent and ciliate. Corolla white, 3—4 in. long, infundibuliform, wide above, gradually tapering towards the base ; lobes about 1 in. long, obovate-oblong, rounded, mucronate. Anthers horny, sagittate, with spurs curving inwards at the base. Disk with 5 broadly ovate-oblong obtuse ciliate lobes. Follicles cylindric, 8—10 by 1—1½ in., somewhat tapering towards the apex, fibrously striate, glabrous. Seeds ½—¾ in. long, ovate-lanceolate, compressed, with a coma of yellowish-white hairs reaching 2¼ in. long at the top. Fl. B. I. v. 3, p. 661 ; Talb. Trees, Bomb. ed. 2, p. 229 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166.—Flowers : Nov.—Dec.

KONKAN : *Stocks* ! ; Wari country, *Dalzell & Gibson*. S. M. COUNTRY : *Dalzell & Gibson*. KANARA : plentiful, *Dalzell & Gibson* ; evergreen forests of the N. Kanara Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

Beaumontia grandiflora, Wall. Tent. Fl. Napal. (1826) t. 7. A gigantic climber, a native of Nipal, grown as an ornamental shrub in gardens and easily propagated by layering. It has obovate-oblong acuminate leaves 7—12 by 3—7 in. and a showy white corolla 3—5 in. long. Fl. B. I. v. 3, p. 660 ; Grah. Cat. p. 113 ; Dalz. &

Gibs. Suppl. p. 52 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Gard. in Ind. ed. 5, p. 381 ; Watt, Dict. Econ. Prod. v. 1, p. 433.—Flowers : Dec.—Feb.

14. **CHONEMORPHA,** G. Don.

Scandent shrubs climbing over high trees. Leaves opposite, large and broad. Flowers large, white, in lax terminal and pseudo-axillary cymes. Calyx tubular, 5-fid, with a ring of glands at the base inside. Corolla hypocrateriform ; tube cylindric, very narrow for a short distance from the base, then enlarged and continued so to the top ; lobes 5, broad, overlapping to the right, twisted to the left. Stamens attached at the top of the narrow portion of the tube, included ; filaments very short, broad ; anthers sagittate, long, pungent, conniving round and adhering to the stigma, the cells spurred below. Disk thick, annular or cupular. Carpels of the ovary distinct ; ovules numerous in each carpel ; style filiform, cleft at the base ; stigma thickened, dilated at the base with an annular membrane, with an apiculus at length 2-fid. Follicles elongate, straight, hard, 3—4-gonous. Seeds ovate or oblong, flat, shortly beaked, crowned with a long coma ; albumen thin ; cotyledons flat, thick, oblong ; radicle short.—DISTRIB. India, Ceylon, and Malaya ; species 2.

1. **Chonemorpha macrophylla,** *G. Don. Gen. Syst.* v. 4 (1837) p. 76. A large climbing shrub with copious milky juice ; older branches stout, often covered with warty excrescences ; younger branches hairy. Leaves very large, 6—12 by 5—10 in. or even more, broadly elliptic or suborbicular, usually shortly and abruptly acuminate, glabrous above, glabrous or more or less pubescent or tomentose and paler beneath, base usually cordate ; main nerves 10—12 pairs, with reticulate veins between ; petioles ¾—1½ in. long. Flowers large, sometimes 3 in. or more across, white, fragrant, in erect terminal racemose cymes ; peduncles variable in length, 2—8 in. long ; bracts ovate, acute, pubescent ; young buds often much twisted to the left. Calyx glabrous or pubescent, divided about ½-way down ; tube with a broad truncate base ; lobes ovate, acute, slightly ciliate. Corolla 3 in. and more across ; tube ¾—1 in. long, naked at the mouth, with 5 longitudinal villous bands inside behind the stamens ; lobes 1½—1¾ in. long, obovate, cuneate, rounded at the apex, overlapping to the right. Anthers nearly ½ in. long, very acute, the cells with slightly divergent spurs at the base ; filaments short, hairy. Follicles about 12 in. long, 3—4-gonous, pointed, glabrous. Seeds ¾ in. long, with a silvery-white coma 2 in. long at the apex. Fl. B. I. v. 3, p. 661 ; Grah. Cat. p. 113 ; Dalz. & Gibs. p. 146 ; Wight, Icon. t. 432 ; Trim. Fl. Ceyl. v. 3, p. 138 ; Talb. Trees, Bomb. ed. 2, p. 229 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 2, p. 271.—Flowers : Apr.—Sept.

KONKAN : *Law* !, *Talbot* ; Banda in the Wari country, *Dalzell & Gibson* ; jungles near Goa, *Dalzell* ! KANARA : evergreen forests of N. Kanara, common in the Supa forests, *Talbot* ; Divimana, *Woodrow* ; Kâla naddi, *Ritchie*, 1842 !—DISTRIB. Throughout India in moist forests ; Ceylon, Malay Peninsula and Archipelago.

15. AGANOSMA, G. Don.

Stout evergreen climbing shrubs. Leaves opposite. Flowers middle-sized, in terminal tomentose cymes. Calyx divided to the base ; sepals linear-lanceolate, acuminate, with subulate glands at the base inside. Corolla hypocrateriform ; lower portion of tube short, cylindric, narrower than the upper campanulate or cylindric portion, the upper portion with bearded longitudinal bands behind the anthers ; lobes linear or lanceolate, overlapping to the right, nearly straight in bud. Stamens at the base of the upper dilated portion of the corolla-tube, included ; anthers sagittate, conniving over and adhering to the stigma, the cells spurred at the base. Disk cupular, 5-lobed. Carpels 2, distinct, the tips usually hirsute ; ovules many in each carpel ; style short ; stigma truncate. Follicles distinct, terete, straight or curved, linear. Seeds ovate or linear-oblong, flattened, glabrous, not beaked, comose ; albumen scanty ; cotyledons oblong ; radicle short.—DISTRIB. India and Malaya ; species 6.

1. **Aganosma cymosa,** *G. Don, Gen. Syst.* v. 4 (1837) p. 77. A large woody much-branched climbing shrub ; young branches appressedly pubescent. Leaves 2—3½ by 1—1¾ in., elliptic or elliptic-lanceolate, acute or acuminate, glabrous above, glabrous or pubescent beneath, base acute ; main nerves 5—8 pairs ; petioles ⅜—½ in. long. Flowers yellowish-white, in dense tomentose cymes ; peduncles short ; buds pointed, tomentose. Calyx divided to the base ; sepals ⅜ in. long, linear-lanceolate, acute, tomentose on both sides. Corolla tomentose outside ; lower narrow portion of the tube about 1/16 in. long, the tube inflated above this portion, and with longitudinal hairy lines inside behind the anthers ; lobes ¼ in. long, oblong-lanceolate, acute. Anthers ⅛ in. long, linear, acuminate, shortly spurred at the base. Carpels of the ovary distinct, hairy at the tip. Follicles 6—9 by ¾ in., linear, cylindric, pointed, at first pubescent, at length glabrous. Seeds ⅝ in. long, elliptic-oblong, compressed, not beaked ; coma 1¼ in. long. Fl. B. I. v. 3, p. 665 ; Trim. Fl. Ceyl. p. 139 ; Talb. Trees, Bomb. ed. 2, p. 229 ; Watt, Dict. Econ. Prod. v. 1, p. 129. *Aganosma elegans,* G. Don, Gen. Syst. v. 4, p. 77 ; Wight, Icon. t. 1304. *Aganosma Doniana,* Wight, Icon. t. 1306 (a small-flowered specimen) ; Dalz. & Gibs. p. 146.—Flowers : Apr.—June.

KONKAN : *Law* ! DECCAN : *Woodrow* ! ; Phunda Ghát, *Dalzell & Gibson.* KANARA : evergreen forests of N. Kanara, *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon, China.

Aganosma caryophyllata, G. Don, Gen. Syst. v. 4 (1837) p. 77. A very large climbing shrub, a native of Lower Bengal, occasionally grown in gardens in Bombay and Poona. It has a woody stem as thick as a man's leg, ovate subcordate leaves 4—5 in. long, and pure-white fragrant flowers about 1¾ in. across, appearing in the rains. It rarely produces seed in the Deccan, but is easily propagated by layering. Fl. B. I. v. 3, p. 664 ; Grah. Cat. p. 113 ; Dalz. & Gibs. Suppl. p. 51 ;

Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Gard. in Ind. ed. 5, p. 381 ; Watt, Dict. Econ. Prod. v. 1, p. 129.—VERN. *Malati* ; *Kemettivalli.*

16. **ANODENDRON,** A. DC.

Scandent glabrous shrubs. Leaves opposite. Flowers small, in axillary or axillary and terminal slender laxly paniculate cymes. Calyx small, 5-cleft, glandular or not inside. Corolla hypocrateriform, the mouth contracted, without scales inside ; lobes 5, narrow, overlapping to the right, twisted to the left. Stamens included, below the middle of the corolla-tube ; filaments very short ; anthers sagittate, conniving round and adhering to the stigma, the cells shortly spurred at the base. Disk annular or cupular. Carpels of the ovary 2, distinct, sunk in the disk and attached to it by their backs at the base ; ovules numerous in each carpel ; style very short ; stigma thick, conical. Follicles divaricate, acuminate, hard. Seeds compressed, ovoid or oblong, beaked, tipped with a long coma.—DISTRIB. India, Malaya ; species 7.

1. **Anodendron paniculatum,** *A. DC. Prodr.* v. 8 (1844) p. 444. A very large branched woody twining shrub ; stems fluted, stout ; bark brown, thick, rather smooth ; young parts glabrous. Leaves 3½—6 by 1½—2½ in., thinly coriaceous, elliptic or oblong, shortly and abruptly acuminate, glabrous and shining, base usually rounded ; main nerves 12—15 pairs, parallel, slender ; petioles ¼—⅝ in. long, stout. Flowers yellow, small, numerous, in large lax trichotomously branched terminal and axillary glabrous paniculate cymes with filiform brachiate branches ; bracts ovate, acute, glabrous ; pedicels ⅛—¼ in. long, slender, glabrous. Calyx glabrous, divided about or rather more than ½-way down ; lobes $\frac{1}{20}$ in. long, ovate, subacute. Corolla-tube $\frac{1}{10}$ in. long, pubescent inside, very slightly enlarged a little above the base over the stamens ; lobes ⅛ in. long, linear, obtuse, slightly falcate, with a few scattered white hairs on the upper surface, overlapping to the right, much twisted to the left in bud. Stamens near the base of the corolla-tube ; filaments short, broad ; anthers sagittate, $\frac{1}{10}$ in. long, spurs short, divergent. Stigma subsessile, conical, pointed. Follicles 4—6 in. long, straight, narrowed from a base ¾ in. in diam. to an obtuse point, glabrous, terete, hard and woody. Seeds 8—12, elliptic-lanceolate, compressed, 1- 1¼ in. long, of which ¼ in. is beak, reddish-brown ; coma white, 2 in. and more long, copious. Fl. B. I. v. 3, p. 668 ; Dalz. & Gibs. p. 147 ; Trim. Fl. Ceyl. v. 3, p. 141 ; Talb. Trees, Bomb. ed. 2, p. 230 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 1, p. 255. *Echites paniculata,* Roxb. Fl. Ind. v. 2, p. 17 ; Wight, Icon. t. 396. *Gymnema nepalense,* Grah. Cat. p. 120 (*not* of Wall.).—Flowers : Dec.—Mar. VERN. *Lámtáni.*

Common on the Ghâts. KONKAN : *Law* !, *Stocks* ! ; Matheran, *Cooke* ! DECCAN : Khandala, *Graham* ; Karli, *Ranade* !, *Gammie* ; Lanoli, *Woodrow.* KANARA : common in the evergreen forests of N. Kanara, *Talbot.*—DISTRIB. India (Silhet, W. Peninsula) ; Ceylon, Java, Timor, Philippine Islands.

17. ICHNOCARPUS, R. Br.

Climbing shrubs. Leaves opposite. Flowers small or minute, in lax many-flowered terminal and axillary paniculate cymes. Calyx 5-fid, glandular or not inside. Corolla hypocrateriform, the throat contracted or villous ; lobes narrowed to an obtuse point, overlapping to the right, the upper half of each lobe deflexed in bud. Stamens at or below the middle of the corolla-tube ; anthers sagittate, conniving over and adhering to the stigma, the cells spurred at the base. Disk free, 5-lobed. Carpels of the ovary 2, distinct, exserted from the disk, hairy ; ovules many in each carpel ; style short ; stigma ovoid or oblong. Follicles spreading or divaricate, slender. Seeds narrowed at the tip, crowned with a deciduous coma ; albumen copious ; cotyledons long, flat ; radicle short, superior.—DISTRIB. India, Malaya, Australia ; species 5 or 6.

1. **Ichnocarpus frutescens,** *Ait. Hort. Kew.* ed. 2, v. 2 (1811) p. 69. A large much-branched twining shrub ; young branches finely fulvous-tomentose. Leaves 1¾—3 by ¾—1½ in., elliptic-oblong, acute or acuminate, glabrous above, glabrous or slightly pubescent and pale beneath, base usually rounded ; main nerves 5—7 pairs, with finely reticulate venation between ; petioles ⅛—¼ in. long. Flowers greenish-white, numerous, in axillary and terminal rusty-pubescent trichotomous pedunculate cymes ; pedicels ⅛—⅙ in. long, often 3 together, rusty-pubescent. Calyx fulvous-hairy, divided ½-way down ; lobes ovate, acute, without glands inside. Corolla-tube 1/10—⅛ in. long with a narrow portion below about 1/30 in. long, the middle portion of the tube much inflated (almost globular) over the stamens, the upper portion constricted below the lobes ; lobes ⅕ in. long, pubescent on the upper side with white hairs, broad and oblong at the base, produced at the apex into a long falcate slender twisted acumen which is deflexed in bud and flower. Disk of 5 erect linear lobes, longer than the hairy ovary. Follicles 4—6 by ⅛ in., straight or slightly curved, very slender, cylindric, rusty-pubescent at first, afterward glabrous. Seeds ½—¾ in long, linear, black, not beaked ; coma as long as the seed, scanty, white. Fl. B. I. v. 3, p. 669 ; Grah. Cat. p. 113 ; Dalz. & Gibs. p. 147 ; Wight, Icon. t. 430 ; Trim. Fl. Ceyl. v. 3, p. 142 ; Talb. Trees, Bomb. ed. 2, p. 230 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prodr. v. 4, p. 326.—Flowers : Nov.—Dec. VERN. *Krishnasarvá.*

KONKAN : Wari country, *Dalzell & Gibson.* S. M. COUNTRY : *Law* ex *Graham* ; Castlerock, *Bhiva* ! ; Dharwar, *Cooke* ! KANARA : common in the evergreen forests of N. Kanara, *Talbot.*—DISTRIB. More or less throughout India ; Ceylon, Java, Australia.

The following plants of the Order not belonging to any of the foregoing genera are more or less cultivated in the Presidency :—

Plumeria acutifolia, Poir. Encyc. Méthod. Suppl. v. 2 (1811) p. 667. A small tree, a native of Tropical America, cultivated and

become naturalized more or less throughout India. It has oblong leaves 8—10 in. long, acute at both ends and only borne during the rainy season. The flowers are white with a golden centre, very fragrant. The plant rarely produces seed in the Bombay Presidency, but is readily propagated by layering and is common about villages. Unsuccessful attempts have been made to manufacture caoutchouc from the tenacious milky juice which exudes plentifully from the tree when wounded. Fl. B. I. v. 3, p. 641 ; Dalz. & Gibs. Suppl. p. 52 ; Talb. Trees Bomb. ed. 2, p. 225 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 165 ; Gard. in Ind. ed. 5, p. 377 ; Watt. Dict. Econ. Prod. v. 6, part 1, p. 297. *Plumeria acuminata*, Ait. Hort. Kew. ed. 2, v. 2, p. 70 ; Grah. Cat. p. 115.—VERN. *Khera-cháphá ; Pándhrá-cháphá.*

The bark and milky juice are used in native medicine. See Watt, Dict. Econ. Prod. l. c.

Plumeria alba, Linn. Sp. Pl. (1753) p. 210. A native of the West Indies. Thrives under the same conditions as *Plumeria acutifolia*, but is a much less common tree, retains its leaves longer and has pure white flowers. Woodr. in Journ. Bomb. Nat. v. 12, p. 165 ; Gard. in Ind. ed. 5, p. 377.

Nerium odorum, Soland. in Hort. Kew. ed. 1, v. 1 (1789) p. 297. A native of the W. Himalaya and Nipal, grown in gardens throughout the Presidency and sometimes found as an escape, though not truly wild, on the banks of streams in the Deccan. It is widely planted in Sind, but not indigenous. The leaves are 4—6 in. long, linear-lanceolate, and the flowers fragrant, 1½ in. in diam., their color varying from pure white to dark-red. Fl. B. I. v. 3, p. 655 ; Grah. Cat. p. 114 ; Talb. Trees, Bomb. ed. 2, p. 228 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Gard. in Ind. ed. 5, p. 376 ; Watt. Dict. Econ. Prod. v. 5, p. 348.—Flowers more or less throughout the year. VERN. *Kanher.*

Roupellia grata, Wall. & Hook. in Bot. Mág. (1849) t. 4466. A stout climbing shrub reaching 20 ft., a native of Sierra Leone, grown in Deccan gardens. It has opposite shining elliptic leaves and produces, during the hot season, large terminal cymes of pale rose-colored flowers 2 in. across, with a ring of processes rising from the thick corolla-lobes. Dalz. & Gibs. Suppl. p. 52 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Gard. in Ind. ed. 5, p. 378.—Flowers : Mar.

Strophanthus Wallichii, A. DC. Prodr. v. 8 (1844) p. 418. A climbing shrub a native of the Khasia hills and the Circars, occasionally grown in gardens. It has elliptic-oblong or obovate leaves, red and white flowers with tails to the corolla-lobes 2—3 in. long. Fl. B. I. v. 3, p. 655. *Strophanthus dichotoma*, Wall. Cat. 1641 (*not* of DC.) ; Wight, Icon. t. 599 ; Grah. Cat. p. 114 ; Dalz. & Gibs. Suppl. p. 52. *Nerium caudatum*, Roxb. Hort. Beng. (1814) p. 84.

Adenium obesum, Roem. & Schult. Syst. v. 4 (1819) p. 411. A curious looking plant found on the dry rocky land about Aden, grown, though rarely, in gardens in the Deccan. It is of slow growth and

has a thick gouty stem rapidly diminishing to short stout branches, which in the hot season bear bright rosy oleander-like flowers. The leaves appear after the flowers. The plant thrives in the Deccan in a soil composed of a mixture of good loam with crushed bricks. It bears pods freely, but does not often ripen seed. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Gard. in Ind. ed. 5, p. 380. *Nerium obesum*, Forsk. Fl. Aegypt-Arab. (1775) p. 205 ; Dalz. & Gibs. Suppl. p. 52.—Flowers : Mar.—Apr. VERN. *Adenachakanher.*

Thevetia neriifolia, Juss. ex Steud. Nom. ed. 2, v. 2 (1841) p. 680. A very common bush or sometimes a small tree, a native of South America and the West Indies, often, in consequence of its rapid growth, used for hedges. It has oleander-like leaves, yellow fragrant flowers, and a fruit the size of a crab-appie. It is sometimes called the *Yellow Oleander*. Watt, Dict. Econ. Prod. v. 6, part 4, p. 47. *Cerbera Thevetia*, Linn. Sp. Pl. (1753) p. 209 ; Grah. Cat. p. 116 ; Dalz. & Gibs. Suppl. p. 53 ; Woodr. Gard. in Ind. ed. 5, p. 378.—VERN. *Pivala-kanher.*

The milky juice of the tree and the kernels of the fruit are poisonous; the bark is bitter and has some repute as a febrifuge. See Watt, Dict. Econ. Prod. l. c.

Allamanda cathartica, Linn. Mantiss. v. 2 (1771) p. 214. A scandent milky shrub a native of Guiana, grown in gardens in the Bombay Presidency and commonly throughout India, probably introduced into Bombay by the Portuguese (*Dalzell*). It has become almost wild near Goa. It has obovate-lanceolate acuminate leaves, 4 in a whorl, and large yellow flowers about 3 in. long. Rarely produces seed in the Bombay Presidency. Watt, Dict. Econ. Prod. v. 1, p. 168. *Allamanda Aubletii*, Pohl, Pl. Bras. v. 1 (1827) p. 75 ; Grah. Cat. p. 116 ; Dalz. & Gibs. Suppl. p. 53.—Flowers more or less throughout the year.

Allamanda neriifolia, Hook. in. Bot. Mag. (1851) t. 4594. An erect evergreen glabrous shrub 3 ft. high, a native of S. America, often grown in gardens. It has opposite or whorled oblong leaves and deep golden-yellow flowers elegantly streaked with orange. Woodr. Gard. in Ind. ed. 5, p. 379.

ORDER LXXXIII. **ASCLEPIADACEÆ.**

Herbs or shrubs frequently twining, often with milky juice. Leaves opposite or whorled, rarely alternate (absent in *Sarcostemma*), entire ; stipules 0. Flowers hermaphrodite, regular, solitary or few or many together, in umbels, umbellate cymes, fascicles or racemes, axillary, lateral (between the bases of the leaves) or terminal. Calyx inferior, usually divided to the base or nearly so ; segments imbricate, usually with minute processes or glands at the base inside. Corolla various, hypogynous, gamopetalous, 5-lobed ; tube usually short (long in *Ceropegia*), often furnished within or at its mouth with a ring of scales or processes (*corolline corona*) ; lobes imbricate contorted or valvate in æstivation, often recurved or connate at their tips.

Stamens 5, inserted at or near the base of the corolla and alternating with its lobes ; filaments rarely free, usually connate into a fleshy tube (*staminal-column*), with its apex often united to the dilated part of the style, usually with fleshy scales or processes on the back (*staminal corona*) ; anthers free or united to the dilated part of the style, 2-celled, the margins of the anthers or their basal prolongations below the cells more or less horny and wing-like (*anther-wings*), usually projecting outwards, the adjacent wings of each pair of anthers nearly meeting and forming narrow fissures leading to the stigmatic cavities ; connectives of the anthers often produced into membranous terminal appendages which are sometimes connate ; pollen forming one or two granular or waxy masses (*pollinia* or *pollen-masses*) in each cell, the pollinia of the adjoining cells of two contiguous anthers united in pairs or fours either directly or by appendages (*caudicles*) to each of the 5 minute turgid or 2-fid bodies (*pollen-carriers* or *corpuscles*) which lie on the dilated part of the style. Ovary superior, of 2 one-celled distinct carpels enclosed within the staminal-column, with their styles united above into a disk (*style-apex* or *style-table*) which is 5-angled, short and included between the anthers, or is produced beyond them into a long or short simple or 2-fid column ; ovules usually numerous, rarely few or solitary, anatropus, pendulous, imbricate in several series on the projecting placenta. Fruit of 2 follicles (1 sometimes suppressed). Seeds compressed, usually flat, often margined, crowned with a tuft of long hairs (*coma*) at one end ; albumen thin or 0 ; embryo large ; cotyledons flat ; radicle short, superior.—DISTRIB. A large Order of more than 1800 species spread through tropical and subtropical regions of the world, a few in temperate regions.

Filaments usually free; pollen-masses granular.
- Corolla-lobes valvate ..... 1. HEMIDESMUS.
- Corolla-lobes overlapping to the right.
  - Corona of 5 free fleshy lobes..... 2. CRYPTOLEPIS.
  - Corona-lobes connate into a ring..... 3. PERIPLOCA.

Filaments connate into a tube; pollen-masses waxy.
- Anthers with a membranous appendage.
  - Pollen-masses 2 in each anther-cell (20 in all).
    - Corolla-lobes overlapping to the right..... 4. TOXOCARPUS.
    - Corolla-lobes valvate ..... 5. GENIANTHUS.
  - Pollen-masses 1 in each anther-cell (10 in all).
    - Pollen-masses pendulous.
      - Corona corolline ..... 6. GLOSSONEMA.
      - Corona staminal
        - Stem erect ..... 7. CALOTROPIS.
        - Stem twining.
          - Corona single, of 5 lobes.
            - Corolla divided ½-way down ... 8. OXYSTELMA.
            - Corolla divided almost to the base ..... 9. PENTATROPIS.
          - Corona double.
            - Follicles with soft spines ..... 10 DÆMIA.
          - Corona single, annular or cupular.
            - Twining or erect leafy shrubs.
              - Flowers large; corona a fleshy ring with truncate margin; follicles thick, obtuse ..... 11. HOLOSTEMMA.

Flowers small; corona a plicate ring with lobed or toothed margin; follicles narrow, tapering... 12. CYNANCHUM.
Trailing leafless shrubs..... 13. SARCOSTEMMA.
Pollen-masses erect, rarely horizontal, never pendulous.
Corona corolline ..... 14. GYMNEMA
Corona staminal, rarely 0.
Corolla-lobes overlapping.
Corona of 5 distinct lobes or tubercles.
Corona-lobes tubercle-like and entirely adnate to the staminal-column or radiating from its base ..... 15. TYLOPHORA.
Corona-lobes with their basal part adnate to the staminal-column, shortly free above.
Corona-lobes with a subulate process on the inner face of their free apical part ..... 16. PERGULARIA.
Corona-lobes without a subulate process on the inner face of their free apical part ..... 17. MARSDENIA.
Corona-lobes scale-like, bifid at their apex; style-apex with a distinct rim. 18. COSMOSTIGMA.
Corolla-lobes valvate.
Corolla-rotate.
Leaves thin; corona small, stellate ..... 19. HETEROSTEMMA.
Leaves thick and fleshy; corona large stellate..... 20. HOYA.
Corolla urceolate or disciform; corona cupular, fleshy ..... 21 CHANTHUS.
Anthers incumbent on the style-apex without a membranous appendage.
Corona double, corolline and staminal.
Calyx turbinate, 5-lobed; corolla rotate..... 22. LEPTADENIA.
Corona double, staminal.
Leafy herbs.
Corolla-tube long ..... 23. CEROPEGIA.
Corolla rotate ..... 24. FREREA.
Leafless or almost leafless herbs with fleshy 4-angled stems and branches..... 25. CARALLUMA.

1. HEMIDESMUS, R. Br.

Twining shrubs. Leaves opposite. Flowers small, greenish-purple, in axillary opposite crowded subsessile cymes. Calyx 5-partite, with glands inside at the base; segments acuminate. Corolla rotate, deeply 5-fid, fleshy; tube very short; lobes thick, valvate. Corona-scales 5, short, thick, on the throat of the corolla and alternate with its lobes. Stamens inserted at the base of the corolla-tube; filaments distinct or subconnate at the base; anthers small, cohering at the apex, terminated by an inflexed membrane; pollen-masses cohering in pairs in each cell, granular, the caudicles of the pollen-

carriers dilated or hooded. Style-apex 5-gonous, flat on the top. Follicles divaricate, long, slender, terete, smooth. Seeds comose.—DISTRIB. India ; species 1.

1. **Hemidesmus indicus,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 57. A perennial prostrate or twining shrub ; rootstock woody ; stems numerous, slender, terete, glabrous or pubescent, striate, thickened at the nodes. Leaves very variable, from elliptic-oblong to linear-lanceolate, 2—4 in. long, but of very variable breadth (from ⅛—1½ in.), apiculate, the narrow leaves acute, the broad ones often obtuse at the apex, glabrous, dark-green, often variegated with white above, pale and sometimes silvery-white and pubescent beneath, with reticulate veins ; petioles ⅛—⅛ in. long. Flowers crowded in subsessile cymes in the opposite axils ; pedicels short, clothed with numerous ovate acute imbricating bracts. Calyx $\frac{1}{10}$ in. long, glabrous outside ; lobes $\frac{1}{16}$ in. long, ovate, acute, with membranous ciliolate margins. Corolla ⅛—¼ in. long, greenish outside, purple inside ; tube very short ; lobes valvate, fleshy, ⅛ in. long, ovate-oblong, acuminate. Follicles 4—6 by ¼ in., cylindric, tapering to a point at the apex, straight or sometimes slightly curved, striate, glabrous. Seeds ¼—⅓ in. long, ovate-oblong, flattened, black ; coma silvery-white, 1 in. long. Fl. B. I. v. 4, p. 5 ; Grah. Cat. p. 122 ; Dalz. & Gibs. p. 147 ; Wight, Icon. t. 594 ; Trim. Fl. Ceyl. v. 3, p. 144 ; Talb. Trees, Bomb. ed. 2, p. 232 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 4, p. 219.—Flowers throughout the greater part of the year. VERN. *Ananlvel* ; *Uparsul.*

A tolerably common plant throughout the Presidency, often found in hedges. KONKAN : *Stocks* !, *Law* ! ; Malabar hill (Bombay) and Wargaon, *Graham.* DECCAN : Poona, *Kanitkar* ! ; hills 10 miles W. of Poona, *Bhiva* ! S. M. COUNTRY : Belgaum, *Ritchie,* 427 ! ; Castlerock, *Bhiva* !

The root has been employed as a substitute for sarsaparilla and in 1864 was made officinal in the British Pharmacopœia. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. India (Northern Provinces, Western Peninsula) ; Ceylon.

2. CRYPTOLEPIS, R. Br.

Glabrous shrubs usually twining. Leaves opposite. Flowers small, in axillary lateral or terminal lax usually few-flowered pedunculate cymes. Calyx 5-partite. Corolla-tube short, cylindric or campanulate ; lobes 5, overlapping to the right in bud ; corona of 5 filiform or fleshy lobes or processes arising from about the middle of the corolla-tube. Stamens inserted towards the base of the corolla-tube ; filaments free ; anthers more or less triangular, with the connective produced into a fleshy apiculus, united at their base to the dilated part of the style, more or less connivent into a cone ; pollen-masses granular, cohering in pairs in each cell ; pollen-carriers more or less spathulate. Style-apex shortly conical, not exserted beyond the anthers. Follicles divaricate, terete, smooth. Seeds comose.—DISTRIB. Africa and Tropical Asia ; species about 20.

1. **Cryptolepis Buchanani,** *Roem. & Schult. Syst.* v. 4 (1819) p. 409. A large twining shrub ; branches terete, pale, glabrous. Leaves 3—5 by 1½—2½ in., elliptic-oblong or sometimes oblong-

lanceolate, rounded, retuse, or sometimes acute, apiculate, green above, whitish beneath, glabrous, base usually acute ; main nerves numerous, slender, nearly at right angles to the midrib, uniting in an intramarginal nerve ; petioles ¼—½ in. long. Flowers greenish-yellow, in short paniculate cymes ; pedicels glabrous ; bracts ovate, acute, with scarious margins. Calyx glabrous ; segments $\frac{1}{16}$ in. long, ovate, subacute. Corolla-tube $\frac{1}{12}$ in. long ; lobes ¼ in. long, linear or linear-lanceolate, subacute ; corona-scales clavate. Follicles 2—4 in. long, straight, rigid, divaricate, gradually tapering to a blunt point from about the middle, where they are ½—¾ in. in diam. Seeds ¼—⅓ in. long, ovate-oblong, black ; coma rather more than 1 in. long. Fl. B. I. v. 4, p. 5 ; Dalz. & Gibs. p. 148 ; Wight, Icon. t. 494 ; Trim. Fl. Ceyl. v. 3, p. 145 ; Talb. Trees, Bomb. ed. 2, p. 232 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 2, p. 642.—Flowers : June—Aug. VERN. *Karanta* ; *Setakávali.*

KONKAN : *Law* !, *Stocks* !, *Dalzell* ! ; Elephanta, *Dalzell & Gibson.* DECCAN : widely, *Woodrow* ; Poona, *Woodrow* ; Bhakam near Poona, *Bhiva* ! S. M. COUNTRY : Belgaum, *Bhiva* !, *Cooke* !, *Ritchie,* 436 ! KANARA : *Talbot* ; Kálanaddi, *Ritchie,* 436 !—DISTRIB. Throughout India ; Ceylon.

3. **PERIPLOCA,** Linn.

Erect or twining shrubs, sometimes leafless. Leaves when present opposite. Flowers in lax axillary or terminal cymes. Calyx 5-partite. Corolla rotate ; lobes 5, usually bearded inside, overlapping to the right ; corona a 10-lobed ring arising from the corolla a little above the stamens, often produced behind the stamens into 5 subulate or branched processes. Stamens inserted a little above the base of the corolla within the corona ; filaments free, broad, short ; anthers bearded on the back or at the base, conniving over and adhering to the style-apex, the connective produced into an apiculus by which they are usually connate at the tips ; pollen-masses in pairs in each cell (20 in all), granular. Style-apex convex or subtruncate. Follicles smooth. Seeds comose.—DISTRIB. S. Europe Asia, Africa ; species about 12.

1. **Periploca aphylla,** *Decaisne, in Jacquem. Voy. Bot.* (1844) p. 109, t. 116. An erect branched milky shrub, very commonly leafless ; stems many, 6—10 ft. long, rarely as thick as a goose-quill, twiggy, glabrous ; bark greenish, rugosely striate. Leaves when present ¼ in. long, ovate-oblong, acute, thick, nerveless. Flowers fragrant, numerous, in glabrous cymes (often opposite) ½—1 in. long and broad, on short thick peduncles or branched from the base ; bracts ovate-oblong, subobtuse, with scarious margins, breaking off about the middle and leaving the lower thick portion ; buds globose. Calyx ⅛ in. long, glabrous ; segments $\frac{1}{16}$ in. long, broadly ovate-oblong, obtuse, with scarious margins. Corolla greenish outside, dark-purple within ; tube very short ; lobes ⅛—¼ in. long, oblong, obtuse, densely bearded inside near the apex, reflexed ; corona-lobes ¼ in. long, the basal portion transversely oblong, truncate, the apical portion filiform, recurved at the apex. Filaments of the stamens

glabrous; anthers deltoid-ovate, hairy on the back. Follicles on short thick peduncles, widely divergent, 3—4 by ¼ in., rigid, woody, terete, pointed. Seeds ¼ in. long; coma 1 in. long. Fl. B. I. v. 4, p. 12; Aitch. Pb. & Sind Pl. p. 90; Talb. Trees, Bomb. ed. 2, p. 233; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166; Watt, Dict. Econ. Prod. v. 6, part 1, p. 140.—Flowers: Mar.—Apr. VERN. *Ransher.*

In the Bombay Presidency confined apparently to Sind. SIND: *Stocks!*, *Vicary!*; Thano-Bula-Khán, *Woodrow.*—DISTRIB. India (Panjáb); Afghanistan, Beluchistan, Persia, Arabia, Egypt.

The milky juice is used in Sind as an external application to tumors, the fibre of the stems for making ropes for wells, and the fragrant flowers are eaten, tasting, according to Stocks, like raisins. See Watt, Dict. Econ. Prod. l. c.

4. **TOXOCARPUS,** Wight & Arn.

Twining shrubs. Leaves opposite. Flowers small, in axillary dichotomous paniculate cymes. Calyx minute, 5-partite. Corolla-tube short; lobes 5, linear-oblong, recurved, glabrous, overlapping to the left; corona staminal, of 5 dorsally flattened lobes arising from the back of the filaments, alternating with the corolla-lobes. Stamens inserted at the bottom of the corolla; filaments connate; anthers small, erect or conniving round the style-apex, usually with a minutely fimbriate submembranous border; pollen-masses minute, 2 in each cell (20 in all), pendulous, waxy. Style-apex produced into a long slender erect beak. Follicles smooth. Seeds comose.—DISTRIB. Tropical Asia and Africa; species about 15.

1. **Toxocarpus Kleinii,** *Wight & Arn. in Wight, Contrib.* (1834) p. 61. A twining shrub; young parts rufous-hairy; stem long, more or less rufous-tomentose. Leaves 2½—3½ by 1¼—2¼ in., ovate-elliptic or obovate, sometimes lanceolate, shortly acuminate, glabrous above, glabrous or pubescent beneath, base acute; main nerves 4—5 pairs, slender, with reticulate veins between; petioles ⅛—½ in. long, pubescent. Flowers in rusty-pubescent paniculate axillary cymes; pedicels variable in length, sometimes nearly ½ in. long, sometimes almost 0, rufous-pubescent; bracts linear-oblong, obtuse, hairy. Calyx rufous-hairy; segments ⅛ in. long, ovate-oblong, obtuse or subacute, with scarious margins. Corolla glabrous; tube ⅛ in. long; lobes ¼—⅜ in. long, strap-shaped, much recurved, overlapping to the left in bud. Beak of style-apex long, slender. Follicles 3—6 by ¼—⅓ in., tapering to a point at the apex, slightly curved, glabrous. Seeds ⅓ in. long, ovate-lanceolate, scarcely beaked; coma 1 in. long. Fl. B. I. v. 4, p. 14; Grah. Cat. p. 122; Wight, Icon. t. 886; Talb. Trees, Bomb. ed. 2, p. 233; Trim. Fl. Ceyl. v. 3, p. 146.—Flowers: Nov.-Mar.

A rare plant in the Bombay Presidency. KONKAN: *Stocks!*, *Law!*, *Talbot*; Salsette, *Graham.*—DISTRIB. India (W. Peninsula); Ceylon.

Toxocarpus concanensis, Hook. f. Fl. B. I. v. 4 (1883) p. 14, with obovate elliptic cuspidate mottled glabrous or pubescent leaves 3—5 by 2¼—3 in., is given in the Flora of British India as occurring in Kanara (though not found there by Mr. Talbot), and as occurring in the Bababudan hills (which are

outside our area), *fide* Mr. Law. Except in the size of the leaves it does not seem to differ from *T. Kleinii*.

5. GENIANTHUS, Hook. f.

Twining shrubs. Leaves opposite. Flowers small, in axillary subsimple or dichotomously branched cymes. Calyx minute ; lobes oblong, obtuse. Corolla-tube short ; lobes narrow, spreading and recurved, usually villous to the tip on the inner face, valvate ; corona of 5 scales adnate to the column. Staminal-column minute ; pollen-masses 2 in each cell (20 in all), minute, waxy. Style-apex sessile and capitate, or long and slender.—DISTRIB. Tropical Asia and Malaya ; species 3 or 4.

A new genus described by Sir J. Hooker in Fl. B. I. v. 4 (1883) p. 15. The genus is distinguished from *Toxocarpus* by the bearded corolla-lobes and their valvate æstivation.

1. **Genianthus laurifolius,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 16. A twining shrub ; stem terete, striate, pustular, glabrous. Leaves 3—4 by 1½—2½ in., broadly elliptic, acuminate, glabrous, base acute ; main nerves 8—10 pairs, slender ; petioles ½—⅞ in. long. Flowers in axillary slender branched paniculate cymes, of 2 forms on the same cyme, one with narrow linear obtuse reflexed corolla-lobes densely bearded inside, the other with broader oblong segments nearly glabrous inside, scarcely reflexed ; pedicels short or 0. Calyx pubescent outside, segments $\frac{1}{20}$ in. long, oblong, obtuse. Corolla-lobes about $\frac{1}{10}$ in. long ; tube scarcely any. Follicles 3—5 by ¼ in., slender, terete, curved, pointed, often pustular. Seeds 1 in. long, linear-lanceolate, flattened, not beaked, dark-brown ; coma ¾ in. long. Talb. Trees, Bomb. ed. 2, p. 233 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166. *Toxocarpus crassifolius,* Dalz. & Gibs. p. 148. *Toxocarpus laurifolius,* Wight, Contrib. p. 61, and Icon. t. 598.—Flowers : Oct.—Dec.

KONKAN : *Stocks* !, *Dalzell* ! KANARA : N. Kanara Ghâts in evergreen forests, common in the forests near the Nilkund and Gairsoppa Ghâts, *Talbot.*—DISTRIB. India (Sikkim Himalaya, W. Peninsula).

6. GLOSSONEMA, Decaisne.

Dwarf perennial (rarely annual) herbs, often hoary, branched from the base. Leaves opposite. Flowers small, in few-flowered lateral or sublateral cymes arising from between the base of the petioles, rarely solitary. Calyx 5-partite. Corolla subcampanulate ; tube short ; lobes 5, suberect or spreading, overlapping to the right ; corona arising from the corolla-tube a little above the origin of the staminal-column, of 5 broad hyaline obtuse or acute entire or bifid lobes alternating with the corolla-lobes. Staminal-column short ; anthers terminated by an inflexed membrane ; pollen-masses pendulous, solitary in each anther-cell, attached in pairs to the pollen-carriers by short almost obsolete caudicles. Style-apex usually exserted beyond the anthers, fleshy, conical, clavate or peltate. Follicles thick, acuminate, usually echinate. Seeds comose.—DISTRIB. India (Sind), Tropical Africa, Arabia ; species 6.

1. **Glossonema varians,** *Benth. in Benth. & Hook. f. Gen. Pl.* v. 2 (1876) p. 748. A small erect annual herb 4—6 in. high, much branched from near the base ; branches pubescent. Leaves fleshy, hairy on both sides, 1—2½ by ¾—2 in., the lower leaves rotund-ovate, subcordate, obtuse or retuse, the upper elliptic, acuminate ; margins entire or crisped ; petioles ¼—⅞ in. long. Flowers fragrant, white or yellow, in subsessile umbellate 2—8-flowered cymes ; pedicels very short ; buds ovoid. Calyx hairy, divided nearly to the base ; segments ⅛ in. long, linear, acute, ciliate. Corolla ¼ in. long, glabrous ; lobes ⅛—⅙ in. long, oblong, obtuse, veined ; corona-lobes about 1/10 in. long, erecto-patent, entire or bifid at the apex. Pollen-masses attached to the pollen-carriers by very short caudicles. Style-apex conical, fleshy, much exserted. Follicles 1—2 in. long, ellipsoid, beaked, attenuated at the base, covered with short soft scattered spines and minutely cano-pubescent. Seeds ⅛—¼ in. long, broadly ovate, acute, much flattened, and with very thin (almost papery) margins, sinuate-dentate at the broader end (*Stocks*), yellowish-brown ; coma ½ in. long, white. Fl. B. I. v. 4, p. 16 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166. *Mastostigma varians,* Stocks, in Hook. Icon. Pl. v. 9 (1852) t. 863 ; Aitch. Pb. & Sind Pl. p. 89.—Flowers : Dec. VERN. *Munga.*

In the Bombay Presidency confined to Sind. SIND : *Vicary* !, *Dalzell* !, *Bhola Puran* !, *Woodrow* ; Jemadar ka Landa near Karachi, *Stocks*, 467 ! ; Karachi, in stony ground very common, *Stocks*, 64 !—DISTRIB. Beluchistan, Persia.

The follicles are eaten raw in Sind.

7. CALOTROPIS, R. Br.

Large erect shrubs or small trees. Leaves opposite, broad, subsessile. Flowers of medium size, in umbellate or subracemose lateral pedunculate cymes. Calyx of 5 distinct sepals, glandular inside, broadly ovate. Corolla broadly campanulate or subrotate, divided more than ½-way down ; lobes broad, naked, valvate ; corona of 5 fleshy laterally compressed lobes, adnate to and standing out as wide buttresses from the staminal-column with an upcurved and involute spur at the base and bifid at, or with 2 obtuse auricles a little below, the apex. Anthers short and broad, with short broad membranous appendages inflexed over the depressed pentagonal summit of the style-apex ; pollen-masses solitary in each anther-cell, pendulous, attached to the pollen-carriers by short slender caudicles. Follicles short, thick, not echinate. Seeds comose.—DISTRIB. Species 4, of which 3 are confined to India, S. China, and the Malay Archipelago, the other extending into Africa.

Corona-lobes narrow, shorter than the staminal-column, with 2 obtuse auricles just below the entire apex..... 1. *C. gigantea.*
Corona-lobes broad, equalling or longer than the staminal-column, without auricles below the bifid apex..... 2. *C. procera.*

1. **Calotropis gigantea,** *R. Br. in Ait. Hort. Kew.* ed. 2, v. 2 (1811) p. 78. A tall shrub reaching 8-10 ft. high ; bark yellowish-white, furrowed ; branches stout, terete, more or less covered (espe-

cially the younger ones) with fine appressed cottony pubescence. Leaves 4—8 by 1½—4 in., sessile or nearly so, elliptic-oblong or obovate-oblong, acute, thick, glaucous-green, clothed beneath and more or less above with fine cottony tomentum ; base narrow, cordate, sometimes amplexicaul. Flowers inodorous, purplish or white, 1½—2 in. in diam., in umbellate lateral cymes ; peduncles from between the petioles, 2—3½ in. long, dilated at the base ; pedicels much longer than the flowers, covered with cottony wool ; buds ovoid. Calyx divided to the base ; sepals ¼ by ⅛ in., ovate, acute, cottony. Corolla ¾ in. long or more ; lobes ½—⅝ in. long, deltoid-ovate, subacute, revolute and twisted in age ; lobes of the corona ½ in. long by ⅓ in. broad in the middle, shorter than the column, the back much curved towards the column above the obtuse spur, pubescent on the slightly thickened margin, the apex rounded (not bifid) with 2 obtuse auricles just below it. Follicles 3½—4 in. long, broad, thick, fleshy, ventricose, green. Seeds numerous, ¼ by ⅓ in., broadly ovate, flattened, narrowly margined, minutely tomentose, brown ; coma 1—1¼ in. long. Fl. B. I. v. 4, p. 17 ; Grah. Cat. p. 120 ; Dalz. & Gibs. p. 149 ; Wight, Ill. tt. 155, 156 A ; Trim. Fl. Ceyl. v. 3, p. 148 ; Talb. Trees, Bomb. ed. 2, p. 234 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 2, p. 34.—Flowers : Feb.—July. VERN. *A'k* ; *Mádár* ; *Rui*.

Throughout the Presidency, a common weed in waste places. KONKAN : *Dalzell & Gibson*. DECCAN : *J. G. Woodrow*! S. M. COUNTRY : Belgaum district, *Talbot*. KANARA : Kála naddi, *Ritchie*, 424! GUJARAT : *Woodrow*.—DISTRIB. Throughout India ; Ceylon, Malay Islands, S. China.

All parts of the plant are useful. The stems yield a valuable fibre which is however difficult to extract, though experiments have often been made with this object. The floss from the seeds is soft and very white and is employed for stuffing pillows. The milky sap furnishes a kind of guttapercha, and is used as well as the root-bark medicinally. The wood has been used for gunpowder-charcoal. See Watt, Dict. Econ. Prod. l. c.

2. **Calotropis procera,** *R. Br. in Ait. Hort. Kew.* ed. 2, v. 2 (1811) p. 78. An erect shrub usually 6—8 ft. high (sometimes growing much higher in arid places) ; young parts clothed with white cottony tomentum ; bark soft, corky, spongy. Leaves subsessile, usually 2¾—6 by 1¾—3½ (exceptionally 9 by 6 in.), broadly ovate, ovate-oblong, elliptic or obovate, with a short abrupt acumination, cottony-pubescent when young, at length glabrous. Flowers in umbellate cymes which are at first tomentose, but becoming nearly glabrous ; peduncles 1—3 in. long, lateral ; pedicels ¼ in. long ; buds globose. Calyx divided to the base, glabrous ; sepals ⅓ by ⅒ in., ovate, acute. Corolla glabrous, about 1 in. across, divided about ⅔ of the way down ; lobes usually erect, ovate, acute, ⅜ in. long ; lobes of the corona ¼ by ⅙—⅓ in., compressed, equalling or exceeding the staminal-column, the back nearly straight or sometimes slightly curved away from the column above the upcurved subacute spur, usually glabrous but sometimes slightly scabrous-pubescent along the outer margin, the apex obliquely truncate, bifid and without auricles. Follicles 3—4 by 2—3 in , subglobose, ellipsoid or ovoid. Seeds ¼ by ⅛ in., broadly ovate, acute, flattened, narrowly margined, minutely tomentose, light-brown ; coma 1¼ in. long. Fl. B. I. v. 4, p. 18 ;

Dalz. & Gibs. p. 149 ; Wight, Icon. t. 1278 ; Talb. Trees, Bomb. ed. 2, p. 234 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 2, p. 49.—Flowers : Dec. VERN. *A'k* ; *Rui.*

Pretty common in dry parts of the Presidency, abundant in Sind. DECCAN : Poona, *Cooke* !, *Woodrow* ; Jejuri, *Ranade* ! SIND : *Cooke* !, *Stocks*, 423 !— DISTRIB. More or less in warm dry places throughout India ; Ava, Persia, Tropical Africa.

Very similar to the last species, from which it differs in the smaller flowers, but more especially in the corona. Mr. Talbot (Trees, Bomb. l. c.) aptly likens the shape of the corona-lobes of *C. gigantea* to that of the mythological dolphin, that of the corona of *C. procera* to the prow of a steamer.

This plant is used for the same purposes as the former, and it has been proposed to grow it in Sind, where it flourishes, as a fibre plant, but the quantity of fibre obtained from a stem is so small and the difficulty of separation hitherto has been so great, that this has not been attempted. Watt's Dictionary of Economic Products contains much valuable information on the subject.

8. **OXYSTELMA,** R. Br.

Twining glabrous shrubs or undershrubs. Leaves opposite. Flowers large and handsome, in lax racemose or subumbellate cymes or solitary ; pedicels filiform. Calyx small, 5-partite, glandular inside. Corolla with a very short tube with a densely pubescent ring at its mouth (sometimes described as a corolline corona) within, and a broad saucer-shaped limb 5-lobed ½-way down ; lobes deltoid, acute, valvate at the base, the tips overlapping to the right in bud ; corona of 5 erect ovate or lanceolate acute lobes with 2 keels inside arising from the staminal-column. Stamens inserted at the base of the corolla-tube ; filaments short, connate ; anthers erect, terminated by a short inflexed membranous appendage ; pollen-masses pendulous, waxy, elongate-clavate, compressed, attached in pairs by their attenuated ends to the short ovoid pollen-carriers. Style-apex truncate or convex, not exserted beyond the anthers. Follicles often solitary, oblong and obtuse or lanceolate and acute. Seeds comose.—DISTRIB. Tropical Asia and Africa ; species 3 or 4.

1. **Oxystelma esculentum,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 40. A perennial twining herb with milky juice ; roots fibrous from the lower nodes ; stems numerous, long, much-branched, slender, glabrous. Leaves deciduous, 1¾—3½ by ⅛—⅓ in., linear or linear-lanceolate, acute, thin, pale-green, glabrous, base acute or rounded ; petioles ⅛—½ in. long, very slender. Flowers large, strikingly handsome, drooping, in pedunculate lateral subumbellate or racemose few (usually 2—4) -flowered cymes longer than the leaves ; peduncles long, sometimes reaching 1½ in. or more, slender ; pedicels ½—¾ in. long, filiform, thickened upwards. Calyx glabrous, divided nearly to the base ; segments 5, oblong-lanceolate, acute, ⅛ in. long, glandular inside. Corolla pale rose-colored or nearly white, glabrous, more than 1 in. across when expanded, saucer-shaped ; tube scarcely any, the mouth with a densely pubescent ring ; limb ¾ in. long ; lobes ⅜ in. long, deltoid, acute, conspicuously ciliate, veined with purple ; corona staminal, the lobes ⅛ in. long, ovate-lanceolate, acuminate,

with incurved entire subulate tips. Anthers with inflexed membranous deltoid tips ; pollen-masses 1 in each cell, pendulous. Style-apex slightly convex. Follicles 1½—2½ in. long, ovoid-lanceolate, tapering to a point, glabrous. Seeds very numerous, ⅛ in. long, broadly ovate, flat, the margins thin, often minutely and obscurely denticulate near the base, black ; coma ¾ in. long. Fl. B. I. v. 4, p. 17 ; Grah. Cat. p. 121 ; Dalz. & Gibs. p. 150 ; Wight, Contrib. p. 54 ; Trim. Fl. Ceyl. v. 3, p. 147 ; Aitch. Pb. & Sind Pl. p. 91 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 ; Watt, Dict. Econ. Prod. v. 5, p. 675. *Periploca esculenta*, Linn. f. Suppl. p. 168 ; Roxb. Cor. Pl. v. 1, p. 13, t. 11.—Flowers. Dec. VERN. *Dudhâni.*

KONKAN : *Law* ! DECCAN : Poona, on the river bank near the Sangam, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie*, 429 ! KANARA : *Law* ! SIND : *Stocks*, 543 !, *Cooke* !, *Bhola Puran* !—DISTRIB. Throughout the plains and lower hills of India, usually near water; Ceylon, Java.

The fruit is said to be eaten in Sind, where the plant is plentiful. The milky juice and the roots are used medicinally. See Watt, Dict. Econ. Prod. l. c.

VAR. *Wallichii.* Follicles short, 1½ by 1 in., oblong, rounded at both ends. *Oxystelma Wallichii* (sp.), Wight, Contrib. (1834) p. 54 ; DC. Prodr. v. 8 (1844) p. 543.

Note.—The follicles of the variety *Wallichii* differ very much from those of the specimen of *Oxystelma esculentum* in the British Museum collected by König on the Coromandel coast in 1774, and which is regarded as R. Brown's type of the genus *Oxystelma* and of the species *esculentum*. The follicles of that specimen are ovoid-lanceolate, 2½ by ½ in., tapering to a point, while the follicles of Wight's *O. Wallichii* are broad, oblong, very blunt and rounded at both ends, 1½ by 1 in. The description of the follicles of *Periploca esculenta*, Linn. f. (Suppl. p. 168), is meagre and indefinite. They are described as glabrous, oblong, inflated, a description which does not suit the follicles of König's specimen, which are apparently Linnæus's type. There are no follicles with Linnæus's specimens in Linnæus's Herbarium, nor are there any follicles with Roxburgh's Coromandel specimens. R. Brown follows Linnæus f. in describing the follicles. Roxburgh, whom R. Brown cites, gives an excellent figure (Cor. Pl. v. 1, p. 13, t. 11), but does not show the follicles, which he follows Linnæus f. in describing as oblong, inflated. Wight (Contrib. p. 54) assumes that Linnæus and R. Brown meant the plant with tapering follicles, but as far as the description goes, Linnæus may just as well have intended *O. Wallichii*. Mr. N. E. Brown, in Dyer, Fl. Trop. Afr. v. 4, p. 382, apparently takes this latter view and considers the typical *O. esculentum* to be the plant with rounded and obtuse follicles. I have followed Wight as an undeniable authority on the question, which cannot, it seems to me, be ever satisfactorily settled.

9. **PENTATROPIS,** R. Br.

Slender twining herbs or undershrubs. Leaves opposite, petiolate. Flowers small, in lateral umbellate cymes. Calyx 5-partite. Corolla divided nearly to the base ; lobes 5, elongate, suberect, overlapping to the right, twisted to the left , corona simple, of 5 laterally compressed lobes adnate for ½ to ⅔ of their length to the backs of the anthers. Staminal-column arising from the base of the corolla ; filaments connate ; anthers with membranous appendages inflexed over the truncate apex of the style ; pollen-masses pendulous, 1 in each anther-cell, attached by short slender caudicles to the pollen-carriers, not

compressed, waxy. Follicles lanceolate, narrowed into a beak, small, glabrous. Seeds comose. —DISTRIB. Tropical Asia, Africa, and Australia ; species about 6.

Corolla-lobes with long linear tails	1. *P. cynanchoides.*
Corolla-lobes lanceolate-deltoid (not tailed)	2. *P. microphylla.*

1. **Pentatropis cynanchoides,** *R. Br. in Salt, Voy. Abyss.* (1814) Append. p. 64. Shrubby, glabrous or nearly so ; stems twining, slender. Leaves ¾—1½ in. long, very variable in breadth (¼—¾ in.), ovate or oblong or elliptic or linear, acute or obtuse, usually mucronate, more or less fleshy, glabrous ; petioles 1/10—⅓ in. long, slender. Flowers greenish, in lateral umbellate 3—6-flowered cymes ; peduncles from between the petioles, slender, rarely reaching ¼ in. long, sometimes almost 0 ; pedicels ¼—½ in. long, filiform ; buds acuminate. Calyx deeply divided, slightly pubescent ; segments 1/20—1/10 in. long, ovate, acuminate. Corolla divided almost to the base ; lobes ⅕—½ in. long, narrowly linear from a triangular base which is about ⅛ in. broad, glabrous outside, minutely puberulous inside, the apex often curled ; corona-lobes 1/16 in. long, arising a little above the base of the staminal-column, slightly shorter than the column, deltoid-ovate, with subtruncate base and acute or acuminate apex, compressed, adnate to the column for ⅔ of its length. Follicles 2—3 by ½ in., lanceolate, tapering into a beak, smooth, glabrous. Seeds ⅛ in. long, ovate, flattened, minutely and irregularly crenate at the lower end ; coma ¾—1 in. long. N. E. Brown, in Dyer, Flor. Trop. Afr. v. 4, p. 380. *Pentatropis spiralis,* Decaisne, in Ann. Sc. Nat. sér. 2, v. 9 (1838) p. 327 ; Hook. f. Fl. B. I. v. 4, p. 19 ; Aitch. Pb. & Sind Pl. p. 90 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 132.—Flowers : Feb. VERN. *Ambarvel.*

In the Bombay Presidency confined to Sind. SIND : *Stocks!, Dalzell!, Bhola Puran!* ; Tata, *Cooke!* ; Jemadar ka Landa near Karachi, *Stocks,* 429! ; near Karachi, *Vicary!*—DISTRIB. India (Panjáb and eastwards to the Jumna river) ; Afghanistan, Beluchistan, Arabia, Tropical Africa.

2. **Pentatropis microphylla,** *Wight & Arn. in Wight, Contrib.* p. 52. A twining glabrous perennial herb, often slightly woody at the base ; stems very slender. Leaves ⅛—1 by ⅛—¾ in., broadly oblong or ovate-elliptic, obtuse, mucronate, base rounded or cordate ; petioles ⅛—¼ in. long. Flowers in lateral few-flowered cymes ; peduncles ⅛—1/10 in. long or less ; pedicels filiform, ½ in. long ; buds subglobose. Calyx deeply divided ; segments 1/10 in. long, lanceolate acute. Corolla divided almost to the base ; lobes ⅕ in. long, lanceolate-deltoid, acute, 1/10 in. broad at the base, spreading or reflexed ; corona-lobes 1/12 in. long, triangular, about equalling the column or a little shorter than it, acute at the apex, curving outwards to an acute base. Follicles 1½—2½ in. long, tapering to a long point, glabrous, the valves much everted after dehiscence. Seeds ¼ by ⅛ in., ovate, narrowly margined, truncate at the apex, slightly crenulate at the base ; coma ½—¾ in. long. Fl. B. I. v. 4, p. 20 ; Grah. Cat. p. 120 ; Dalz. & Gibs. p. 149 ; Wight, Icon. t. 352 ; Trim. Fl. Ceyl. v. 3, p. 149 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 131.—Flowers : Oct.—Dec. VERN. *Parparam.*

Tolerably common throughout the Presidency. KONKAN : Salsette, *Graham, Dalzell & Gibson*; Malabar hill (Bombay), *Graham*. DECCAN : *Dalzell & Gibson*; Bijapur, *Bhiva* !, *Woodrow* !; Gokak, *Bhiva* ! GUJARAT : *Dalzell & Gibson*; Dangs, *Bhiva* !—DISTRIB. India (Bengal, Pegu, W. Peninsula); Ceylon.

10. DÆMIA, R. Br.

Twining pubescent or tomentose perennial herbs or undershrubs. Leaves opposite, cordate. Flowers medium-sized, in lateral racemose or corymbose pedunculate cymes. Calyx 5-partite, glandular inside. Corolla yellowish- or greenish-white ; tube short, campanulate or cylindric ; lobes 5, ovate, spreading, overlapping to the right in bud ; corona double, the outer at the base of the staminal-column, membranous, annular, shortly 5-lobed, the lobes subquadrate or oblong, obtuse, truncate or denticulate, the inner corona of 5 erect fleshy lobes spurred at the base, adnate to the staminal-column up to the anthers, free above and produced into subulate horns incurved over the style-apex. Staminal-column arising at the mouth of the corolla-tube ; anthers erect, with a membranous inflexed appendage. Style-apex exserted ; pollen-masses waxy, 1 in each anther-cell, compressed, attached in pairs to the pollen-carriers by their attenuated ends without caudicles. Follicles lanceolate, usually echinate. Seeds comose.—DISTRIB. Tropical Africa, Tropical and Subtropical Asia ; species 6.

1. **Dæmia extensa,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 50. A perennial twining herb, fœtid when bruised and with much milky juice ; stems clothed with spreading hairs. Leaves thin, 2—4 by 1½—3½ in., broadly ovate or suborbicular, acuminate, glabrous or more or less shortly pubescent above, usually valvety-pubescent beneath, the margins ciliate, base deeply cordate, the basal lobes semi-orbicular ; petioles ¾—2½ in. long, pubescent. Flowers greenish-yellow or dull white, in lateral cymes which are at first corymbose, afterwards racemose ; peduncles pubescent, coming off from between the petioles, though not quite midway between them, 3—6 in. long or longer ; pedicels capillary, ¾—1¼ in. long, pubescent ; bracts minute, lanceolate, acute. Calyx pubescent, divided to the base ; sepals ⅛ in. long, ovate-lanceolate, acute, ciliate. Corolla-tube narrowly campanulate, ⅛ in. long ; lobes spreading, ¼ in. long, ovate-oblong, acute, ciliate ; outer corona membranous, subquadrate, truncate ; inner corona-lobes ⅛—⅓ in. long, including the subulate horns which are curved high over the staminal-column, spur acute. Follicles reflexed, 2—3 by ½ in., lanceolate, attenuated into a long beak, echinate with soft spines. Seeds ⅓ by ⅛ in., ovate, truncate at the apex, densely velvety-pubescent on both sides, narrowly margined, crenate at the rounded base ; coma 1—1½ in. long. Fl. B. I. v. 4, p. 20 ; Grah. Cat. p. 122 ; Dalz. & Gibs. p. 150 ; Wight, Icon. t. 596 ; Trim. Fl. Ceyl. v. 3, p. 150 ; Talb. Trees, Bomb. ed. 2, p. 234 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 3, p. 3.—Flowers : Aug.—Jan. VERN. *Utarni.*

A common weed. KONKAN : N. Konkan, *Dalzell & Gibson*; common on the bushes among rocks on Malabar hill, Bombay, *Graham*. DECCAN : Poona, *Raoji* !, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1853 !; Badami, *Bhiva* !

GUJARAT: *Dalzell & Gibson*. SIND: Tata district, *Bhola Puran*!—DISTRIB. Throughout India in the hotter parts; Ceylon, Afghanistan.

The stems yield a fine fibre which does not, however, seem to be of commercial importance. The plant has emetic and expectorant properties, and a decoction of the leaves is employed in some infantile complaints. See Watt, Dict. Econ. Prod. l. c.

11. **HOLOSTEMMA,** R. Br.

Twining glabrous shrubs. Leaves opposite, cordate. Flowers large, purple within, in sublateral lax few-flowered pedunculate cymes. Calyx 5-partite, not glandular inside; segments ovate. Corolla thick, subrotate, deeply 5-fid; lobes overlapping to the right; corona arising from the base of the staminal-column and adnate thereto, annular, fleshy, truncate. Staminal-column arising from the base of the corolla; filaments connate; anther-wings large, decurrent to the base of the column; pollen-masses 1 in each cell, elongate, compressed, pendulous by a long caudicle from an attenuated apex. Style-apex scarcely umbonate. Follicles slender, cylindric, slightly tapering.—DISTRIB. East Indies; species 1.

1. **Holostemma Rheedianum,** *Spreng. Syst.* v. 1 (1825) p. 851. A large glabrous twining shrub; stems much-branched, glabrous, shining. Leaves 3—5 by 2—3 in., thick, ovate-oblong, acuminate, glabrous above, more or less pubescent (especially on the nerves) and reticulately veined beneath, base deeply cordate, with rounded lobes, often with a few small glands at the base of the midrib above; petioles 1—2 in. long, stout, glabrous. Flowers fragrant, edible, purplish-crimson inside, frosted-white or pale-pink outside, in sublateral few-flowered cymes; peduncles 1—2 in. long, arising close to the base of the petiole outside the leaf-axil; pedicels as long as the peduncles. Calyx divided nearly to the base; segments $\frac{1}{8}$ in. long, broadly ovate, obtuse, veined. Corolla subrotate, divided about $\frac{1}{4}$ of the way down; lobes $\frac{1}{2}$ by $\frac{3}{8}$ in., ovate-oblong, obtuse, overlapping to the right; corona arising from the base of the staminal-column, consisting of a fleshy truncate ring $\frac{1}{10}$ in. high. Anthers large, with large stiff wings and with membranous tips inflexed over the column; pollen-masses $\frac{1}{16}$ in. long, waxy, compressed, linear-clavate, slightly curved, pendulous from the linear pollen-carriers by black caudicles $\frac{1}{20}$ in. long. Follicles 4—5 by $\frac{1}{4}$ in., linear-oblong, cylindric, slightly tapering to a blunt point. Seeds $\frac{1}{4}$ in. long, oblong, very thin, much flattened, somewhat truncate and not crenate at the base; coma $\frac{3}{4}$—1 in. long. *Holostemma Rheedei*, Wall. Cat. (1828) 4469; Hook. f. Fl. B. I. v. 4, p. 21; Grah. Cat. p. 121; Dalz. & Gibs. p. 148; Wight, Icon. t. 597 (the corona shewn incorrectly arising from the corolla); Trim. Fl. Ceyl. v. 3, p. 150; Talb. Trees, Bomb. ed. 2, p. 235; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167; Watt, Dict. Econ. Prod. v. 4, p. 261.—Flowers: July—Aug. VERN. *Tultuli*; *Shidodi*.

KONKAN: *Stocks*!, *Law*!; common in hedges about Bombay, *Dalzell & Gibson*; Neral (below Matheran), *Bhiva*!; Salsette, *Graham*. DECCAN: Kothrud near Poona, *Kanitkar*!; Bowdhan near Poona, *Cooke*!—DISTRIB. India (Tropical Himalaya; Pegu, Birma, W. Peninsula); Ceylon.

The root is used in medicine, and the flowers are eaten.

12. CYNANCHUM, Linn.

Herbs or shrubs, erect or twining. Leaves opposite. Flowers small, in sessile or pedunculate corymbose or umbellate cymes or racemes, which are lateral or subaxillary. Calyx 5-partite. Corolla rotate or campanulate, 5-partite ; lobes overlapping to the right or valvate ; corona often membranous, arising from the staminal-column near or at its base, annular, cupular or tubular, toothed or lobed at the top or divided more or less deeply into 5 entire or toothed lobes. Staminal-column arising at or near the base of the corolla ; anthers with a membranous tip ; pollen-masses 1 in each cell, pendulous, attached by a short or long caudicle to the pollen-carriers. Style-apex truncate, conical or rostrate. Follicles smooth, winged or entire.—DISTRIB. Cosmopolitan ; species about 100.

Leaves glaucous beneath; follicles winged..... 1. *C. Callialata.*
Leaves not glaucous beneath; follicles not winged .... 2. *C. pauciflorum.*

1. **Cynanchum Callialata,** *Ham. in Wight, Contrib.* (1834) p. 56. A large twiner, glabrous or nearly so ; stems slender, terete, glabrous or slightly hairy. Leaves 2—4 in. long, very variable (⅜—2 in.) in breadth, linear-oblong or ovate or elliptic-oblong, acuminate, usually glabrous on both surfaces, glaucous beneath, contracted and cordate at the base, the basal lobes small, rounded ; petioles ½—1 in. long, often with a stalked stipule-like rounded leaf in each axil. Flowers in lateral or subaxillary umbellate glabrous cymes ; peduncles ⅛—⅓ in. long, usually arising just outside the petiole ; pedicels ⅛—¼ in. long. Calyx glabrous, divided to the base or nearly so ; segments 1/10—⅛ in. long, lanceolate, acute, not ciliate. Corolla ⅛—¼ in. long, divided nearly to the base, glabrous ; lobes lanceolate-oblong, subacute , corona shorter than the corolla, tubular, plicate, membranous, with 5 obtuse lobes which are bifid or toothed (rarely entire) at the apex and with shorter lobes between them. Anther-tips membranous, orbicular, often crenulate on the margins, shortly stalked ; pollen-masses oblong, attached to the pollen-carriers by distinct caudicles. Style-apex conical, subacute or obtuse or slightly lobulate, scarcely exserted. Follicles 2½—3 in. long, lanceolate, 2-winged, glabrous. Seeds ⅛ by ⅛ in., broadly ovate, margined, not crenate at the base, glabrous, brown. Fl. B I. v 4, p. 24 ; Wight, Icon. t. 1279 ; Talb. Trees, Bomb. ed. 2, p. 235 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167.—Flowers : Oct.—Jan.

KONKAN : *Stocks* ! DECCAN : Kartriz Ghát near Poona, *Bhiva* ! ; Bhor Ghát, *Cooke* ! ; Haveri, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 1111 ! KANARA : common in the evergreen forests near the Nilkund Ghát of N. Kanara, *Talbot*. —DISTRIB. India (Behar, Birma, W. Peninsula).

2. **Cynanchum pauciflorum,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 45. Herbaceous twiner, glabrous or nearly so ; stems with long internodes, slender, terete, glabrous. Leaves 2—3 by 1—1¾ in., ovate or ovate-oblong or subhastate, acute or acuminate, thin, glabrous, base broadly cordate, the basal lobes rounded ; petioles ¾—1¼ in. long, usually with a rounded stipule-like leaf in the axil of each. Flowers in umbellate pedunculate glabrous cymes ; peduncles ⅛—⅓ in. long, arising from between the petioles ; pedicels 1/10—¼ in.

long. Calyx divided to the base ; sepals $\frac{1}{10}$ in. long, lanceolate, acute, ciliate. Corolla divided almost to the base ; lobes $\frac{1}{5}$ in. long, oblong, subacute ; corona arising from the very base of the staminal-column, about as long as the corolla, tubular, plicate, membranous, with 5 distant linear-lanceolate lobes about $\frac{1}{12}$ in. long on the margin and small teeth between the lobes. Staminal-column arising from the base of the corolla ; pollen-masses small, oblong, attached to the pollen-carriers by distinct caudicles. Style-apex rounded, a little exserted beyond the membranous anther-tips. Follicles 2—2½ in. long, lanceolate. Seeds ¼ by ⅛ in., broadly ovate, flattened, margined, glabrous, brown ; coma 1—1¼ in. long. Fl. B. I. v. 4, p. 23 ; Grah. Cat. p. 121 ; Dalz. & Gibs. p. 148 ; Trim. Fl. Ceyl. v. 3, p. 151 ; Talb. Trees, Bomb. ed. 2, p. 235 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 2, p. 678.—Flowers : Oct.—Feb.

DECCAN : Junnar, *Woodrow* ; Musi near Poona, *Dalzell & Gibson*. S. M. COUNTRY : about Dharwar, *Law* ex *Graham* ; Belgaum, *Ritchie* ! ; Castlerock, *Cooke* !—DISTRIB. India (W. Peninsula) ; Ceylon.

13. **SARCOSTEMMA,** R. Br.

Leafless trailing or twining jointed shrubs with pendulous branches. Flowers small, in sessile umbels which are terminal or lateral from the nodes. Calyx 5-partite. Corolla rotate or sub-campanulate, deeply divided ; lobes 5, overlapping to the right in bud ; corona double, arising from the staminal-column, the outer annular or cup-shaped, often pentagonal, truncate or shortly lobed, the inner corona of 5 erect fleshy compressed or keeled lobes with their basal part embraced by the outer corona. Staminal-column arising from the base of the corolla ; anthers with membranous inflexed or suberect appendages ; pollen-masses pendulous, 1 in each cell, attached in pairs by short or long slender caudicles to the pollen-carriers. Style-apex shortly conical or oblong-fusiform, included or exserted. Follicles smooth. Seeds comose.—DISTRIB. Tropical Asia, Africa, and Australia ; species 5 or 6.

Umbels terminal ; style-apex short, conical, not exserted.
Follicles tapering to both ends, slightly divergent.... 1. *S. brevistigma.*
Follicles straight, rod-like, not tapering towards the base and but little towards the apex, much divaricate..... 2. *S. Stocksii.*
Umbels terminal and lateral ; style-apex oblong, fusiform, much exserted ..... 3. *S. intermedium.*

1. **Sarcostemma brevistigma,** *Wight, Contrib.* (1834) p. 59. Stems ⅛—¼ in. in diam., green, glabrous ; joints 4—8 in. long. Flowers in sessile many-flowered terminal umbels ; pedicels ¼—½ in. long, slender, pubescent ; bracts minute, lanceolate. Calyx divided to the base or nearly so, with glands inside ; segments $\frac{1}{20}$ in. long, ovate-oblong, subacute, with membranous margins. Corolla campanulate, pale greenish-white, divided nearly to the base ; lobes ⅛ in. long, ovate-oblong, subacute ; outer corona crenately 10-lobed on the margin ; lobes of the inner corona thick, fleshy, obtuse, longer than the staminal-column, almost concealing the anthers. Staminal-

column very short ; pollen-masses waxy, compressed, clavate, slightly curved, attached by a very short caudicle to the pollen-carriers. Style-apex very shortly conical or blunt. Follicles 4—5 by $\frac{1}{2}$ in., lanceolate, tapering to both ends, straight, slightly diverging when two together. Seeds $\frac{1}{2}$ by $\frac{1}{8}$ in., ovate, flattened, coma $\frac{3}{4}$ in. long. Fl. B. I. v. 4, p. 26 ; Dalz. & Gibs. p. 149 ; Wight, Icon. t. 595 ; Talb. Trees, Bomb. ed. 2, p. 235 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 477.—Flowers : June—July. VERN. *Soma.*

KONKAN : *Stocks* ! DECCAN : in stony places, *Dalzell, Talbot;* Poona, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1864 !—DISTRIB. India (Bengal, Birma, W. Peninsula).

The stems of this plant as well as those of *Sarcostemma intermedium* are used by cultivators to extirpate white ants from sugar-cane fields. A bundle of twigs is put into the trough from which the field is watered together with a bag of salt, and the water thus impregnated destroys the white ants without affecting the crop. The milky juice of the plant is drunk by native travellers. See Watt, Dict. Econ. Prod. l. c.

2. **Sarcostemma Stocksii,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 27. Stems $\frac{1}{8}$—$\frac{1}{4}$ in. in diam., green, glabrous. Flowers in terminal umbels exactly as in *Sarcostemma brevistigma.* Follicles $2\frac{1}{2}$—3 in. long, straight, cylindric, almost the same breadth throughout except towards the subacute apex, widely divaricate, so much so that both follicles are sometimes in one horizontal straight line. Seeds $\frac{1}{2}$ by $\frac{1}{10}$ in., narrowly oblong, truncate at the apex, somewhat attenuated towards the base ; coma 1 in. long. Fl. B. I. v. 4, p. 27 ; Talb. Trees, Bomb. ed. 2, p. 236. *Sarcostemma brachystigma* (by error for *brevistigma*), Hook. Icon. t. 861 (*axillary* umbels of flowers incorrectly shewn).—Flowers : July—Sept. The only difference between this plant and *S. brevistigma* seems to be in the follicles.

S. M. COUNTRY : Gadag táluka of the Dharwar district, *Talbot.* SIND : *Stocks,* 509 !—DISTRIB. Apparently endemic in the Bombay Presidency.

3. **Sarcostemma intermediuum,** *Decaisne, in DC. Prodr.* v. 8 (1844) p. 538. Twining. Flowers in terminal and lateral sessile umbels. Calyx puberulous outside, divided to the base or nearly so ; segments $\frac{1}{20}$ in. long, ovate-oblong, subacute. Corolla white, divided nearly to the base ; lobes $\frac{1}{4}$ in. long, oblong, obtuse ; outer corona with 10 obtuse lobes on the margin ; lobes of the inner corona rather thin, not fleshy, oblong, subacute. Staminal-column elongate ; pollen-masses waxy, clavate, compressed, attached by rather long caudicles to the pollen-carriers. Style-apex oblong-fusiform, much exserted beyond the anthers. Follicles 3—4 in. long, not narrowed at the base, narrowed towards the tip, not divaricate when two together. Seeds $\frac{1}{2}$—$\frac{1}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., oblong, flattened, rounded at the base, truncate at the apex ; coma $\frac{3}{4}$ in. long. Fl. B. I. v. 4, p. 27 ; Dalz. & Gibs. p. 149 ; Wight, Icon. t. 1281. *Sarcostemma viminale,* Wight, Contrib. p. 59 (*not* of R. Br.) ; Grah. Cat. p. 122.—Flowers : July—Sept.

KONKAN : *Stocks* ! DECCAN : *Dalzell & Gibson* ; Poona, *Woodrow* ! ; rocky hills about Loni, *Graham* ; Kamatki and Kartriz Ghâts, *Graham.* GUJARAT :

island of Perim at the mouth of the Narbada river, *Dr. Lush* ex *Graham*.—DISTRIB. India (W. Peninsula).

14. GYMNEMA, R. Br.

Twining shrubs. Leaves opposite. Flowers small, in crowded lateral umbellate cymes. Calyx 5-partite. Corolla subrotate, campanulate or urceolate, divided to the middle or beyond it ; lobes thick, overlapping to the right in bud ; corona arising from and adnate to the corolla-tube, either of 5 fleshy lobes adnate up to the mouth of the corolla-tube with more or less incurved tips, or of 5 pairs of fleshy ridges on the lower part of the tube alternating with the corolla-lobes. Staminal-column arising from the base of the corolla ; anthers short, erect, with short membranous appendages ; pollen-masses erect, solitary in each anther-cell. Style-apex often exserted beyond the anthers. Follicles smooth. Seeds comose.—DISTRIB. Asia, Africa, and Australia ; species about 20.

Ridges of the corona protruding beyond the mouth of the corolla	1. *G. sylvestre.*
Ridges of the corona not protruding beyond the mouth of corolla	
Calyx-segments longer than the corolla-tube	2. *G. montanum.*
Calyx-segments shorter than the corolla-tube	3 *G. pergularioides.*

1. **Gymnema sylvestre,** *R. Br. in Mem. Wern. Soc.* v. 1 (1811) p. 33. A large woody much-branched climber running over the tops of high trees ; young stems and branches pubescent, often densely so, terete. Leaves 1¼—2 by ½—1¼ in., ovate, elliptic, or ovate-lanceolate, acute or shortly acuminate, more or less pubescent on both sides, sometimes densely so beneath, especially on the nerves, base rounded or cordate, sometimes cuneate ; petioles ¼—½ in. long, pubescent. Flowers in pedunculate or nearly sessile cymes ; peduncles densely pubescent, shorter than the petioles and arising from between them, sometimes producing successive umbels or whorls of flowers ; pedicels ⅛—½ in. long, pubescent ; bracts minute, ovate-oblong, hairy, ciliate. Calyx pubescent, divided to the base or nearly so ; segments 1/12 in. long, oblong, obtuse, ciliolate. Corolla yellow, ⅛—⅕ in. across ; tube campanulate, 1/10 in. long, about equalling the lobes ; lobes thick, ovate-deltoid, spreading, recurved, glabrous ; corona of 5 processes inserted on the corolla-tube, alternate with its lobes, free at the short deltoid subacute tip which protrudes above the sinus, the lower adnate portion decurrent, channelled and with strongly ciliate margins. Style-apex thick, subhemispherical, much exserted beyond the anthers, pearly-white. Follicles 2½—3 by ¼ in., terete, rigid, lanceolate, attenuated into a beak, glabrous, one follicle often suppressed. Seeds ½ in. long, narrowly ovoid-oblong, flat, with a thin broad marginal wing, brown, glabrous. Fl. B. I. v. 4, p. 29 ; Grah. Cat. p. 120 ; Dalz. & Gibs. p. 151 ; Wight, Icon. t. 349 ; Trim. Fl. Ceyl. v. 3, p. 153 ; Talb. Trees, Bomb. ed. 2, p. 236 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 4, p. 189.—Flowers : Apr.—May. VERN. *Kavali* ; *Pitáni.*

KONKAN : *Stocks* !, *Law* ! DECCAN : Mahableshwar, very common, *Cooke* !, *Woodrow* ! S. M. COUNTRY : hills near Bagalkot and Badami, *Law* ex *Graham* ;

Dharwar districts, common, *Talbot*; Belgaum Ghâts, *Ritchie*, 433! KANARA: near the coast at Karwar, *Talbot*; Sampkhand (N. Kanara), *Woodrow*.—DISTRIB. India (W. Peninsula, Banda); Ceylon, Tropical Africa.

The leaves of this plant if chewed possess the peculiar property of completely destroying the taste for saccharine substances, sugar feeling like sand in the mouth. The effect lasts for some hours. It is also said to neutralise the taste of bitters such as quinine, but I have not, in my own case, found this to be so. In Mahableshwar, where the plant is abundant, I have frequently tried the experiment.

2. **Gymnema montanum,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 31. A twining shrub glabrous or nearly so; branches slender, smooth. Leaves 3—4½ by 1¼—2 in., coriaceous, oblong or ovate-oblong or oblong-lanceolate, obtuse, acute or acuminate, glabrous; petioles ⅓—½ in. long, puberulous. Flowers greenish-yellow (*Dalz. & Gibs.*), in corymbose at length racemose cymes; peduncles shorter than the petioles, pubescent; pedicels ⅛—⅙ in. long, pubescent; bracts minute, oblong, obtuse, ciliate. Calyx divided to the base; sepals ⅓ in. long, linear-oblong, reflexed, ciliate. Corolla-tube ⅛ in. long, narrowly campanulate; lobes about equalling the tube, oblong, subacute; corona of 5 processes adnate to the corolla-tube and alternate with its lobes, the apices of the processes not prolonged above the sinus, the margins slightly thickened and densely villous. Staminal-column arising from the base of the corolla-tube; anther-tips acute; pollen-masses erect, clavate, compressed, waxy, attached by very short caudicles to the pollen-carriers. Follicles acuminate, 3 by ¼—⅓ in. (*Dalzell & Gibson*). Talb. Trees, Bomb. ed. 2, p. 236. *Bidaria elegans*, Dalz. & Gibs. p. 151. *Gymnema tingens*, var. *ovalifolia*, Wight, Icon. t. 592.

KONKAN: *Law*!, *Stocks*!, *Dalzell*!; from the Konkan southwards, *Talbot*. —DISTRIB. India (W. Peninsula).

3 **Gymnema pergularioides,** *Wight & Gard. in Thw. Enum.* (1860) p. 198. A twining shrub; branches long, slender, hairy. Leaves membranous, 1—5 by ⅜—2 in., elliptic or oblong-lanceolate, caudate-acuminate, glabrous or slightly pubescent on both sides, pale beneath, base rounded or acute; petioles ¼—½ in. long, slender. Flowers in umbellate globose cymes; peduncles as long as the petioles; pedicels short, pubescent. Calyx divided to the base or nearly so; segments 1/10 in. long, elliptic-oblong, obtuse. Corolla-tube ⅛ in. long; lobes equalling the tube, oblong-lanceolate, subacute, spreading or recurved; corona of 5 hairy somewhat obscure ridges on the corolla-tube, their tops not reaching nearly to the sinus. Staminal-column arising from the base of the corolla-tube; anther-tips obtuse; pollen-masses erect, oblong, subsessile on the pollen-carriers. Style-apex exserted, conical, bifid. Follicles not divaricate, 4½—6 in. long, cylindric, tapering to a long beak, pubescent at first, at length glabrate. Fl. B. I. v. 4, p. 32; Trim. Fl. Ceyl. v. 3, p. 154; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167.—Flowers: Apr.

S. M. COUNTRY: Haveri, *Woodrow*.

Woodrow, in his list of Bombay plants (*l. c.*), gives this as occurring at Haveri in the Dharwar districts, but I have seen no specimens from the Bombay Presidency. Trimen says the plant is endemic in Ceylon, where it is however not common.

15. TYLOPHORA, R. Br.

Twining (rarely erect) perennials. Leaves opposite. Inflorescence lateral or axillary, usually consisting of slender simple or branched axes with several flower-clusters or short racemes scattered along them, or occasionally the flower-clusters are sessile at the nodes of the stem ; flowers small. Calyx 5-partite. Corolla deeply 5-lobed, rotate or rotate-campanulate ; lobes slightly overlapping to the right ; corona of 5 small fleshy tubercles adnate to or radiate from the filament part of the staminal-column and arising from near its base. Staminal-column arising from the base of the corolla ; anthers erect, small, with a membranous appendage ; pollen-masses very minute, erect, suberect or horizontal, attached by their middle or near their base to very slender caudicles, by which they are affixed in pairs to the pollen-carriers. Style-apex pentagonal or 5-lobed, depressed, flattened or convex, rarely exceeding the anthers. Follicles smooth, acuminate, sometimes winged. Seeds comose.—DISTRIB. Tropics of the Old World and Australia ; species about 40.

Stem suberect, less than 20 in. long	1. *T. fasciculata.*
Stem and branches long, twining.	
Calyx glabrous	2. *T. tenuis.*
Calyx hirsute or pubescent.	
Corona wholly adnate to the staminal-column without free points above.	
Leaves obtuse; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long; corolla $\frac{1}{8}$ in. long	3. *T. rotundifolia.*
Leaves acute or acuminate; petioles $\frac{1}{4}$ in. long; corolla $\frac{1}{8}$ in. long	4. *T. Dalzellii.*
Corona-apex free, the point reaching as high as the style-apex	5. *T. asthmatica*

1. **Tylophora fasciculata,** *Ham. in Wight, Contrib.* (1834) p. 50. Stems several from the root, 12—18 in. long, erect, flexuous or slightly twining amongst grass, pubescent. Leaves approximate, diminishing in size upwards, coriaceous, 1—2 by $\frac{1}{2}$—$1\frac{1}{4}$ in., ovate or lanceolate, acute, glabrous above, more or less pubescent on the nerves beneath, base acute or rounded ; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long. Flowers in lateral peduncled umbellate or racemose cymes ; peduncles arising from between the petioles ; pedicels filiform, $\frac{1}{2}$ in. long, pubescent ; bracts lanceolate. Calyx divided almost to the base ; segments $\frac{1}{12}$ in. long, lanceolate, acute. Corolla $\frac{1}{8}$ in. long, deeply divided ; lobes $\frac{1}{16}$ in. long, oblong-lanceolate, acute, veined ; corona of 5 broadly ovoid fleshy lobes radiating from the staminal-column. Anther-appendages membranous, broad, projecting above the 5-lobed style-apex ; pollen-masses minute, subtransverse. Follicles $1\frac{1}{2}$—2 by about $\frac{1}{2}$ in., fusiform, acute, striate, glabrous. Seeds $\frac{1}{4}$ in. long, broadly ovate, flat ; coma $\frac{3}{4}$ in. long. Fl. B. I. v. 4, p. 40 ; Dalz. & Gibs. p. 151 ; Wight, Icon. t. 848 ; Trim. Fl. Ceyl. v. 3, p. 156 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 206.—Flowers : July—Aug. VERN. *Bhindodi.*

KONKAN : *Law* !, *Dalzell & Gibson*; Wandra, side of Tansa canal, *Kanitkar* ! S. M. COUNTRY : hills north of Belgaum, *Ritchie,* 1859 !—DISTRIB. India (W. Peninsula, Nipal); Ceylon.

2. **Tylophora tenuis,** *Blume, Bijdr.* (1826) p. 1062. A slender twiner ; stems much-branched, slender, tough, glabrous. Leaves variable, somewhat fleshy, $\frac{3}{4}$—$1\frac{1}{2}$ by $\frac{1}{3}$—$\frac{3}{4}$ in. (on the main stem sometimes reaching 2 by 1 in.), ovate or elliptic or oblong, obtuse or acute, often apiculate, glabrous, base acute or rounded ; petioles $\frac{1}{8}$—$\frac{1}{3}$ in. long. Flowers lurid-purple inside, in lateral paniculate glabrous cymes ; peduncles from between the petioles, close to one of them ; pedicels filiform ; bracts lanceolate-subulate. Calyx divided nearly to the base, glabrous ; segments $\frac{1}{12}$ in. long, lanceolate, acute. Corolla $\frac{1}{8}$ in. across ; lobes $\frac{1}{16}$ in. long, ovate-oblong, subacute, glabrous, veined ; corona of 5 small dark-colored tubercles adnate to the staminal-column. Pollen-masses suberect, minute. Style-apex pentagonal, slightly convex. Follicles 2—3 in. long, lanceolate, tapering to both ends, finely pointed, finely striate, glabrous. Seeds $\frac{1}{3}$ in. long, ovate-oblong ; coma $\frac{3}{4}$ in. long. Fl. B. I. v. 4, p. 42 ; Trim. Fl. Ceyl. v. 3, p. 158. *Tylophora carnosa,* Wall. in Wight, Contrib. p. 49 ; Wight, Icon. t. 351 (*not* of Dalz. & Gibs.). *T. tenuissima,* Wight & Arn. in Wight, Contrib. p. 49 ; Wight, Icon. t. 588 ; Dalz. & Gibs. p. 150.

This is given in Dalzell & Gibson's Bombay Flora (*l. c.*), but no locality has been assigned to it.

I have seen no specimens from the Bombay Presidency. There are none in Herb. Kew, and Woodrow does not include the plant in his list of Bombay plants.

3. **Tylophora rotundifolia,** *Ham. in Wight, Conrtib.* (1834) p. 50. A twining perennial ; stems shortly pubescent. Leaves $1\frac{1}{4}$—$2\frac{1}{2}$ by 1—2 in., coriaceous, broadly ovate, oblong or suborbicular, rounded and often mucronate at the apex, glabrous above, more or less pubescent beneath and with ciliolate margins, base subcordate, rounded or truncate ; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long. Flowers in many-flowered umbellate cymes ; peduncles from between the petioles, pubescent, shorter than the leaves (sometimes almost 0), bearing at the apex several filiform pubescent pedicels $\frac{1}{2}$—1 in. long ; bracts long, lanceolate-subulate. Calyx hairy outside, divided nearly to the base ; segments $\frac{1}{8}$ in. long, narrowly lanceolate, acute, ciliate. Corolla $\frac{1}{8}$ in. long, glabrous ; lobes $\frac{1}{6}$ in. long, elliptic, obtuse, veined ; corona of 5 fleshy rounded lobes wholly adnate to the staminal-column. Anther-appendages short, membranous ; pollen-masses minute. Style-apex pentagonal, not exserted beyond the anther-tips. Follicles not seen. Fl. B. I. v. 4, p. 43 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167.

KONKAN : *Law* !, *Stocks* ! S. M. COUNTRY : Londa, *Woodrow.*—DISTRIB. India (Oude, Assam, W. Peninsula).

4. **Tylophora Dalzellii,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 43. A twining perennial ; stems slender, terete, glabrous or the young ones pubescent. Leaves 2—$4\frac{1}{2}$ by 1—$2\frac{1}{2}$ in., ovate-oblong, acute or acuminate, often mucronate, glabrous or nearly so, base rounded or cordate ; petioles $\frac{1}{2}$ in. long. Flowers in sessile or pedunculate lateral cymes or with umbels or racemes at the flexures of a somewhat zigzag rhachis, which is hispid or with a number of linear-lanceolate

bracts at the insertion of the pedicels ; peduncles from between the petioles ; pedicels ¼—1 in. long, filiform, glabrous. Calyx hispid outside, divided almost to the base ; segments $\frac{1}{10}$ in. long, linear-lanceolate, acute. Corolla ⅛ in long ; lobes $\frac{1}{10}$ in. long, elliptic-oblong, obtuse, veined ; corona of 5 dark-colored processes, rounded at the base and sloping a little upward towards the top of the staminal-column, wholly adnate to the column ; pollen-masses minute. Follicles 3—4 in. long, tapering to a fine point at the apex, scarcely tapering towards the base, finely striate, glabrous. Seeds ⅓ in. long, ovate-oblong, flattened ; coma ¾ in. long. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167. *Tylophora carnosa*, Dalz. & Gibs. p. 150 (*not* of Wight).—Flowers : Aug.

KONKAN : *Stocks* !, *Law* ! ; Vingorla, *Stocks* !, *Ritchie*, 1858 ! ; W. Ghâts, *Kanitkar* ! DECCAN : Mahableshwar, *Cooke* !—DISTRIB. India (W. Peninsula).

5. **Tylophora asthmatica**, *Wight & Arn. in Wight, Contrib.* (1834) p. 51. A twining perennial ; roots many, long, fleshy ; stems elongate, glabrous or pubescent, not much branched. Leaves 2—4 by 1—2¼ in., ovate or elliptic-oblong, acute or acuminate, often apiculate, glabrous or nearly so above, more or less pubescent (especially when young) beneath, base usually cordate ; petioles ¼—½ in. long. Flowers large for the genus, in umbellate cymes ; peduncles from between the petioles, shorter than the leaves, each bearing at its apex 2—3 nearly sessile umbels ; pedicels filiform with a number of filiform hairy bracts at their base. Calyx coarsely hairy outside, divided almost to the base ; segments $\frac{1}{10}$ in. long, lanceolate, very acte. Corolla greenish-yellow or greenish-purple, ⅓—¼ in. long ; lobes ⅛ in. long, oblong, acute ; corona gibbous below, abruptly narrowed at the apex to a free point which reaches nearly as high as the apex of the style. Pollen-masses minute, transverse, attached to the pollen-carriers by distinct caudicles. Style-apex not exserted beyond the anther-tips. Follicles 3—4 in. long, tapering to a fine point at the apex, scarcely tapering towards the base, finely striate, glabrous. Seeds ⅓ in. long, broadly ovate ; coma ¾—1 in. long. Fl. B. I. v. 4, p. 44 ; Dalz. & Gibs. p. 150 ; Wight, Icon. t. 1277 ; Trim. Fl. Ceyl. v. 3, p. 158 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 204.—Flowers : Aug.—Nov. VERN. *Antamul ; Pitmâri.*

KONKAN : Vingorla, *Stocks* ! DECCAN : Lanoli, *Woodrow* ; Gokak, *Woodrow*. KANARA : *Law* ! ; Kusardi, *Ritchie*, 1857 !—DISTRIB. Throughout the plains of India ; Ceylon, Siam, Malay Islands, Borneo.

The roots and leaves are used as a substitute for ipecacuanha, and were official in the Bengal Pharmacopœia of 1844. See Watt, Dict. Econ. Prod. l. c.

16. PERGULARIA, Linn.

Twining shrubs. Leaves opposite. Flowers of moderate size, in lateral umbellate cymes. Calyx 5-partite. Corolla hypocrateriform ; tube inflated at the base ; lobes 5, overlapping to the right ; corona of 5 erect lobes arising from the base of the staminal-column and adnate to it in the lower part, free above and with a narrow or subulate process on the face. Staminal-column arising from the base

of the corolla ; anthers oblong, erect, with long membranous appendages conniving over the style-apex ; pollen-masses 1 in each anther-cell, erect, attached in pairs to the pollen-carriers by very short caudicles. Style-apex not exserted beyond the anther-tips, stout, pentagonal-ovoid. Follicles lanceolate, terete, rather turgid. Seeds comose.—DISTRIB. Species about 10, Asiatic and African.

1. **Pergularia pallida,** *Wight & Arn. in Wight, Contrib.* (1834) p. 42. A large twining shrub ; branches pale, slender, more or less pubescent. Leaves 2—4½ by 1½—3 in., ovate, acuminate, glabrous or slightly pubescent, pale and reticulately veined beneath ; petioles ½—2 in. long, pubescent. Flowers not or scarcely fragrant, in umbellate lateral cymes ; peduncles from between the petioles ¼—½ in. long, pubescent ; pedicels ½ in. long, pubescent. Calyx pubescent outside, divided to the base ; sepals ⅛ in. long, oblong, obtuse, ciliate. Corolla pale-yellow, ⅝ in. long, divided to below the middle ; tube ¼ in. long, inflated at the base, glabrous inside except near the base where it is slightly hairy ; lobes ⅜ in. long, linear, obtuse, overlapping to the right, glabrous ; corona-lobes linear, with a long slightly bent beaked process projecting from the inner edge. Anther-appendages very long, membranous, subacute ; pollen-masses $\frac{1}{10}$ in. long, oblong or slightly clavate, erect on short distinct caudicles. Style-apex not exserted, stout. Follicles 2½—4 in. long, lanceolate, somewhat turgid, tapering to a blunt point, glabrous. Seeds ⅓ by ⅛ in., ovate, strongly margined, flattened, rounded at the base, truncate at the apex, pale brown, glabrous ; coma 1 in. long. Fl. B. I. v. 4, p. 38 ; Wight, Icon. t. 585 ; Talb. Trees, Bomb. ed. 2, p. 237 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167.—Flowers : July—Aug.

Dalzell in Herb. Kew, without locality. DECCAN : *Talbot*. S. M. COUNTRY : stony hills near Dharwar, *Talbot*.—DISTRIB. India (Tropical Himalaya, Central India, Behar, Birma).

Pergularia minor, Andr. Bot. Rep. t. 184. A large climber, a native of the Himalayas, with ovate, cordate, acuminate leaves 3 in. long and umbellate cymes of greenish-yellow sweetly scented flowers. It is largely grown in gardens, and is much valued for its fragrant flowers, from which, according to Watt, an *attar* is extracted. Fl. B. I. v. 4, p. 38 ; Bot. Mag. t. 755 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 139. *Pergularia odoratissima,* Wight, Contrib. p. 43 (*not* of Sm.) ; Grah. Cat. p. 120 ; Dalz. & Gibs. Suppl. p. 54 ; Woodr. Gard. in Ind. ed. 5, p. 383.—VERN. *Kunja-luta.*

17. MARSDENIA, R. Br.

Twining rarely erect shrubs. Leaves opposite. Flowers medium-sized or small, in umbellate cymes or in small sessile umbels or clusters scattered along the branches of the cymes or panicles which are lateral or axillary. Calyx 5-partite. Corolla subcampanulate ; lobes 5, overlapping to the right ; corona of 5 erect fleshy lobes arising from and with their basal portion adnate to the staminal-column, the apical portion free, applied to the backs of the anthers. Staminal-

column arising from or near the base of the corolla ; anthers erect, with membranous appendages more or less incumbent on the top of the style ; pollen-masses erect, 1 in each anther-cell, attached in pairs to the pollen-carriers by short or long moderately stout caudicles. Style-apex depressed, convex, conical or produced into a beak. Follicles with a thick pericarp, smooth, sometimes winged. Seeds comose.—DISTRIB. Tropics of both hemispheres, 1 species in the Mediterranean region ; species about 70.

I have followed Mr. N. E. Brown (Dyer, Fl. Trop. Afr. v. 4, p. 417) in including the genus *Dregea* in *Marsdenia*.

Corolla hairy outside; corona-lobes acute at top.....	1. M. *tenacissima*.
Corolla glabrous outside: corona-lobes rounded at top.	
Leaves broadly ovate.....	2. *M. volubilis*.
Leaves lanceolate.....	3. *M. lanceolata*.

1. **Marsdenia tenacissima,** *Wight & Arn. in Wight, Contrib.* (1834) p. 41. A large twining shrub, the old stems with grey corky bark ; branchlets softly pubescent. Leaves 3—6 by 2½—4½ in., broadly ovate, acuminate, hairy above, densely and softly tomentose beneath, base cordate with a deep sinus and rounded lobes ; petioles 2—3 in. long, softly pubescent. Flowers greenish-yellow, in dense much-branched compound pubescent cymes ; peduncles arising from between the patioles, close to one of them ; pedicels slender, rather longer than the flowers. Calyx hairy, divided nearly to the base ; segments ⅛ in. long, oblong-lanceolate, acute. Corolla hairy outside ; tube ⅛ in. long, slightly contracted at the mouth ; lobes shorter than the tube, hairy outside, oblong, obtuse, spreading ; corona-lobes very acute at tip, arching over the top of the style-apex. Staminal-column arising from the very base of the corolla-tube ; anther-tips membranous, oblong, subobtuse, inflexed over the apex of the style ; pollen-masses erect, oblong-clavate, attached to the pollen-carriers by very short caudicles. Style-apex large, conical, not exserted beyond the anther-tips. Follicles 3—6 in. long, ovoid-lanceolate, downy. Seeds flattened, ovate-oblong, ½ in. long. Fl. B. I. v. 4, p. 35 ; Wight, Icon. t. 590 ; Trim. Fl. Ceyl. v. 3, p. 155 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 5, p. 188.

GUJARAT : Champanir, *Woodrow*.

This plant is included on the authority of Woodrow, who gives its habitat as above. I have not seen any specimens from the Bombay Presidency.—DISTRIB. India (E. and W. Himalayas, Rajmahal hills, Ava) ; Ceylon, Timor.

A milky juice exudes from incisions in the stem which thickens into a kind of caoutchouc and removes pencil-marks. The bark of the stems yields a very valuable fibre of great strength. See Watt, Dict. Econ. Prod. l. c.

2. **Marsdenia volubilis,** *T. Cooke.* A large twining shrub ; older branches ash-colored, very long, glabrous, often with lenticels and sometimes with small black dots ; young branches green, slender, smooth. Leaves 2½—6 by 1¾—4½ in., broadly ovate or suborbicular, acuminate, glabrous or more or less softly pubescent, reticulately veined and with a few small glands just above the petioles, base rounded or cordate ; petioles ½—1¼ in. long. Flowers numerous, green or yellowish-green, in lateral drooping umbellate cymes ;

peduncles arising from between the petioles, 1—2 in. long, slender, puberulous ; pedicels ¼—1 in. long, very slender. Calyx divided nearly to the base ; segments $\frac{1}{10}$ in. long, ovate-oblong, obtuse or subacute, ciliolate. Corolla ¼ in. long, deeply divided, glabrous outside ; lobes ⅛ in. long, broadly ovate, obtuse, veined, overlapping to the right ; corona-lobes large, fleshy, the upper free portion rounded on the outer edge, obliquely truncate at top, and with a small apiculation on the inner edge, which lies against the top of the anther. Staminal-column arising from the base of the corolla ; anther-tips membranous, broadly ovate-oblong, obtuse ; pollen-masses oblong, attached to the pollen carriers by very short caudicles. Style-apex dome-shaped. Follicles 3—4 in. long, slightly tapering to a very blunt point, rugosely striate, glabrous. Seeds broadly ovate, ½ by ⅓ in., flattened, strongly margined, pale yellowish-brown ; coma 1¾ in. long, copious. *Dregea volubilis*, Benth. ex Hook. f. Fl. B. I. v. 4 (1883) p. 46 ; Trim. Fl. Ceyl. v. 3, p. 161 ; Talb. Trees, Bomb. ed. 2, p. 237 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 3, p. 193. *Hoya viridiflora*. R. Br. in. Mem. Wern. Soc. v. 1, p. 27 ; Grah. Cat. p. 119 ; Dalz. & Gibs. p. 153. *Asclepias volubilis*, Linn. f. Suppl. p. 170. *Hoya Lacuna*, Ham. in Wall. Cat. 8169.—Flowers : Apr.—May. VERN. *Hirandodi* ; *A'mbri*.

DECCAN : Mahableshwar, *Cooke* ! ; Máwal near Poona, *Woodrow* ! ; Kadakvasla, *Cooke* ! S. M. COUNTRY : Belgaum and Padshapur, *Ritchie*, 437 !—DISTRIB. India (Bengal, Assam, W. Peninsula) ; Ceylon, Java.

3. **Marsdenia lanceolata,** *T. Cooke*. Suberect or climbing ; old stems with pale bark, glabrous or nearly so ; young branches terete, thinly tomentose. Leaves 2—2¼ by ½—¾ in., lanceolate, acute or acuminate, glabrous or slightly velvety-pubescent above, glabrous and reticulately veined beneath, base acute ; petioles ⅛ in. long. Flowers green, in rather small lateral globose cymes ; peduncles ¼—¾ in. long, arising between the petioles and near to one of them ; pedicels ¼—½ in. long, slender. Calyx glabrous, divided to the base ; sepals $\frac{1}{10}$—⅛ in. long, oblong, obtuse. Corolla divided rather more than ½-way down ; lobes ⅛—⅛ in. long, broadly oblong, obtuse, overlapping to the right ; corona-lobes large, fleshy, rounded at the top, the apiculation on the inner edge very small. Anther-tips membranous, obtuse ; pollen-masses erect, oblong, attached to the pollen-carriers by short caudicles. Style-apex dome-shaped, not exserted beyond the anthers. Follicles not seen. *Dregea volubilis* var. *angustifolia*, Hook. f. Fl. B. I. v. 4, p. 47.—Flowers : July—Aug.

The entirely different leaves, short petioles and peduncles, and the different flowering period are I think sufficiently distinctive characters to separate this from *M. volubilis*.

Dalzell in Herb. Kew, without locality ! DECCAN : Lohagaon 11 miles S.E. of Poona, *Bhiva* !—DISTRIB. India (W. Peninsula).

18. **COSMOSTIGMA,** Wight.

A twining glabrous shrub. Leaves opposite. Flowers small, greenish, in racemose axillary or lateral cymes. Calyx 5-partite. Corolla subrotate, deeply 5-fid ; lobes valvate or slightly overlapping

to the right ; corona of 5 erect broad membranous truncate or 2-fid scales adnate to the base of the anthers and shorter than them. Staminal-column very short ; anthers appendiculate with a rounded inflexed membrane ; pollen-masses 1 in each anther-cell, erect, attached to the pollen-carriers by long basal caudicles. Style-apex broad, 5-gonous, with a distinct rim and slightly umbonate centre. Follicles large, ovoid-oblong, bluntly pointed, smooth. Seeds comose. —DISTRIB. India, Ceylon, Java ; species 1.

1. **Cosmostigma racemosum,** *Wight, Contrib.* (1834) p. 42. A shrubby twiner ; stems stout, terete, usually quite glabrous. Leaves deciduous, 3—5 by 2—3 in., ovate, acute or acuminate, glabrous, base cordate ; petioles ¾—1½ in. long. Flowers small, greenish, in axillary or sublateral cymes which are at first corymbose, at length racemose ; peduncles equalling or exceeding the petioles, arising either from the leaf-axils or just outside them ; pedicels ¼—½ in. long ; bracts 0. Calyx divided almost to the base, glabrous ; segments ⅛ in. long, broadly oblong, rounded at the apex and with membranous ciliate margins. Corolla ⅛ in. long ; lobes ⅛ in. long, ovate-oblong, obtuse, fleshy, speckled with brown dots ; corona of 5 usually 2-fid broad membranous erect scales. Staminal-column arising from near the base of the corolla ; pollen-masses clavate, slightly curved, erect, waxy, attached to the pollen-carriers by very long slender flexuous caudicles. Style-apex broad, 5-gonous, with a distinct rim, slightly umbonate in the centre. Follicles 3—7 by 1½ in., ovoid-oblong, bluntly pointed, smooth. Seeds ½ in. long, ovate, margined ; coma 1 in. long. Fl. B. I. v. 4, p. 46 ; Grah. Cat. p. 119 ; Dalz. & Gibs. p. 151 ; Wight, Icon. t. 591 ; K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, part 2, p. 294, fig. 90, F ; Trim. Fl. Ceyl. v. 3, p. 160 ; Talb. Trees, Bomb. ed. 2, p. 237 ; Woodr. in Journ. Bomb. Nat v. 12 (1898) p. 167.—Flowers : June—Aug. VERN. *Jati.*

KONKAN : *Talbot* ; Parel hill (Bombay), *Graham.* KANARA : *Talbot.*— DISTRIB. India (Silhet, Chittagong, W. Peninsula) ; Ceylon, Java.

19. HETEROSTEMMA, W. & A.

Twining shrubs. Leaves opposite, glandular at the base on the upper surface. Flowers small, in lateral umbellate or racemose sessile or shortly pedunculate cymes. Calyx 5-partite. Corolla divided ½-way down or more ; lobes triangular, valvate or slightly overlapping to the right ; corona of 5 large fleshy lobes spreading horizontally from the staminal-column, usually with a large erect appendage on the upper side. Staminal-column small, depressed ; anthers minute, terminated by a small membranous appendage ; pollen-masses 1 in each anther-cell, ovoid, attached by very short caudicles to the pollen-carriers. Style-apex 5-gonous, truncate, not exserted beyond the anthers. Follicles slender, straight, pointed, glabrous. Seeds comose. —DISTRIB. India and Malaya ; species about 10.

1. **Heterostemma Dalzellii,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 48. A perennial twiner ; stems long, glabrous, terete, slender. Leaves thin, 3—6 by 1¼—3¼ in., ovate or ovate-oblong, acuminate, glabrous,

base rounded or cordate, rarely subacute ; main nerves 3—5 from the base ; petioles ¾—1½ in. long, with glands above them on the upper surface of the leaf. Flowers in lateral subsessile cymes ; peduncles when present arising from between the petioles ; pedicels short, stout, glabrous. Calyx small, glabrous, divided almost to the base ; segments scarcely $\frac{1}{20}$ in. long, ovate-oblong, obtuse. Corolla fuscous within (*Dalzell*), ¼ in. long, divided to a little below the middle ; lobes ⅛ in. long, ovate, acute ; corona very conspicuous, of 5 large subspathulate lobes projecting horizontally from the staminal-column and lying flat on it when expanded, without appendages on the upper side. Staminal-column very short ; pollen-masses with a pellucid apical margins, waxy, attached to the pollen-carriers by very short caudicles. Style-apex depressed. Follicles 3—4 in. long, straight, tapering to a point at the apex, not or scarcely tapered at the base, striate, glabrous. Seeds few, ⅜ in. long, oblong, narrowly margined ; coma 1 in. long. Talb. Trees, Bomb. ed. 2, p. 238. *Heterostemma Wallichii*, Dalz. & Gibs. p. 152 (*not* of Wight).—Flowers : Aug.—Sept.

KONKAN : *Stocks* ! ; Vingorla, *Dalzell* ! ; Malwán, *Dalzell & Gibson*. DECCAN : near Poona, *Talbot*.—DISTRIB. India (W. Peninsula).

20 **HOYA**, R. Br.

Twining or climbing pendulous (rarely erect), sometimes epiphytic shrubs. Leaves opposite, thick and fleshy. Flowers in axillary, lateral or terminal umbels (rarely fascicled). Calyx small, 5-partite. Corolla rotate, fleshy or waxy ; lobes 5, often convex and spreading or reflexed, valvate in bud ; corona of 5 fleshy membranous or horny lobes, adnate to the staminal-column, stellately spreading or ascending, turgid or compressed, often concave on the upper surface, the inner margin usually produced into a tooth or process, which is erect and incumbent on the anther. Staminal-column short, arising from the base of the corolla ; anthers conniving over the apex of the style, terminated by an erect or inflexed membranous appendage ; pollen-masses 1 in each anther-cell, erect, waxy, usually attached to the pollen-carriers by distinct caudicles. Style-apex included, flat or scarcely apiculate. Follicles various, usually slender with a thin pericarp, rarely turgid with a thick one. Seeds small ; coma long.—DISTRIB. Tropical Asia, Malaya, and Australia ; species about 60.

Leaves linear, not more than ¼ in. broad at the widest part ; flowers 1—3-nate	1.	*H. retusa*.
Leaves ovate or elliptic, ¾ in. or upwards at the widest part ; flowers in many-flowered umbels.		
Calyx and corolla-lobes glabrous.		
Corona-lobes with the broad end outside	2.	*H. Wightii*.
Corona-lobes with the narrow end outside	3.	*H. ovalifolia*.
Calyx and corolla-lobes hairy	4.	*H. pendula*.

1. **Hoya retusa**, *Dalzell, in Kew Journ. Bot.* v. 4 (1854) p. 294. Parasitic on trees, pendulous, glabrous ; stem very slender, terete. Leaves 1½—2½ by ⅛—⅓ in. at the widest part, pale, fleshy, linear, gradually increasing in width from the base to the obcordate apex,

furrowed on the upper surface, glabrous; petioles $\frac{1}{10}$—$\frac{1}{8}$ in. long. Flowers 1—3-nate, subaxillary; pedicels filiform, $\frac{1}{2}$—$\frac{3}{4}$ in. long. Calyx minute, divided to the base; sepals $\frac{1}{20}$ in. long, deltoid-ovate, subacute. Corolla white, shining, $\frac{1}{2}$—$\frac{3}{4}$ in. across; lobes $\frac{1}{8}$ in. long, broadly deltoid, acute, with velvety-pubescent margins; corona pink, the lobes $\frac{1}{12}$ in. long, horizontal, ovate-oblong, stellately spreading, the broad end outwards. Pollen-masses erect, oblong or slightly clavate, waxy. Follicles not seen. Fl. B. I. v. 4, p. 56; Dalz. & Gibs. p. 153; Talb. Trees, Bomb. ed. 2, p. 238; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167.—Flowers: July. VERN. *Jamaki*; *Dhákti-A'mbri.*

KONKAN: *Stocks*! KANARA: common in the forests of Yellapur, *Talbot*; Dandeli woods, *Dalzell*!; Yacombi, *Woodrow*; Kála naddi, *Ritchie*, 1860!—DISTRIB. India (W. Peninsula), apparently endemic.

2. **Hoya Wightii,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 59. A stout glabrous climber. Leaves thick, pale, 2½—3½ by 1¼—1¾ in., elliptic or elliptic-lanceolate, bluntly acuminate, the margins recurved, base acute or subacute, rarely rounded; main nerves nearly horizontal with reticulate venation between them; petioles $\frac{1}{8}$—$\frac{3}{4}$ in. long. Flowers in lateral pedunculate umbels; peduncles $\frac{1}{4}$—$\frac{3}{4}$ in. long, arising from between the petioles; pedicels stout, $\frac{3}{4}$—1 in. long. Calyx glabrous, divided almost to the base; segments $\frac{1}{12}$ in. long, oblong, the margins sometimes slightly ciliolate. Corolla cream-colored, glabrous inside, $\frac{3}{4}$ in. across; lobes $\frac{1}{4}$ in. long, deltoid, acute; corona of 5 fleshy lobes, stellately radiating from the column, the broad end outside, subquadrate in transverse section, the inner margin of each lobe with an obtuse process which rests against the back of the anther. Pollen-masses clavate, compressed, attenuated at the base into a distinct caudicle, waxy, without a pellucid margin. Follicles 3—4 by ¼ in., slender, straight, cylindric, very slightly tapering towards the ends. Seeds lanceolate, $\frac{1}{8}$ in. long, narrowed at both ends; coma nearly 2 in. long. Talb. Trees, Bomb. ed. 2, p. 238; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167. *Hoya pendula,* Wight & Arn. in Wight, Contrib. p. 36 (exclud. syn.), *not* of Wight, Icon. t. 575; Grah. Cat. p. 119. *H. pallida,* Dalz. & Gibs. p. 152. *H. parasitica,* Grah. Cat. p. 119 (*not* of Wall.).—Flowers: Oct.—Dec. VERN. *A'mbri*; *Dudh-yel.*

KONKAN: *Law*!, *Stocks*!, *Dalzell*!; Nagotna jungles, *Graham.* DECCAN: Lanoli, *Graham*; Mahableshwar, *Graham, Cooke*! KANARA: common on the Supa Ghâts, *Talbot;* Sampkhand (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula).

3. **Hoya ovalifolia,** *Wight & Arn. in Wight, Contrib.* (1834) p. 37. A twining glabrous shrub. Leaves 2—4 by ¾—1½ in., without recurved margins, elliptic-lanceolate, obtuse or acute, very thick, glabrous, pale beneath, base usually acute; petioles $\frac{1}{8}$—¼ in. long. Flowers greenish- or purplish-white in lateral pedunculate umbels peduncles stout, ¾—1 in. long, arising from between the petioles pedicels ½ in. long. Calyx glabrous, divided almost to the base, segments $\frac{1}{12}$ in. long, ovate-oblong, subacute. Corolla $\frac{1}{8}$—½ in. across when expanded, divided about $\frac{2}{3}$ of the way down; lobes $\frac{1}{16}$ in. long,

ovate, acute ; corona of 5 large lobes $\frac{1}{10}$ in. long, radiating from the staminal-column, the narrow and outside, the upper surface concave, the inner end prolonged into a cuspidate point. Anther-appendages large, ovate, acute, membranous ; pollen-masses erect, subsessile on the pollen-carriers, oblong, without a pellucid margin. Follicles 5—6 in. long, very slender, curved. Fl. B. I. v. 4, p. 60 ; Wight, Icon. t. 847 ; Trim. Fl. Ceyl. v. 3, p. 162 ; Talb. Trees, Bomb. ed. 2, p. 239.

KANARA : N. Kanara, *Talbot.*

This plant has been included on the authority of Mr. Talbot, who reports its occurrence in N. Kanara. I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew.—DISTRIB. India (W. Peninsula); Ceylon.

4. **Hoya pendula,** *Wight, Icon.* t. 474 (not of W. & A. in Wight, Contrib.). A twining shrub ; branches terete, sparsely hairy. Leaves $1\frac{3}{4}$—3 by 1—$1\frac{1}{2}$ in., with recurved margins, ovate-oblong, acute or acuminate, thick, glabrous, base rounded ; petioles $\frac{1}{4}$ in. long. Flowers in lateral pedunculate umbels ; peduncles $\frac{1}{2}$ in. long, arising from between the petioles, stout, pubescent ; pedicels slender, $\frac{7}{8}$—1 in. long, sparsely hairy. Calyx hairy outside, divided almost to the base ; segments $\frac{1}{8}$ in. long, lanceolate, acute. Corolla divided about $\frac{1}{2}$-way down, silky-villous inside ; lobes $\frac{1}{4}$ in. long, broadly ovate-deltoid, acute, the inside faces and margins silky-villous ; corona-lobes $\frac{1}{8}$ in. long, ovate-lanceolate, the outer end the narrower, sub-acute, the process from the inner margin ovate, acute, short. Follicles not seen. Fl. B. I. v. 4, p. 61 ; Dalz. & Gibs. p. 152 ; Talb. Trees, Bomb. ed. 2, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 4, p. 302.—Flowers : July—Nov.

KONKAN : hills of the Kolaba district, *Talbot*; hills near Nagotna, *Dalzell & Gibson*; Southern Konkan, *Nimmo* ex *Dalzell & Gibson.*—DISTRIB. India (W. Peninsula).

Hoya carnosa, R. Br. in Mem. Wern. Soc. v. 1 (1811) p. 27. The *Wax-plant*. Leaves fleshy, elliptic-oblong, acuminate. Flowers pinkish-white, in pendulous umbels on short peduncles ; corolla fleshy, bearded inside. A native of Queensland, grown commonly in gardens. There is a form with variegated leaves. Grah. Cat. p. 118 ; Dalz. & Gibs. Suppl. p. 54 ; Woodr. Gard. in Ind. ed. 5, p. 384.

Hoya Griffithii, Hook. f. Fl. B. I. v. 4 (1883) p. 59. A native of the Khasia mountains, sometimes grown in gardens in the Presidency. It has thick elliptic or oblanceolate leaves and rosy flowers rather larger than those of *Hoya carnosa.* Woodr. Gard. in Ind. ed. 5, p. 385.

21. **OIANTHUS,** Benth.

Twining undershrubs. Leaves opposite. Flowers in lateral few-flowered small, subsessile cymes. Calyx 5-partite. Corolla ovoid-urceolate or disciform ; lobes 5, short, broad, valvate ; corona adnate to the staminal-column, cupular, spreading, fleshy, lobed, toothed, or entire at the apex. Staminal-column arising from the base of the

corolla, minute, short, depressed ; anther-appendages short ; inflexed ; pollen-masses 1 in each anther-cell, waxy, ovoid, compressed, ascending, attached to the pollen-carriers by very short caudicles, the inner margin often pellucid. Style-apex broadly conical, not exserted beyond the anthers. Fruit not known.—DISTRIB. India (W. Peninsula) ; species 3.

Bentham inclines to the opinion that this genus together with the genus *Asterostemma*, Decaisne, might be included *Heterostemma*.

Corolla urceolate; corona-lobes 3-toothed at the apex..... 1. *O. urceolatus.*
Corolla disciform; corona-lobe entire at the apex..... 2. *O. disciflorus.*

1. **Oianthus urceolatus,** *Benth. in Hook. Icon. Pl.* t. 1191. A twining undershrub ; stem purple, puberulous. Leaves 2—4 by 1—2 in., ovate, acute or acuminate, glabrous, base rounded or subcordate, 3—5-nerved ; petioles ¼ in. long, with glands above them on the upper side of the leaf. Flowers in lateral few-flowered sessile or shortly pedunculate cymes ; peduncles when present arising from between the petioles ; pedicels shorter than the petioles. Calyx minute, 5-partite ; segments $\frac{1}{20}$ in. long, oblong, obtuse. Corolla shortly 5-fid at the apex, urceolate, $\frac{5}{8}$—¾ in. long, reddish-purple outside, dark-purple within ; lobes triangular, $\frac{1}{12}$—⅛ in. long, with minute teeth between them ; corona arising from the staminal-column, of 5 fleshy lobes exceeding the column and forming a cup around it, each lobe 3-toothed at the apex, the terminal tooth bent inwards. Anthers short, terminated by a colored membranous appendage ; pollen-masses 1 in each anther-cell, erect, ovoid-oblong, slightly compressed, the inner margin pellucid (*Dalzell*) ; caudicle short. Follicles not seen. Fl. B. I. v. 4, p. 49 ; K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, part 2, p. 294, fig. 90, J—K ; Talb. Trees, Bomb. ed. 2, p. 238 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167. *Heterostemma urceolatum*, Dalz. in Kew Journ. Bot. v. 4 (1852) p. 295 ; Dalz. & Gibs. p. 152.—Flowers : July—Aug.

Rare. DECCAN : Poona, *Woodrow*. S. M. COUNTRY : hills near Belgaum, *Dalzell, Ritchie,* 1112!—DISTRIB. India (W. Peninsula), apparently endemic.

2. **Oianthus disciflorus,** *Hook. f. Fl. B. I* v. 4 (1883) p. 49. A twining undershrub, glabrous or nearly so ; young stems pubescent. Leaves 3—5 by 1½—2½ in., elliptic-oblong or ovate-oblong, acute or obtuse, glabrous, base rounded or subcordate ; petioles ¾—1 in. long. Flowers in small subsessile lateral cymes arising from between the petioles. Calyx divided nearly to the base ; segments $\frac{1}{16}$ in. long, oblong, obtuse. Corolla disciform, vertically depressed ; corona 5-lobed, with entire, somewhat incurved apex. Follicles not seen.

There are two sheets in Herb. Kew, each ticketed "Kanara & Mysore, Law," with a query, and each also bearing a ticket "Konkan, Stocks," neither ticket being in the handwriting of either Law or Stocks. The habitat of the plant is therefore uncertain.

22. LEPTADENIA, R. Br.

Erect or twining shrubs with much-branched rush-like stems. Leaves opposite, variable in the same species, sometimes absent. Flowers small, in umbellate lateral sessile or pedunculate many-

flowered cymes. Calyx more or less deeply 5-fid. Corolla deeply divided, rotate or with a very short campanulate tube ; lobes 5, pubescent or bearded inside, valvate in bud ; corona double, the corolline of 5 short transverse or rounded fleshy lobes tipped with a tuft of hairs or with a subulate hairy point, inserted at the sinuses of the corolla, the staminal corona of a raised undulate fleshy ring at the base of the staminal-column. Staminal-column arising from the base of the corolla ; anthers incumbent on the top of the style, without terminal appendages ; pollen-masses 1 in each anther-cell, suberect, pellucid at the apex, attached in pairs by short caudicles to the pollen-carriers. Follicles smooth. Seeds comose.—DISTRIB. Tropical Asia and Africa ; species about 12.

Leafy twining shrub	1. *L. reticulata.*
An erect shrub, leafless (except occasionally the young shoots)	2. *L. Spartium.*

1. **Leptadenia reticulata,** *Wight & Arn. in Wight, Contrib.* (1834) p. 47. A twining shrub ; stems with corky deeply cracked bark ; branches numerous, the younger ones terete, glabrous or hoary-puberulous. Leaves thinly coriaceous, 1½—3 by ¾—1¾ in., ovate, acute, glabrous above, more or less finely pubescent (especially on the nerves) beneath, base rounded or subcordate (rarely subacute) ; petioles ¼—¾ in. long, puberulous. Flowers greenish-yellow, in lateral or subaxillary many-flowered hoary-puberulous globose cymes ; peduncles arising from between the leaves or subaxillary, sometimes in pairs, puberulous ; pedicels ⅛—⅛ in. long, puberulous. Calyx pubescent outside, divided to about the middle ; segments 1/10 in. long, ovate-oblong, subacute. Corolla ⅛ in. long (about ⅛ in. across when expanded) ; tube very short, glabrous ; lobes of the limb thick, 1/10 in. long, ovate-oblong, subobtuse, with revolute margins, pubescent on both surfaces, often with a small hairy process (absent in Deccan specimens) on the inner face near the tip ; corolline corona of 5 quadrate truncate fleshy lobes at the sinuses ; staminal corona minute, annular, close to the staminal-column. Anthers without membranous appendages, incumbent on the style-apex ; pollen-masses ovoid, large, waxy, pellucid at the apex, attached to the minute pollen-carriers by moderately long caudicles. Follicles subwoody, 2½—3½ in. long, turgid, tapering into an obtuse shortly curved beak. Seeds ¼ in. long, narrowly ovate-oblong, acute ; coma 1¼—1½ in. long. Fl. B. I. v. 4, p. 63 ; Grah. Cat. p. 118 ; Dalz. & Gibs. p. 152 ; Trim. Fl. Ceyl. v. 3, p. 164 ; Talb. Trees, Bomb. ed. 2, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 4, p. 630.—Flowers : Apr.—July. VERN. *Hirandodi* ; *Kharkhoda* ; *Shinguti.*

KONKAN : common, particularly near the sea, *Dalzell & Gibson.* DECCAN Poona, *Cooke* !, *Woodrow* ! S. M. COUNTRY : *Graham* ; Dambal, in the Dharwar district, *Talbot.* KANARA : Jatihalli on the Kála naddi, *Ritchie* 1857 ! GUJARAT : hedges about Surat, *Graham* ; Kernali *Kanitkar* !—DISTRIB India (Panjáb, Birma, W. Peninsula) ; Ceylon, Singapore, Ava.

2. **Leptadenia Spartium,** *Wight, Contrib.* (1834) p. 48. A much branched often leafless bush 2—6 ft. high ; branches erect, slender terete, straight, the young ones puberulous. Leaves present on the young shoots only (not always so), 1—2¼ by ⅛ in., linear or linear

lanceolate, acute, glabrous, subsessile. Flowers yellow, in small lateral umbellate pubescent cymes ; peduncles $\frac{1}{16}$—$\frac{1}{8}$ in. long, pubescent, arising from between the petioles when leaves are present ; pedicels $\frac{1}{16}$—$\frac{1}{10}$ in. long, pubescent. Calyx pubescent, divided to about the middle ; segments $\frac{1}{10}$ in. long, ovate-deltoid, acute. Corolla $\frac{1}{8}$ in. long, deeply divided ; tube funnel-shaped, short, glabrous ; lobes $\frac{1}{10}$ in. long, ovate-oblong, subacute, thickened towards the apex, puberulous outside, pubescent inside ; corona-lobes at the sinuses of the corolla very small, tubercle-like, pubescent at the apex, the staminal corona minute, annular, close to the base of the staminal-column. Staminal-column very short ; pollen-masses erect, with pellucid apex, attached to minute pollen-carriers by short caudicles. Follicles 3½—4½ by ¼ in., lanceolate, terete, attenuated into a long slender beak, slightly narrowed at the base, glabrous. Seeds ⅓ in. long, narrowly lanceolate, glabrous ; coma 1—1½ in. long. Fl. B. I. v. 4, p. 64 ; Talb. Trees, Bomb. ed. 2, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 4, p. 630. *Leptadenia Jacquemontiana*, Decaisne, in DC. Prodr. v. 8 (1844) p. 641 ; Dalz. & Gibs. p. 152.—Flowers : Dec.—Jan. VERN. *Kip*.

Abundant in Kathiawar and Sind. GUJARAT : Kathiawar, *Dalzell* ! ; sea-shore south of Gogo, plentiful, *Dalzell & Gibson* ; Perim Island at the mouth of the Narbada river, *Raoji* ! SIND : *Stocks*, 408 ! ; Mándvi, *Woodrow* ; Shikarpur, *Cooke* !—DISTRIB. India (Panjáb) ; Beluchistan, Arabia, Egypt.

The fibre is used for making ropes for drawing water from wells as it does not rot. The branches are used as fodder for cattle. See Watt, Dict. Econ. Prod. l. c.

23. **CEROPEGIA**, Linn.

Perennial herbs erect or twining ; rootstock often tuberous. Leaves opposite, sometimes minute or 0. Flowers often large, in lateral (rarely terminal) umbellate or racemose cymes, rarely solitary or in pairs. Calyx 5-partite. Corolla tubular, usually elongate, more or less inflated at the base, straight or curved ; lobes 5, more or less connate at their tips, valvate in bud ; corona staminal, double, arising from the staminal-column, the outer corona cup-shaped, entire or 5—10-toothed, or of 5 bifid lobes more or less adnate to the inner corona-lobes and often appearing to form one series with them, or reduced to minute pouches alternating with the stamens, the inner corona of 5 short or long lobes opposite the anthers and incumbent on them or erect, dorsally adnate at their base to the cup of the outer corona or laterally to its lobes, when the corona appears to be formed of 5 lobes with a tooth on each side at the base. Staminal-column arising a little above the base of the corolla, very short, included in its inflated basal part ; anthers oblong or subquadrate without appendages ; pollen-masses erect, ascending or subhorizontal, 1 in each anther-cell, attached to the pollen-carriers by short caudicles or subsessile. Style-apex not exserted, truncate or shortly conical. Follicles lanceolate or linear-fusiform, acuminate, smooth. Seeds comose.—DISTRIB. Africa, East Indies, Malayan Archipelago, and Australia ; species perhaps 80 or more.

LXXXIII. ASCLÆPIADACEÆ.

A genus of plants the flowers of which are of curious form, many of them large and beautifully colored. Unfortunately it is by no means easy to dry them so as to produce good Herbarium specimens. Owing to the unavoidable deformations which occur in pressing plants of a succulent nature, the floral organs of which are extremely delicate, systematic work with Herbarium specimens is far from satisfactory. In order to discriminate accurately between the several species of the genus, living plants should be examined and careful dissections and colored drawings of the flowers made. As most of the species appear in the rainy season, their collection in the jungles during the wet weather is neither easy nor pleasant, but there can be little doubt that the Konkan and Deccan jungles would, if they could be explored during the months of July and August when most of the species flower, yield some new species to an adventurous botanist, while seeds and tubers would be welcomed as valuable contributions to conservatories at home. The islands in the harbor of Bombay may be suggested as affording a good hunting-ground.

Stem erect.

Leaves linear, less than $\frac{1}{4}$ in. wide; corolla-lobes as long as or longer than the tube ..... 1. *C. attenuata.*

Leaves ovate, 1 in. or more wide; corolla-lobes shorter than the tube ..... 2. *C. Lawii.*

Stem twining.

Leaves fleshy.

Leaves small, less than 1 in. long, or 0 ..... 3. *C. uncea.*

Leaves exceeding 1 in. long, never wanting ..... 4. *C. bulbosa.*

Leaves membranous.

Corolla-lobes $\frac{1}{4}$ as long as the tube.

Leaves and peduncles glabrous; corolla-lobes contracted into a narrow beak in bud ..... 5. *C. tuberosa.*

Leaves and peduncles pubescent or hispid; corolla-lobes forming a clavate head in bud.

Inner corona-lobes hooked ..... 6. *C. hirsuta.*

Inner corona-lobes straight.

Corolla-tube much inflated (almost globose) at the base; corolla-lobes lanceolate ..... 7. *C. oculata.*

Corolla-lobes as long as or nearly as long as the tube.

Corolla-tube slightly inflated at the base; corolla-lobes linear ..... 8. *C. Stocksii.*

1. **Ceropegia attenuata,** *Hook. Icon. Pl.* v. 9 (1852) t. 867. Erect, 6—12 in. high; root tuberous; stem more or less pubescent when young, when mature glabrous. Leaves 2—6 by $\frac{1}{8}$—$\frac{3}{8}$ in., linear, acute, narrowed at the base, subsessile, the young ones more or less pubescent; midrib strong. Flowers usually solitary at the apex of a pubescent peduncle $\frac{1}{2}$ in. long, which arises from between the petioles. Calyx divided to the base; sepals $\frac{1}{4}$—$\frac{1}{3}$ in. long, subulate, hairy down the middle of the back. Corolla $2\frac{1}{4}$ in. long, straight; tube 1 in. long, cylindric, inflated at the base, closely striately veined; lobes $1\frac{1}{4}$ in. long, deltoid for $\frac{1}{4}$ in., then narrowly linear, united at the tip; outer corona-lobes deltoid-oblong, deeply bifid, the segments very acute, ciliate with long very fine hairs; inner corona-lobes linear, $1\frac{1}{4}$ in. long, deltoid for $\frac{1}{4}$ in., then narrowly linear, united at the tip; lose, on a peduncle $\frac{3}{4}$ in. long. Seeds ovoid-oblong, $\frac{1}{8}$ in. long, with a thick margin; coma $\frac{1}{8}$ in. long. Fl. B. I. v. 4, p. 67; Dalz. & Gibs. p. 154; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168. *Ceropegia angustifolia,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 259; Dalz. & Gibs. p. 154 (*not* of Wight).—Flowers: July—Sept.

KONKAN: *Stocks*!, *Law*!, *Dalzell*!; near Vingorla, *Dalzell*!, *Ritchie*!; Malwán, *Dalzell*. DECCAN: hill near Junnar, *Woodrow*.—DISTRIB. India (W. Peninsula).

2. **Ceropegia Lawii,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 67. Erect, 15—20 in. high; root a tuber 2—3 in. in diam.; stems stout, succulent, more or less pubescent or glabrous. Leaves 2—4 by 1—2 in., ovate or ovate-lanceolate, usually acute, glabrous, base acute, rarely rounded or truncate; petioles ½—¾ in. long, glabrous. Flowers in pedunculate cymes; peduncles many-flowered, arising from between the petioles or subaxillary, more or less hairy; pedicels short, hairy; bracts lanceolate-subulate. Calyx divided to the base; sepals ⅛—⅛ in. long, linear-lanceolate acute. Corolla 1—1¼ in. long; tube more or less inflated at the base, ¾—1 in. long, closely striate; lobes incurved, forming a small globose head; outer corona 10-toothed, the teeth short, obtuse, ciliate with long fine hairs; inner corona-lobes linear, 1/12 in. long. Follicles not seen. Woodr. in Journ. Bomb. Nat. v 12 (1898) p. 168.—Flowers: Aug.

KONKAN: *Stocks*!, *Law*!, *Dalzell*. DECCAN: Khandala, *Woodrow*; Purandhar, *Woodrow*; Mahableshwar, *H. M. Birdwood*.—DISTRIB. India (W. Peninsula).

3. **Ceropegia Juncea,** *Roxb. Cor. Pl.* v. 1 (1795) p. 12, t. 10. Twining, fleshy, glabrous; root tuberous, with numerous branched fibres. Leaves small or 0; when present sessile, distant, ⅜—½ by ⅛—¼ in., lanceolate, acute, fleshy. Flowers in 3—5-flowered umbellate pedunculate cymes; peduncles ½—1 in. long, arising from between the petioles, stout; pedicels short, stout. Calyx divided to the base; sepals ⅛ in. long, lanceolate, acute. Corolla 1½—2 in. long, curiously variegated with green, yellow, and purple; tube inflated at the base, funnel-shaped above the middle; lobes about as long as the tube, linear from a broad elliptic-oblong base, slightly clavate at the apex, the tips connate; outer corona of 5 subquadrate deeply bifid lobes, the segments subdeltoid with a wide sinus, ciliate with fine hairs; inner corona-lobes 1/10 in. long, linear, with hooked tips. Follicles 6—7 by ¼ in. Fl. B. I. v. 4, p. 68; Grah. Cat. p. 117; Dalz. & Gibs. p. 153; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168.—Flowers: Aug.—Sept. VERN. *Kanvel*.

S. M. COUNTRY: Badami, *Woodrow*. KANARA: Kasersai jungles, *Dr. Lush* ex *Graham*.—DISTRIB. India (W. Peninsula).

4. **Ceropegia bulbosa,** *Roxb. Cor. Pl.* v. 1 (1795) p. 11, t. 7. Twining; root tuberous, the size of a small turnip, a little flattened, with several fibres from its base; stem very slender, usually glabrous. Leaves excessively variable (see the varieties). Flowers in pedunculate umbellate cymes; peduncles ½—1 in. long, arising from between the petioles; pedicels ⅛—¼ in. long, slender. Calyx divided to the base; sepals 1/12 in. long, lanceolate, acute. Corolla ½—¾ in. long, greenish; tube inflated at the base; lobes ⅛ in. long, linear from a deltoid base, hairy, connate at the tips, violet-purple inside; outer corona-lobes 5, minute; inner corona-lobes narrowly linear, 1/12 in. long. Pollen-masses erect, attached to the pollen-carriers by very short caudicles. Follicles 4 by ⅛ in., cylindric, tapering towards an

acute apex, glabrous ; pericarp thin. Seeds ⅓ in. long, ovate-oblong, flattened, with a broad submembranous margin ; coma 1—1½ in. long. Fl. B. I. v. 4, p. 67 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 2, p. 262.

The leaves and the tubers are eaten, the former, according to Roxburgh, tasting like purslane (*Portulaca oleracea*), the latter, when fresh, like raw turnips.—DISTRIB. India (Panjáb and Upper Gangetic plain, W. Peninsula).

VAR. 1. *bulbosa proper,* Hook. f. Fl. B. I. v. 4 (1883) p. 68. Leaves petiolate, the lowest almost orbicular, the upper ones elliptic-oblong or obovate, rarely elliptic-lanceolate, usually apiculate, base rounded, truncate, subcordate or acute. Grah. Cat. p. 117 ; Dalz. & Gibs. p. 153 ; Wight, Icon. t. 845.—Flowers : Aug.

KONKAN : Malabar Hill (Bombay), *Graham*; island of Karanja, *Dalzell & Gibson.* DECCAN : 10 miles W. of Poona, *Woodrow.* S. M. COUNTRY : Belgaum, *Ritchie,* 1110!

VAR. 2. *Lushii,* Hook. f. Fl. B. I. v. 4 (1883) p. 68. Leaves subsessile, fleshy, glaucous, 4—8 by ⅛—⅓ in., narrowly linear, acuminate. *Ceropegia Lushii* (sp.), Graham, in Bot. Mag. (1834) t. 3300 ; Grah. Cat. p. 117 ; Dalz. & Gibs. p. 154.

Rare. KANARA : Kasersai jungles, *Dr. Lush* ex *Graham.*

5. **Ceropegia tuberosa,** *Roxb. Cor. Pl.* v. 1 (1795) p. 12, t. 9. Twining, glabrous ; root of many small tuberous knobs with fleshy fibres ; stem slender. Leaves membranous, 1¼—4 by ½—2 in., the lower leaves suborbicular, the middle-stem leaves ovate, the upper oblong, all usually apiculate, glabrous, base rounded, acute or subcordate ; petioles ¼—½ in. long. Peduncles 1—3 together, ½—3 in. long, arising from between the petioles or subaxillary ; pedicels fascicled or subpaniculate, slender, glabrous ; bracts subulate. Calyx divided to the base ; sepals ⅛—¼ in. long, narrowly lanceolate, acute, with scarious margins, more or less recurved. Corolla 1—1½ in. long ; tube inflated at the base and enlarged at the mouth ; limb suddenly contracted from a broad triangular base into linear lobes, at first connate throughout their entire length, appearing in bud like a narrow beak, afterwards free, about ½ as long as the tube ; outer corona cupular, truncate, with 5 small pockets alternating with the inner corona-lobes, ciliate ; inner corona-lobes $\frac{1}{10}$ in. long, linear, slightly clavate at the apex. Pollen-masses with a pellucid apical margin, erect, attached to the pollen-carriers by very short caudicles. Follicles 3½—5 by ⅛ in., slender, straight or very slightly curved, tapering to a fine point, glabrous. Seeds ¼ in. long, linear-oblong, strongly margined ; coma 1—1½ in. long. Fl. B. I. v. 4, p. 70 ; Grah. Cat. p. 117 ; Dalz. & Gibs. p. 154 ; Wight, Icon. t. 353 ; Watt, Dict. Econ. Prod. v. 2, p. 262. *Ceropegia acuminata,* Grah. Cat. p. 117 ; Dalz. & Gibs. p. 153 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 (*not* of Roxb.). *C. Candelabrum,* Roxb. Hort. Beng. p. 21 ; Grah. Cat. p. 117 (*not* of Linn.).—Flowers : Aug.

KONKAN : *Nimmo* ex *Graham.* DECCAN : Páshan near poona, *Woodrow.* S. M. COUNTRY : about Dharwar, *Law* ex *Dalzell & Gibson, Graham.*—DISTRIB. India (W. Peninsula).

6. **Ceropegia hirsuta,** *Wight & Arn. in Wight, Contrib.* (1834) p. 30. Suffruticose, twining, hirsute or pubescent; roots tuberous. Leaves membranous, 2—4 in. long, varying from ovate-cordate, obtusely acuminate, to narrowly lanceolate, acute; peticles ½—1 in. long. Flowers in few-flowered umbellate cymes; peduncles ½—2 in. long, arising from between the petioles, hispid; pedicels ¼—½ in. long, hispid; bracts subulate. Calyx divided to the base; sepals ⅛ in. long, linear-subulate, very acute, hirsute with rigid hairs. Corolla greenish, blotched with purple, 1½—1¾ in. long, with a very large club-shaped head; tube inflated at the base, enlarged at the mouth; lobes about ½ as long as the tube, oblong-lanceolate, about ¼ in. broad at the widest part, connate at the tip; outer corona-lobes subquadrate, narrowed a little towards the more or less deeply bifid apex, the teeth deltoid, ciliate; inner corona-lobes ⅛ in. long, linear, curved or hooked at the slightly clavate apex. Follicles 4 by ⅛ in., finely pointed, glabrous. Seeds ⅓ in. long, narrowly oblong; coma 1—1¼ in. long. Fl. B. I. v. 4, p. 71; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168. *Ceropegia Jacquemontiana,* Dalz. & Gibs. Bo. Fl. p. 153 (*not* of Decaisne). *C. ophiocephala,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 259; Dalz. & Gibs. p. 154.—Flowers: Aug. VERN. *Hámana.*

KONKAN: *Stocks*!, *Law*!; Vingorla, *Ritchie,* 1851!; island of Karanja, *Dalzell & Gibson.* DECCAN: Páshan, 6 miles W. of Poona, *Tukaram*!; Poona districts, *Woodrow*!; Nanded, 10 miles W. of Poona, *Kanitkar*!—DISTRIB. India (W. Peninsula).

VAR. *vincæfolia,* Hook. f. Fl. B. I. v. 4 (1883) p. 72. Leaves slightly downy on both sides; outer corona of 5 erecto-patent emarginate fleshy lobes tipped with long hairs. *Ceropegia vincæfolia* (sp.), Hook. in Bot. Mag. (1840) t. 3740.

Near Bombay, *Nimmo* ex *Dalzell & Gibson.*

I have seen no authentic specimens of this, which can hardly be considered a good variety. The only difference between it and *C. hirsuta proper* appears to be in the outer corona-lobes, which are described and figured in the Bot. Mag. (*l. c.*) *as* erecto-patent, emarginate.

7. **Ceropegia oculata,** *Hook. Bot. Mag.* (1844) t. 4093. Herbaceous, twining; stem and branches terete, glabrous. Leaves membranous, 4—6 by 1½—2½ in., ovate, acuminate, more or less pubescent, ciliate; base usually cordate; petioles ½—1 in. long. Flowers in 4—8-flowered umbellate cymes; peduncles 1½—2 in. long, arising from between the petioles, usually clothed with spreading hairs; pedicels ¼—⅝ in. long. Calyx divided to the base; sepals ⅓ in. long, linear-lanceolate, acute, glabrous or nearly so. Corolla 1¾—2¼ in. long, pale-green in the lower part, the upper part of the tube beneath the lobes spotted with purple; tube much inflated, almost globose at the base, enlarged at the mouth; lobes ½ the length of the tube, erect, oblong-lanceolate, pubescent towards the upper part, the tips connate; outer corona of 5 shortly bifid lobes, the teeth acute, ciliate; inner corona-lobes slender, erect, straight, not hooked at the tip. Follicles not seen. Fl. B. I. v. 4, p. 72; Dalz. & Gibs. p. 154.—Flowers: Aug.—Sept.

KONKAN : *Stocks* !, *Law* ! ; Bombay, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula).

8. **Ceropegia Stocksii,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 74. Twining ; stem terete, glabrous. Leaves membranous, 2½—5 by 1—2¼ in., ovate, acuminate, puberulous on both sides, base rounded or subcordate, rarely subacute ; petioles ½—1 in. long. Flowers in umbellate cymes ; peduncles 1—1½ in. long, arising from between the petioles, 3—many-flowered, hairy ; pedicels short. Calyx divided to the base, glabrous or nearly so ; sepals reaching ½ in. long, linear-subulate. Corolla reaching 2½ in. long, straight ; tube slightly inflated at the base ; lobes about equalling the tube, linear from a triangular base, connate at the tips ; outer corona-lobes 5, deltoid, ciliate ; inner corona-lobes linear-oblong or somewhat oblanceolate, erect, straight, not hooked at the tip. Follicles not seen.—Flowers : Aug.—Sept.

KONKAN : *Stocks* !, *Law* ! ; Uran (Bombay harbor), *Stocks* !—DISTRIB. India (W. Peninsula).

24. FREREA, Dalz.

A low fleshy glabrous perennial cæspitosely branched herb. Leaves opposite. Flowers lateral, solitary or in pairs. Calyx 5-partite. Corolla rotate ; lobes 5, broadly deltoid, acute, valvate ; outer corona cupular, with 5 short truncate or retuse lobes ; inner corona of 5 linear narrow incurved truncate lobes resting against the anthers and inflexed over them. Staminal-column very short ; anthers without appendages ; pollen-masses 1 in each anther-cell, erect, with a pellucid margin. Style-apex nearly flat, not exserted. Follicles terete, smooth. Seeds comose.—DISTRIB. Western Peninsula of India ; species 1.

1. **Frerea indica,** *Dalz. in Journ. Linn. Soc.* v. 8 (1865) p. 10, t. 3. A fleshy glabrous herb 4—6 in. high with thick branches. Leaves 1½ in. long, oblong, obtuse or subacute, fleshy, subsessile. Flowers solitary or in pairs ; pedicels arising from between the petioles, very short. Calyx glabrous, divided about ⅔ the way down ; lobes deltoid, acute. Corolla rotate, ¾ in. in diam., divided rather less than ½-way down ; lobes deltoid, acute, fringed with fine hairs, purple, with a pale-yellow irregularly shaped spot in the centre of each lobe ; corona purple, the outer cupular with 5 broad short truncate or sinuate lobes, the inner of 5 linear truncate lobes incurved at the apex and inflexed over the staminal-column. Staminal-column short ; anthers red (*Dalzell*). Style-apex pearly white. Follicles not seen. Fl. B. I. v. 4, p. 76 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168.—Flowers : Sept.—Oct. VERN. *Shindal-makudi.*

A rare plant, originally found by Dalzell on a hill near Junnar in the Poona districts. DECCAN : Hill fort, Junnar, *Ranade* !, *Woodrow*.—DISTRIB. Apparently endemic.

25. CARALLUMA, R. Br.

Succulent perennial branched almost leafless herbs ; stems usually angled, thick and fleshy. Flowers in few- or many-flowered fascicles

or sessile umbels, at the base, apex, or along the sides of the stems between the angles, pedicellate or subsessile. Calyx 5-partite. Corolla rotate or broadly campanulate ; lobes 5, valvate in bud ; corona double, arising from the staminal-column, the outer corona annular or cupular, adnate to the backs of the inner corona-lobes at their base or connected to them by narrow partitions, 5-lobed, the lobes 2-cuspidate, the inner corona-lobes incumbent on the backs of the anthers and not exceeding them, or produced into erect connivent or recurved tips. Staminal column short, arising from the bottom of the corolla ; anthers without appendages ; pollen-masses horizontal or ascending, 1 in each anther-cell, pellucid along the inner margin or at the apex, attached to the pollen-carriers in pairs by short rather slender caudicles. Style-apex truncate, not exserted beyond the anthers. Follicles narrowly fusiform, linear-terete or 3-gonous, smooth. Seeds comose. The genus *Boucerosia*, Wight & Arn., has been included in this genus.—DISTRIB. Africa, Arabia, India, South Europe ; species about 30.

Corolla-lobes glabrous within	1. *C. edulis.*
Corolla-lobes densely fibriate within	2. *C. fimbriata.*

1. **Caralluma edulis,** *Benth. Gen. Pl.* v. 2 (1876) p. 782. Erect, 6—18 in. high ; stem and branches subterete, 4-grooved. Leaves sometimes present on the young shoots, ¼—½ in. long, linear, acute. Flowers 1—4 together from the apex or the nodes of the stem, subaxillary when leaves are present ; pedicels ¼—½ in. long. Calyx divided to the base, glabrous ; sepals $\frac{1}{10}$ in. long, ovate, acute, with membranous margins. Corolla campanulate, purple inside, ¼ in. long, glabrous within ; lobes ⅛ in. long, ovate-lanceolate, acute ; outer corona 5-lobed, each lobe produced into 2 distant subulate teeth ; lobes of the inner corona $\frac{1}{12}$ in. long, linear, subacute. Pollen-masses subhorizontal, 1 in each anther-cell, attached to the pollen-carriers by short slender caudicles. Style-apex truncate, not exserted. Follicles not seen. Fl. B. I. v. 4, p. 76 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 2, p. 141. *Boucerosia edulis,* Edgew. in Journ. Linn. Soc. v. 6, p. 205, t. 1 ; Aitch. Pb. & Sind Pl. p. 90.—Flowers : Sept. VERN. *Pippa* ; *Pippu.*

In the Bombay Presidency confined to Sind. SIND : *Stocks* !, *Dalzell* ! ; Jemadar ka Landa near Karachi, *Stocks,* 533 ! ; Mulir, 6 miles from Karachi, *Woodrow.*

The plant is eaten as a vegetable.—DISTRIB. India (Panjáb).

2. **Caralluma fimbriata,** *Wall. Pl. As. Rar.* v. 1 (1830) p. 7, t. 8. Erect, fleshy ; stem diffusely branched, 4-angled to the extremities. Leaves present on the young shoots, minute, $\frac{1}{12}$ in. long, soon falling and leaving raised tooth-like points along the angles. Flowers terminal on the ends of the branches or at the upper nodes, solitary or 2 or 3 together on short pedicels. Calyx glabrous, divided to the base ; lobes $\frac{1}{10}$ in. long, lanceolate, acute. Corolla rotate, nearly ¾ in. across when expanded, deeply divided ; lobes ⅛—¼ in. long, linear-oblong, subobtuse with a long apiculus, purple, copiously fimbriate with long purple flattened hairs ; outer corona-lobes linear-

oblong in the basal part which is about $\frac{1}{18}$ in. long, divided above into 2 divergent points $\frac{1}{36}$ in. long ; inner corona-lobes $\frac{1}{60}$ in. long, very obtuse, incumbent on the backs of the anthers and not exceeding them. Follicles 4—5 in. long, cylindric, tapering, slender, smooth, 1 of the pair often suppressed. Fl. B. I v. 4, p. 77 ; Dalz. & Gibs. p. 155 ; Trim. Fl. Ceyl. v. 3, p. 168 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 2, p. 141. *Caralluma ascendens*, Grah. Cat. p. 118 (*not* of R. Br.).—Flowers : June. VERN. *Mákadsing* (monkey's horn).

DECCAN : *Dalzell & Gibson*; hills, *Woodrow* ! ; Bopudi, 3 miles N. of Poona, *Ganpat* !

The plant is eaten as a vegetable.—DISTRIB. India (W. Peninsula) ; Ava.

Cryptostegia grandiflora, R. Br. in Bot. Reg. (1819) t. 435. A lofty climber with glossy elliptic leaves 3—4 in. long, large rose-colored showy flowers and 3-winged follicles 4—5 in. long. The plant, which is a native of Tropical Africa, has been grown extensively in gardens in the Bombay Presidency, where it has become almost naturalized. It abounds in milky juice which supplies a fairly good caoutcho which has not however as yet become an article of commerce. See Watt, Dict. Econ. Prod. v. 2, p. 625. Fl. B. I. v. 4, p. 6 ; Grah. Cat. p. 122 ; Dalz. & Gibs. Suppl. p. 54 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 166 & Gard. in Ind. ed. 5, p. 384.—Flowers : June—Sept. VERN. *Vilayti-vakundi*.

Asclepias curasavica, Linn. Sp. Pl. (1753) p. 215. Introduced from the West Indies, where it is known to the colonists as the *bastard* or *wild Ipecacuanha*. It is rapidly becoming naturalized in W. India and used to be very abundant in the fields near the Railway station at Poona. It has linear-lanceolate leaves and rather handsome orange-colored flowers. Fl. B. I. v. 4, p. 18 ; Grah. Cat. p. 120 ; Dalz. & Gibs. Suppl. p. 54 , Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 ; Watt, Dict. Econ. Prod. v. 1, p. 343 —Flowers : Feb.—Dec.

Stephanotis floribunda, Brongn. in Ann. Sc. Nat. sér. 2, v. 7 (1837) p. 30. A handsome climbing shrub a native of Madagascar (sometimes known as the *Madagascar Jasmine*), with opposite coriaceous elliptic smooth leaves and highly fragrant white flowers in umbelliform cymes. A very ornamental plant much grown in gardens. Dalz. & Gibs. Suppl. p. 54 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 167 & Gard. in Ind. ed. 5, p. 383.

Stapelia grandiflora, Masson, Stapel. (1796) p. 13, t. 11. A low thickly-fleshy leafless succulent plant a native of S. Africa, with quadrangular clavate branches and a fœtid hairy corolla 3 in. in diam., dark purple at the bottom, the ovate-lanceolate lobes of a lighter purple striped with white. This strange-looking plant thrives on a dry bank and requires little care. Woodr. Gard. in Ind. ed. 5, p. 385.

ORDER LXXXIV. LOGANIACEÆ.

Trees, shrubs, or herbs. Leaves opposite (rarely ternate), entire; stipules present or reduced to a transverse line. Flowers usually regular, hermaphrodite, generally in 2—3-chotomous cymes, various in size and color. Calyx inferior; tube short; lobes usually 4—5. Corolla gamopetalous, 4—5-lobed or -partite; lobes imbricate or valvate. Stamens 4—5 inserted on the corolla-tube, alternate with its lobes; anthers 2-celled. Ovary free, usually 2-celled; ovules 1-many in each cell; styles 1 or 2. Fruit capsular or indehiscent, 1—many-seeded. Seeds various, albuminous; embryo usually straight; cotyledons broad or narrow; radicle usually inferior.—DISTRIB. Chiefly tropical and subtropical; genera 30; species 400.

Herbs.		
Cymes 2—3-chotomous; corolla 5-lobed	1.	MITREOLA.
Pedicels solitary or clustered; corolla 4-lobed	2.	MITRASACME.
Shrubs or trees.		
Fruit capsular	3.	BUDDLEIA.
Fruit indehiscent.		
Corolla-lobes contorted	4.	FAGRÆA.
Corolla-lobes valvate	5.	STRYCHNOS.

1. MITREOLA, Linn.

Herbs. Leaves opposite, membranous; stipules small or reduced to a transverse line. Flowers in terminal or axillary 2—3-chotomous cymes, small, sometimes unilateral on the ultimate cyme-branches. Calyx 5-partite; segments lanceolate. Corolla urceolate; lobes 5, short, valvate. Stamens 5, included in the corolla-tube; filaments short; anthers ovate, cordate at the base, with parallel cells. Ovary 2-celled; ovules many in each cell, attached to a peltate placenta; styles 2, short, connate under a small capitate hairy stigma, free and divergent after flowering. Capsule broad, obovoid, compressed contrary to the septum; carpels at first separating and then dehiscing along the inner face. Seeds small, numerous, subglobose or compressed; albumen fleshy; embryo linear; cotyledons small; radicle terete.—DISTRIB. Species 4, of which 2 are American and 2 Asiatic.

1. **Mitreola oldenlandioides,** *Wall. Cat.* (1828) 4350. An annual herb 6—18 in. high. Leaves membranous, 1½—3 by ⅝—1¼ in., oblong, acute or acuminate, glabrous or nearly so, base acute running down into the petiole; main nerves 8—10 pairs with slender reticulate veins between; petioles ¼ in. long. Flowers in axillary and terminal dichotomous cymes, secund along the branches; pedicels $\frac{1}{10}$ in. long; bracts lanceolate-subulate, $\frac{1}{16}$ in. long. Calyx $\frac{1}{12}$ in. long, glabrous, divided rather more than ½-way down; segments $\frac{1}{20}$ in. long, subacute. Corolla $\frac{1}{16}$ in. long; lobes 5, about ⅓ the length of the corolla, acute. Capsule $\frac{1}{8}$—¼ in. long (including the somewhat inturned horns), wedge-shaped, veined. Seeds twice as long as broad, oblong, rounded at the ends, obscurely trigonous, pale, smooth and shining. Fl. B. I. v. 4, p. 79; Dalz. & Gibs. p. 155; Hook. Icon. t. 827; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168. *Mitreola paniculata,* Wall. Cat. 4349.—Flowers: Aug.—Sept.

KONKAN: *Law*!; Pali, *Kanitkar*!, *Woodrow*; Uran, *Dalzell*!; island of Karanja (Bombay harbor), *Dalzell & Gibson*. KANARA: Kála naddi, *Ritchie*, 1869!—DISTRIB. India (Central Provinces, Birma, Pegu, W. Peninsula); Malaya, N. Australia.

2. **MITRASACME,** Labill.

Low slender herbs. Leaves opposite, entire; petioles united by a very small sheath or by a transverse line. Flowers small, white or yellowish, terminal or axillary, solitary or in fascicles or irregular umbels. Calyx campanulate, 4-fid. Corolla campanulate; lobes 4, valvate. Stamens 4, inserted near the base of the corolla-tube, usually included. Ovary 2-celled; ovules ∞ in each cell, attached to a peltate placenta; styles 2, at first connate, afterwards free at the apex under the capitate or 2-lobed stigma. Capsule subglobose, ovoid or broad, usually compressed contrary to the septum, truncate or 2-horned at the apex; carpels at first separating, then dehiscing down the inner face. Seeds numerous, ovoid or subglobose, usually rugulose; albumen fleshy; embryo straight, subterete.—DISTRIB. India, Japan, New Zealand, Australia; species 28.

1. **Mitrasacme alsinoides,** *R. Br. Prod.* (1810) p. 455. A low nearly glabrous annual 3—6 in. high, having the general appearance of an *Oldenlandia*; stem erect, slender, 2-edged. Leaves ¼—½ by $\frac{1}{16}$—⅛ in., sessile, sheathing and connate at the base, oblong or linear, acute, glabrous, veinless. Flowers solitary or 2—3 together, clustered in the upper axils; pedicels ¼—¾ in. long, filiform. Calyx $\frac{1}{12}$ in. long, divided ½-way down; segments 4, lanceolate, acute. Corolla white, ⅛—¼ in. long; lobes 4, shorter than the tube, subobtuse, slightly hairy at the base. Capsule globose, $\frac{1}{10}$ in. in diam., surrounded by the persistent calyx and with 2 falcately curved converging horns at the apex. Seeds minute, subglobose or ellipsoid; testa reticulate. Fl. B. I. v. 4, p. 80; Trim. Fl. Ceyl. v. 3, p. 170. *Mitrasacme pusilla,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 136; Dalz. & Gibs. p. 155. *M. crystallina,* Griff. Notul. v. 4, p. 87. *M. indica,* Wight, Icon. t. 1601.—Flowers: Aug.—Sept.

KONKAN: *Dalzell*!; Malwán, *Dalzell & Gibson*.—DISTRIB. Throughout India; Ceylon, Borneo, Philippines, Australia.

3. **BUDDLEIA,** Linn.

Trees or shrubs often tomentose. Leaves opposite, entire, crenate or toothed, united by a stipular line. Flowers in usually dense globose or corymbiform cymes which are axillary or arranged in a thyrsoid terminal corymbose panicle. Calyx campanulate, 4-lobed. Corolla-tube cylindric or campanulate; lobes 4, short, broad, imbricate, spreading in flower. Stamens 4, inserted on the corolla-tube; anthers subsessile, ovate or oblong. Ovary 2-celled; ovules many in each cell, many-seriate; style filiform, clavate or capitate at the stigmatose tip. Capsule septicidally 2-valved; valves 2-fid or entire. Seeds numerous, oblong or fusiform; testa appressed or laxly reticulate, often expanded into a wing or tail; albumen fleshy; embryo straight.—

DISTRIB. Tropical and Subtropical Asia, America, and Africa ; species about 70.

1. **Buddleia asiatica,** *Lour. Fl. Cochinch.* (1790) p. 72. A large evergreen shrub, rarely a small tree ; young branches tomentose. Leaves 2½—5 by ⅜—1¼ in., lanceolate, acute or acuminate, entire or serrulate, usually glabrous above, covered beneath with a white or yellowish more or less mealy tomentum, base usually acute ; petioles 0—¼ in. long. Flowers white, odorous, subsessile, in bracteate tomentose dense usually continuous terminal and axillary spikes which are solitary or several together, sometimes panicled ; bracts large, lanceolate, tomentose. Calyx ⅛ in. long, woolly-tomentose, divided about ½-way down ; segments ovate, subacute. Corolla ⅛ in. long, tubular, white, hairy outside and in the throat ; lobes 1/10 in. long, obovate, obtuse. Ovary ovoid, glabrous ; style clavate. Capsule ⅛ in. long, ovoid or ellipsoid ; carpels separating and then dehiscing along the inner face. Seeds minute, not tailed. Fl. B. I. v. 4, p. 82 ; Dalz. & Gibs. p. 180 ; Bot. Mag. t. 6323 ; Bedd. For. Man. in Flor. Sylvat. p. clxiii, t. 21 ; Talb. Trees, Bomb. ed. 2, p. 240 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 1, p. 546. *Buddleia discolor,* Roth, Nov. Pl. Sp. (1821) p. 83 ; Wight, Icon. t. 894.—Flowers : Jan.—Apr.

KONKAN : *Stocks* ! ; hills near Pen, *Dalzell & Gibson.* DECCAN : Fitzgerald Ghât below Mahableshwar, *Cooke* ! S. M. COUNTRY : Castlerock, *Kanitkar* !, *Bhiva* ! GUJARAT : Dangs, *Bhiva* !—DISTRIB. Throughout India ; Malaya, Cochinchina, China.

4. FAGRÆA, Thunb.

Glabrous trees or shrubs often epiphytic. Leaves opposite, coriaceous, usually entire ; petioles dilated at the base or united by a stipular sheath. Flowers white or yellowish, in bracteate terminal cymes, rarely solitary. Calyx deeply 5-fid or 5-partite ; segments thick, broad, imbricate, persistent in fruit. Corolla infundibuliform ; lobes 5, twisted and slightly overlapping to the right in bud. Stamens 5 ; filaments filiform ; anthers oblong or ovate with parallel cells. Ovary 2-celled throughout or 1-celled in the upper part ; ovules ∞ in each cell ; style filiform ; stigma capitate. Berry 1—2-celled. Seeds numerous, immersed in pulp ; testa crustaceous ; albumen horny ; embryo small, straight.—DISTRIB. India, Malaya, China, Japan, Australia, Pacific Islands ; species 30.

1. **Fagræa obovata,** *Wall. in Roxb. Fl. Ind. ed. Carey,* v. 2 (1824) p. 33. A climbing epiphyte throwing out branched roots like a *Ficus* at intervals on the stem of the host, which is often *Terminalia paniculata* (Talbot) ; bark smooth, dark-grey, lenticellate. Leaves at the ends of the branches, somewhat fleshy, 4—6 by 2—3 in., obovate-oblong or elliptic, shortly and abruptly acuminate, glabrous above, velvety-tomentose beneath, base narrowed ; petioles ¼—½ in. long ; stipules often partly free within the petiole, embracing the branch. Flowers white or cream-colored, in 1—5-flowered terminal cymes ; peduncles usually 3 together, ½—1 in. long, stout ; pedicels very

short ; bracts ovate. Calyx $\frac{2}{3}$ in. long ; lobes $\frac{1}{3}$ in. long, oblong, obtuse. Corolla 2—3 in. long ; tube 1—$1\frac{3}{4}$ in. long, the upper half campanulate ; lobes 1—$1\frac{1}{2}$ in. long, elliptic, obtuse. Berry $1\frac{1}{2}$ by 1 in., ellipsoid, pointed, glabrous, filled with a fleshy pulp. Seeds about $\frac{1}{10}$ in. in diam., subglobose, slightly pitted. Fl. B. I. v. 4, p. 83 ; Wall. Cat. (1828) 1595 ; Bot. Mag. t. 4205 ; Trim. Fl. Ceyl. v. 3, p. 171 ; Talb. Trees, Bomb. ed. 2, p. 241 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 3, p. 312. *Fagræa coromandelliana*, Wight, Icon. t. 1316 ; Bedd. Flor. Sylvat. t. 244.—Flowers : July. VERN. *Menakalli* ; *Hannachalli*.

KONKAN : *Stocks* !, *Law* !, *Dalzell* !, *Talbot*. KANARA : evergreen forests, *Talbot* ; Sampkhand (N. Kanara), *Woodrow* !—DISTRIB. India (W. Peninsula, Khasia mountains) ; Malaya.

5. STRYCHNOS, Linn.

Trees or scandent shrubs with short axillary often hooked tendrils. Leaves opposite, usually coriaceous, 3—5-nerved at or a little above the base. Flowers usually white, in terminal or axillary cymes ; bracts small. Calyx 5- or 4-partite. Corolla campanulate or hypocrateriform ; lobes 5 or 4, valvate. Stamens 5 or 4, inserted in the throat of the corolla ; filaments short, filiform ; anthers ovate, with distinct parallel cells. Ovary 2-celled throughout, or 1-celled in the upper part ; ovules many in each cell ; style long or short ; stigma capitate or obscurely 2-lobed. Berry usually globose, with a hard rind. Seeds many or 2—1, embedded in a fleshy pulp, variously compressed or, if solitary, globose ; albumen horny ; embryo short ; cotyledons foliaceous ; radicle terete, short.—DISTRIB. Tropical and subtropical regions of both hemispheres ; species about 100.

Climbing shrubs.		
Upper part of ovary hairy ; berry $\frac{3}{4}$ in. in diam., 1—2-seeded	1.	*S. colubrina*.
Ovary wholly glabrous ; berry 1—$1\frac{1}{2}$ in. in diam., many-seeded	2.	*S. Dalzellii*.
Erect trees.		
Fruit orange, $1\frac{1}{2}$—3 in. in diam., usually many-seeded.	3.	*S. Nux-vomica*.
Fruit black, $\frac{3}{4}$ in. in diam., 1—2-seeded	4.	*S. potatorum*.

1. **Strychnos colubrina,** *Linn. Sp. Pl.* (1753) p. 189. A large woody climber ; stem often 3 in. in diam., at the base ; bark smooth. Tendrils usually single but sometimes in pairs, circinate, thickened upwards. Leaves 3—$4\frac{1}{2}$ by $1\frac{1}{4}$—2 in., elliptic or elliptic-lanceolate, acute, glabrous, shining, strongly 3-nerved from the usually narrowed base ; petioles $\frac{1}{4}$—$\frac{3}{4}$ in. long. Flowers in small compound axillary puberulous cymes ; peduncles very short ; pedicels 0—$\frac{1}{10}$ in. long. Calyx $\frac{1}{12}$ in. long, puberulous ; segments 5, orbicular-oblong, $\frac{1}{25}$ in. long, with membranous ciliolate margins. Corolla $\frac{1}{8}$ in. long, 5-lobed ; lobes $\frac{1}{10}$ in. long, oblong, subacute, with a dense fringe of hairs about $\frac{1}{2}$-way down inside. Ovary glabrous below, hairy in the upper part. Berry $\frac{3}{4}$ in. in diam., crustaceous, 1—2-seeded. Seeds $\frac{1}{2}$ in. in diam., discoid. Fl. B. I. v. 4, p. 87 ; Dalz. & Gibs. p. 155 ; Trim. Fl. Ceyl. v. 3, p. 173 ; Talb. Trees, Bomb. ed. 2, p. 241 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod.

v. 6, part 3, p. 378. *Strychnos bicirrhosa,* Lesch. ex Roxb. Fl. Ind. ed. Carey, v. 2 (1824) p. 267 ; Grah. Cat. p. 112.—Flowers : Oct.—Jan. VERN. *Kánal* ; *Kájrá-vel.*

KONKAN : *Stocks* !, *Law* !, *Dalzell* ! ; Mira Donger near Pen, *Dalzell & Gibson* ; Matheran, *H. M. Birdwood, Cooke* ! DECCAN : ravines at Khandala, *Graham* ; Párghát, *Graham.* S. M. COUNTRY : Chorla Ghát, *Dalzell & Gibson.* KANARA : *Law* ! ; in the forests of the Tinai Ghát and near Suntgal (Kumpta táluka), *Talbot.*—DISTRIB. India (W. Peninsula) ; Ceylon.

The wood which contains strychnia in considerable quantity is used by the Hindus as a tonic in dyspepsia and malarious affections. In Ceylon it has some repute as a remedy in cases of snake-bite. See Watt, Dict. Econ. Prod. l. c.

2. **Strychnos Dalzellii,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 87. A large climber with clavate ferruginous-pubescent tendrils (*Talbot*). Leaves coriaceous, 3—5 by 1½—2¼ in., ovate, acute, glabrous, 3-nerved, base rounded or cuneate ; petioles ¼ in. long. Flowers in short dense axillary and terminal subcapitate puberulous cymes ; peduncles and pedicels short ; bracts ovate, acute, ciliate. Calyx $\frac{1}{12}$ in. long, puberulous outside ; segments 5, orbicular-oblong, $\frac{1}{16}$ in. long, hairy at the base inside and with ciliate margins. Corolla ⅛ in. long, 5-lobed ; lobes $\frac{1}{10}$ in. long, thick, oblong, subacute, with a dense transverse fringe of white hairs about ½-way down the inner face. Stamens 5 ; filaments short : anthers deltoid-ovate, cordate, the lobes slightly bearded at the base. Ovary ovoid, quite glabrous, tapering into the style. Berry 1—1½ in. in diam., crustaceous, many-seeded. Seeds ⅓ in. in diam., discoid. Talb. Trees, Bomb. ed. 2, p. 241 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168. *Strychnos axillaris,* Dalz. & Gibs. Bo. Fl. p. 155 *in adn.* (*not* of Colebr.). *S. colubrina,* Grah. Cat. p. 112 (*not* of Linn.).

KONKAN : N. & S. Konkan, *Law* ! ; southern Ghâts, *Dalzell & Gibson.* KANARA : Supa Ghâts, *Ritchie,* 1867 !—DISTRIB. India (W. Peninsula).

3. **Strychnos Nux-vomica,** *Linn. Sp. Pl.* (1753) p. 189. A deciduous tree sometimes reaching 100 ft. in height (*Talbot*), often with short sharp strong axillary spines ; bark thin, grey, smooth or rough with lenticels. Leaves 3—6 by 1¾—3 in., broadly elliptic, acute, obtuse, or shortly acuminate, glabrous and shining, 5-nerved (the lateral pair often faint), base usually rounded ; petioles ¼—½ in. long. Flowers numerous, greenish-white, in terminal pedunculate pubescent compound cymes ; peduncles and pedicels short, pubescent. Calyx $\frac{1}{16}$ in. long, pubescent outside ; segments 5, lanceolate, acute, $\frac{1}{16}$ in. long. Corolla a little less than ½ in. long, 5-lobed, glabrous or nearly so outside ; tube cylindric, hairy inside below, the throat glabrous ; lobes ⅛ in. long, narrowly oblong, acute. Ovary and style glabrous. Fruit globose, 1—3 in. in diam., slightly rough but shining, orange-red when ripe. Seeds usually many, discoid, about ¾ in. in diam., much compressed, concave on one side and convex on the other, clothed on both sides with very fine appressed grey silky hairs radiating from the centre ; cotyledons cordate. Fl. B. I. v. 4, p. 90 ; Grah. Cat. p. 112 ; Dalz. & Gibs. p. 155 ; Bedd. Flor. Sylvat. t. 243 ; Trim. Fl. Ceyl. v. 3, p. 175 ; Talb. Trees, Bomb. ed. 2, p. 241 ; Woodr. in

Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 379.—Flowers : Mar.—Apr. VERN. *Kájrá* ; *Kásarkanamara.*

KONKAN : hilly parts, *Graham*; Goa jungles, *Dalzell*!, Ratnagiri, *Woodrow*; Wari country, common, *Dalzell & Gibson*. S. M. COUNTRY : Badami, *Cooke*! KANARA : common on the laterite along the sea-coast, *Talbot*; Kála naddi, *Ritchie*, 90!—DISTRIB. More or less throughout Tropical India.

Strychnine is obtained from the seeds, of which large quantities are exported from India, the Bombay product being considered the best. Although the pulp of the fruit contains a small quantity of strychnine, it is eaten voraciously by birds and also by the natives in some localities. See Watt, Dict. Econ. Prod. l. c.

4. **Strychnos potatorum,** *Linn. f. Suppl.* (1781) p. 148. A moderate-sized glabrous tree attaining 40 ft. ; bark black, cracked and scaly ; trunk often irregularly fluted. Leaves 2—3 by 1—1¾ in., nearly sessile, subcoriaceous, ovate or elliptic, acute or subacuminate, glabrous and shining, spurious 3- or 5-nerved (the lateral nerves springing from the lower part of the midrib not far from its base), base rounded or acute ; petioles $\frac{1}{10}$ in. long. Flowers rather large for the genus, in short almost glabrous nearly sessile axillary cymes ; peduncles 0—$\frac{1}{3}$ in. long ; pedicels very short. Calyx $\frac{1}{12}$ in. long, glabrous ; segments 5, ovate, acute, $\frac{1}{20}$ in. long. Corolla $\frac{1}{8}$—$\frac{1}{4}$ in. long, 5-lobed ; lobes $\frac{1}{10}$ in. long, oblong, acute, with a tuft of hair inside towards the base of each lobe. Ovary ovoid, glabrous, tapering into a long glabrous style ; stigma obscurely 2-lobed. Berry black when ripe, $\frac{2}{3}$ in. in diam. Seeds 1 or 2, circular, $\frac{1}{3}$ in. in diam., bluntly lenticular, not greatly compressed (in shape like a cheddar cheese), shining with short appressed silky hairs, yellow. Fl. B. I. v. 4, p. 90 ; Grah. Cat. p. 112 ; Dalz. & Gibs. p. 156 ; Wight, Ill. t. 156 ; Bedd. For. Man. in Flor. Sylvat. p. clxiii ; Trim. Fl. Ceyl. v. 3, p. 176 ; Talb. Trees, Bomb. ed. 2, p. 242 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 382.—Flowers : Apr.—May. VERN. *Nirmali.*

KONKAN : Matheran near Hart Point, *H. M. Birdwood.* DECCAN : Pál jungles (Khandesh districts), *Kanitkar*! S. M. COUNTRY : Belgaum districts, *Talbot*; hills north of Belgaum, *Ritchie*, 1119! KANARA : *Law*; banks of the Kála naddi, *Law* ex *Graham*.—DISTRIB. India (Birma, Central India, W. Peninsula) ; Ceylon.

The ripe seeds known as *clearing nuts* are employed by the natives for clearing muddy water. The cut seeds are rubbed on the inside of a rough earthen vessel, which is then filled with water and, on standing, most of the impurities subside so that the water becomes drinkable. See Watt, Dict. Econ. Prod. l. c.

ORDER LXXXV. GENTIANACEÆ.

Annual or perennial bitter usually glabrous herbs (rarely shrubs). Leaves opposite (alternate in *Limnanthemum*) ; stipules 0. Flowers usually regular and hermaphrodite, in terminal cymes or clusters, or axillary and clustered or solitary. Calyx inferior, 4—5-lobed or -partite ; lobes usually imbricate. Corolla gamopetalous ; tube campanulate, infundibuliform or cylindric ; lobes usually 4—5, contorted, imbricate or induplicate-valvate. Stamens as many as the corolla-

lobes, inserted in the corolla-tube or at its mouth ; filaments filiform or dilated at the base ; anthers dehiscing longitudinally, less commonly by apical pores or short slits. Disk annular, or of 5 glands at the base of the ovary or 0. Ovary superior, 2-carpellary, 1—2-celled ; ovules usually many in each cell ; style simple ; stigma entire or 2-lobed. Fruit usually capsular and dehiscent, septicidally 2-valved. Seeds usually sessile, sometimes winged ; albumen copious ; testa membranous or crustaceous ; embryo small.—DISTRIB. Temperate regions of both hemispheres, abundant ; in the Tropics rare except on the mountains ; genera about 50 ; species 500—600.

Terrestrial herbs ; leaves opposite ; corolla-lobes contorted in bud.	
Ovary 2-celled	1. EXACUM.
Ovary 1-celled.	
Corolla-lobes without pits, depressions, or glands at the base.	
Corolla regular.	
Flowers in sessile axillary clusters	2. ENICOSTEMMA.
Flowers in dichotomous cymes	3. ERYTHRÆA.
Corolla irregular.	
Stigma scarcely lobed ; flowers yellow.	4. HOPPEA.
Stigma deeply 2-lobed ; flowers pink or white	5. CANSCORA.
Corolla-lobes with 1 or 2 pits, depressions, or glands at the base	6. SWERTIA.
Aquatic herbs ; leaves alternate ; corolla-lobes induplicate-valvate in bud	7. LIMNANTHEMUM.

1. EXACUM, Linn

Annual herbs. Leaves opposite, entire. Flowers in terminal and axillary usually dichotomous cymes. Calyx deeply 4—5-lobed ; lobes keeled, winged or flat. Corolla blue, purple, or white ; tube short, globose ; lobes 4—5, ovate or oblong. Stamens 4—5 on the corolla-throat ; filaments short, dilated at the base ; anthers dehiscing by terminal pores at length extending into lateral slits. Ovary 2-celled ; ovules many in each cell ; style long ; stigma capitate. Capsule globose, septicidally 2-valved. Seeds many, minute, reticulate.—DISTRIB. Chiefly Indian ; a few species Malayan, Chinese, and African ; species 20.

Corolla-lobes 1 in. or more long	1. *E. bicolor.*
Corolla-lobes less than ½ in. long.	
Calyx-lobes winged on the back.	
Pedicels stout, rigid ; corolla-lobes lanceolate, acute.	2. *E. pedunculatum.*
Pedicels filiform ; corolla-lobes suborbicular, obtuse.	3. *E. pumilum.*
Calyx-lobes not winged on the back	4. *E. Lawii.*

1. **Exacum bicolor,** *Roxb. Hort. Beng.* (1814) p. 83. Annual, erect, reaching 2 ft. high ; root fibrous ; stem quadrangular, scarcely branched. Leaves very variable in size and form, sessile, 1½—5 by ¾—2 in., ovate or elliptic or lanceolate, acute or obtuse, sometimes apiculate, 5-nerved, glabrous. Flowers showy, in copious terminal glabrous cymes ; pedicels ¼—¾ in. long ; bracts lanceolate, acute. Calyx ½ in. long, glabrous, deeply 4-partite ; segments ovate, suddenly aristate-acuminate and with membranous margins, the keel furnished

with a large veined wing which is more or less decurrent on the pedicel. Corolla reaching 1¼ in. long (when expanded 2 in. and more across); lobes reaching 1 in. or more long, obliquely obovate, acute, the lower half white, the upper blue. Anthers ⅓—½ in. long, curved. Style ⅝—¾ in. long. Capsule ½ in. long, ellipsoid, smooth and shining, tipped with the remains of the style, yellowish-brown. Fl. B. I. v. 4, p. 96; Grah. Cat. p. 123; Dalz. & Gibs. p. 156; Wight, Icon. t. 1321; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168; Watt, Dict. Econ. Prod. v. 6, p. 306. *Exacum tetragonum*, var. *β. bicolor*, Bot. Mag. (1847) t. 4340. *Sebœa carinata*, Grah. Cat. p. 124 (*not* of Spreng.).—Flowers: Aug.—Nov. VERN. *Udichiráyet.*

KONKAN: pasture-lands between Panwel and Khandala, *Graham*; Salsette, *Graham.* DECCAN: hills, *Woodrow*!; Málwal (Poona districts), *Woodrow*!; Kadkala, *Cooke*!; Khandala *Graham*; Wadgaon, *Kanitkar*! S. M. COUNTRY: Belgaum, *Cooke*!; *Ritchie*, 458!; Castlerock, *Cooke*!—DISTRIB. India (W. Peninsula).

The dried stalks are sold in the market in S. India. An infusion of the dried stalks affords a good bitter and may be used as a substitute for gentian. See Watt, Dict. Econ. Prod. l. c.

2. **Exacum pedunculatum,** *Linn. Sp. Pl.* (1753) p. 112. Annual, erect, 3—18 in. high; stem quadrangular, much-branched above. Leaves subsessile (distinctly petiolate in var. *petiolare*), 1¼—2 by ⅜—½ in., elliptic or lanceolate, 3- or 5-nerved, glabrous, base usually tapering. Flowers in terminal much-branched cymes; peduncles and pedicels long, rigid; bracts lanceolate. Calyx ⅛—¼ in. long, 4-lobed, thinly membranous; lobes ⅛—⅛ in. long, lanceolate, furnished with a large almost semicircular strongly nerved wing which is rounded and often subauricled at the base, more or less decurrent into the pedicel, produced at the apex into a fine point which is fused with the apex of the sepal so as to form a mucro. Corolla blue, ¼—½ in. long; lobes 4, lanceolate, acute, ⅛—⅓ in. long. Stamens on the corolla-throat; filaments $\frac{1}{20}$—$\frac{1}{16}$ in. long; anthers $\frac{1}{16}$—⅛ in. long, oblong (not tapering), cordate at the base. Capsule globose, ⅛ in. in diam., smooth, shining. Fl. B. I. v. 4, p. 97; Trim. Fl. Ceyl. v. 3, p. 182; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168; Watt, Dict. Econ. Prod. v. 3, p. 306. *Exacum pedunculare*, Arn. in Ann. Sc. Nat. sér. 2, v. 11 (1839) p. 176; Wight, Icon. t. 336.—Flowers: Dec.

DECCAN: *Dalzell*!; Kelgaon, 14 miles north of Poona, *Bhiva*! S. M. COUNTRY: Belgaum, common near brooks, *Ritchie*, 459! KANARA: Yellur, *Ritchie*, 459! GUJARAT: Surat, *Kanitkar*!—DISTRIB. Throughout India; Ceylon.

VAR. *petiolare*, Trim. Fl. Ceyl. v. 3, p. 182. Leaves distinctly petiolate, broader, 5-nerved. Griesb. in DC. Prod. v. 9, p. 46 (sp.); C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 98; Wight, Icon. t. 1324; Dalz. & Gibs. p. 157; Trim. in Journ. Bot. v. 27 (1889) p. 164; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168.

KONKAN: island of Karanja, *Dalzell & Gibson*; Matheran, *H. M. Birdwood, Cooke*!, *Kanitkar*! S. M. COUNTRY: Londa, *Cooke*!—DISTRIB. India (W. Peninsula); Ceylon.

I have followed Trimen in reducing this to a variety. The only difference appears to be that the leaves are beteter developed and have longer petioles, which might perhaps be the effect of soil and situation.

3. **Exacum pumilum,** *Griesb. in DC. Prodr.* v. 9 (1845) p. 46. Harbaceous, erect, 4—9 in. high ; stems tetragonal. Leaves thin, sessile, those near the base of the stem abbreviated, sometimes scarcely $\frac{1}{8}$ in. long, linear, acute, 1-nerved, the upper leaves $\frac{1}{2}$—$\frac{3}{4}$ by $\frac{1}{8}$—$\frac{1}{4}$ in., lanceolate subobtuse, 3-nerved, attenuated towards the base. Flowers in lax cymes, bluish-purple ; peduncles slender, long ; pedicels filiform, sometimes reaching $\frac{3}{4}$ in. long. Calyx $\frac{1}{8}$—$\frac{1}{6}$ in. long, thinly membranous ; lobes 4, ovate, acute, $\frac{1}{10}$ in. long, the keels with rounded veined wings obtuse at the base and produced to a point at the apex, there fusing with the acute apex of the calyx-lobes. Corolla $\frac{1}{3}$ in. long ; lobes $\frac{1}{4}$ by $\frac{1}{8}$—$\frac{1}{4}$ in., broadly elliptic or suborbicular, obtuse. Anthers oblong, straight. Capsule subglobose or ovoid, $\frac{1}{8}$ in. in diam. Fl. B. I. v. 4, p. 98 ; Dalz. & Gibs. p. 157 ; Wight, Icon. t. 1324.—Flowers : Aug.—Sept.

Pretty common in grass during the rains. KONKAN : *Law* !, *Dalzell* ! ; Uran (in Bombay harbor), *Dalzell* ! S. M. COUNTRY : Belgaum, *Ritchie*, 463 ! —DISTRIB. India (W. Peninsula).

Griesbach (*l. c.*) is in error when he describes the calyx as wingless. The plant may perhaps be a slender form of *E. pedunculatum*, to which it is very closely allied.

4. **Exacum Lawii,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 98. A small erect herb 2—5 (rarely reaching 6) in. high. Stem slender, quadrangular, usually simple, but sometimes slightly branched near the top. Leaves sessile, small, $\frac{1}{4}$ in. long or less, often as broad as long, ovate, acute or subobtuse, thick, usually 3 (sometimes 5) -nerved, glandular-punctate. Peduncles terminal, quadrangular, $\frac{1}{2}$—2 in. long, usually 1-flowered. Calyx $\frac{1}{8}$ in. long, 4-partite ; segments $\frac{1}{8}$ in. long, broadly ovate, acute, pellucido-punctate, nerved, the midrib very strong. Corolla bluish-purple, $\frac{1}{4}$—$\frac{1}{3}$ in. long ; lobes broadly obovate. Filaments $\frac{1}{16}$ in. long, filiform ; anthers yellow, $\frac{1}{20}$ in. long, oblong, not tapering, about $\frac{1}{2}$ as broad as long. Capsule subglobose or ovoid, $\frac{1}{8}$ in. in diam. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168.—Flowers : Oct.

DECCAN : Mahableshwar, common, *Cooke* !, *Woodrow* !, *H. M. Birdwood.* S. M. COUNTRY : Cheeta hill, Belgaum, *Ritchie*, 462 !—DISTRIB. Hills of the Western Peninsula of India ; Ceylon (?).

Trimen (Fl. Ceyl. v. 3, p. 183 *in adnot.*) apparently considers this to be a dwarf uniflorous state (confined to the hills) of *E. sessile*, which is a common plant in Ceylon, and further states that the flowers of *E. sessile*, which have been differently described as yellow and white, are really (at all events in Ceylon) purple.

2. ENICOSTEMMA, Blume.

Erect or procumbent herbs. Leaves numerous, opposite. Flowers small, in axillary clusters. Calyx-tube campanulate ; lobes 5, oblong or lanceolate. Corolla-tube long, the lower half cylindric, the upper half narrowly infundibuliform ; lobes 5, small. Stamens 5, inserted at the middle of the corolla-tube ; filaments filiform with a small double-hooded scale at the base ; anthers erect, not twisted, acute. Ovary 1-celled ; placentas little intruded ; ovules many ; style short ; stigma capitate. Capsule ellipsoid, septicidally 2-valved. Seeds many,

globose, foveolate.—DISTRIB. Species 4; 1 in Madagascar, 1 in Tropical America, 2 in Tropical Africa, of which 1 also occurs in Asia.

1. **Enicostemma littorale,** *Blume, Bijdr.* (1826) p. 848. A perennial glabrous herb 4—20 in. high, branched from the base; stems erect or procumbent, subquadrangular or subterete, glabrous. Leaves sessile, variable, 1¼—2½ by ⅛—⅝ in., linear or linear-oblong or elliptic-oblong or lanceolate, obtuse or acute, glabrous, 3-nerved, the midnerve strong, the marginal nerves often obscure. Flowers sessile, in axillary clusters all along the stem. Calyx ⅛ in. long; lobes $\frac{1}{16}$ in. long, ovate-oblong, obtuse, with narrow membranous margins. Corolla white, ¼—⅓ in. long, tubular; lobes $\frac{1}{10}$ in. long, lanceolate, acute. Capsule ⅛ in. long, ellipsoid, slightly narrowed at the base, rounded at the apex, apiculate with the remains of the style. Fl. B. I. v. 4, p. 101; Trim. Fl. Ceyl. v. 3, p. 185; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169; Watt, Dict. Econ. Prod. v. 3, p. 245. *Slevogtia maritima,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 137. *Adenema hyssopifolium,* G. Don, Syst. v. 4 (1837) p. 201; Wight, Icon. t. 600. *Hippion orientale,* Dalz. & Gibs. p. 157.—Flowers: Aug.—Nov. VERN. *Chota-Karáit.*

KONKAN: *Stocks*!, *Dalzell*!; Malwán, *Dalzell*. S. M. COUNTRY: Dharwar, *Woodrow*; Badami, *Cooke*!; Padshapur, *Ritchie*, 1879! GUJARAT: Porbandar (Kathiawar), *Cooke*!; Ankleshwar, *Kanitkar*!; Nadiad, *Bhat*! SIND: *Bhola Puran*!—DISTRIB. Throughout the greater part of India, more frequent near the sea, but not known in Bengal; Ceylon, Malaya, Tropical Africa, W. Indies.

An infusion of the plant is used as a bitter tonic; it is brought in considerable quantity to Bombay from Gujarat. See Watt, Dict. Econ. Prod. l. c.

3. ERYTHRÆA, Renealm.

Annual or perennial erect branched herbs. Leaves opposite, sessile. Flowers rosy or white, in dichotomous often corymbose cymes. Calyx shortly or deeply 5 (rarely 4) -cleft; lobes keeled. Corolla-tube long or short; lobes 5 (rarely 4), spreading. Stamens 5 (rarely 4), inserted on the corolla-tube; filaments short; anthers usually exserted, erect, linear-oblong, often spirally twisted. Ovary 1-celled, the placentas however often much intruded; ovules many; style filiform; stigma 2-lobed. Capsule oblong, 1- or almost 2-celled, 2-valved, many-seeded. Seeds minute, foveolate.—DISTRIB. Chiefly in temperate and subtropical regions of the northern hemisphere, rare in the Tropics, 1 species extending to Chili and another to Australia; species about 20.

1. **Erythræa Roxburghii,** *G. Don, Gen. Syst.* v. 4 (1837) p. 206. A small erect herbaceous plant 2—8 in. high. Radical leaves rosulate, persistent, ¾—1 by ⅛—¼ in., obovate or oblong, obtuse. Cauline leaves smaller, linear-oblong. Flowers in dichotomous cymes with a flower in each fork on a pedicel ¼—½ in. long. Calyx ⅛ in. long; segments ⅛ in. long, linear-subulate. Corolla ½—⅝ in. long; tube ⅛ in. long; lobes pink, ⅛ in. long, elliptic, acute, spreading star-like (*Dalzell*). Anthers twisted at the apex. Stigma large 2-lobed. Capsule exceeding ⅓ in. long, narrowly oblong. Fl. B. I. v. 4, p. 102;

Dalz. & Gibs. p. 157 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169 ; Watt, Dict. Econ. Prod. v. 3, p. 268—Flowers : Feb.—Apr. VERN. *Luntak.*

Tolerably common in cultivated fields. KONKAN : *Stocks* !, *Law* ! ; Pen, *Kanitkar* ! DECCAN : *Woodrow* ; Kolhapur, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1878 !—DISTRIB. Throughout India.

The whole plant is very bitter, and is used as a substitute for chiretta. See Watt, Dict. Econ. Prod. l. c.

4. **HOPPEA,** Willd.

Small much-branched glabrous herbs. Leaves opposite, small, sessile. Flowers shortly pedicellate or sessile, small, in 2—3-chotomous cymes. Calyx campanulate, membranous ; lobes 4, lanceolate. Corolla tubular ; lobes 4, more or less unequal. Stamens inserted in the throat of the corolla, 1 perfect, 3 barren ; filaments short, filiform ; anthers small, ovate, erect, with parallel cells. Ovary 1-celled, placentas little intruded ; style short ; stigma subentire. Capsule globose or ellipsoid, septicidally 2-valved. Seeds numerous, minute, obscurely reticulate.—DISTRIB. East India and Ceylon ; species 2.

1. **Hoppea dichotoma,** *Willd. in Ges. Naturf. Fr. Neue Schr.* v. 3 (1801) p. 434. A small divaricately branched herb 2—5 in. high ; stem and branches quadrangular, more or less winged. Leaves $\frac{1}{4}$ by $\frac{1}{8}$ in., ovate, acute. Cymes dense or lax ; pedicels short ; bracts lanceolate. Calyx campanulate, $\frac{1}{16}$—$\frac{1}{8}$ in. long, membranous ; lobes $\frac{1}{16}$ in. long, overtopping the corolla, lanceolate, very acute, with a strong green nerve at each margin. Corolla tubular, $\frac{1}{12}$ in. long, pale-yellow ; lobes $\frac{1}{2}$ as long as the tube, ovate-oblong, obtuse. Anthers, 1 fertile, 3 barren. Capsule ellipsoid, $\frac{1}{12}$ in. long. Fl. B. I. v. 4, p. 100. *Hoppea fastigiata,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 168 (*not* of C. B. Clarke). *Pladera pusilla,* Roxb. Fl. Ind. ed. Carey, v. 1, p. 419 ; Griesb. in DC. Prodr. v. 9, p. 63.—Flowers : Oct.

KONKAN : Uran (Bombay harbor), *Stocks* ! DECCAN : Ganesh Khind near Poona, *Woodrow* ! ; Jinsi near Raver (Khandesh), *Kanitkar* ! S. M. COUNTRY : Belgaum in grass land, *Ritchie,* 1877 !—DISTRIB. Throughout India.

5. **CANSCORA,** Lamk.

Much-branched erect annuals. Leaves opposite, sessile, petiolate or perfoliate. Flowers pink or white, in lax terminal cymes. Calyx tubular, 4-toothed ; tube terete, ribbed or winged. Corolla-tube cylindric ; lobes 4, more or less unsymmetric, imbricate in bud. Stamens 4, inserted at different heights on the corolla-tube, 1 (rarely 2) with longer filaments and larger and fertile anthers and inserted higher up than the others, which are usually barren ; filaments short ; anthers ovate or oblong. Ovary 1-celled ; placentas slightly intruded ; ovules many ; style filiform ; stigma deeply 2-lobed. Capsule cylindric, membranous, septicidally 2-valved. Seeds reticulato-rugose.—DISTRIB. East Indies, Malaya, Australia, Tropical Africa ; species 14.

Calyx not winged.		
Stems obtusely quadrangular, not or obsoletely winged..	1.	*C. diffusa.*
Stems strongly 4-winged.		
Lower leaves exceeding 1 in. long; corolla-limb shorter than the tube.....	2.	*C. decurrens.*
Lower leaves less than 1 in. long; corolla-limb equalling the tube.....	3.	*C. pauciflora.*
Calyx strongly 4-winged.		
Herb 3—5 in. high; bracts small, linear-lanceolate....	4.	*C. concanensis.*
Herb 6—20 in. high; bracts large, circular, perfoliate.	5.	*C. perfoliata.*

1. **Canscora diffusa,** *R. Br. Prodr.* (1810) p. 451 *in Obs.* A much-branched slender erect annual 6—24 in. high (occasionally under favorable conditions of growth reaching 4 ft. high) ; stems obtusely quadrangular, obscurely winged. Leaves membranous, 3-nerved, reticulately veined, the upper $\frac{3}{8}$—$\frac{5}{8}$ by $\frac{1}{4}$—$\frac{3}{8}$ in., broadly ovate, acute, apiculate, rounded at the base, sessile, the lower 1—1½ by ½—⅝ in., elliptic, acute, much narrowed at the base, petiolate. Flowers numerous, in lax diffuse paniculate cymes ; pedicels filiform, ¼—½ in. long or even longer ; bracts linear-subulate. Calyx ¼ in. long, not winged ; teeth 4, lanceolate, acute, $\frac{1}{10}$ in. long. Corolla ½ in. long ; tube ¼ in. long, green ; limb rosy, with a darker ring edged with white in the throat, 4-cleft, one of the divisions much less deep than the others ; lobes unequal, ovate, obtuse. Stamens 4, one longer than the other three, which are equal, the long stamen inserted higher up than the others. Capsule membranous, ⅓ in. long, narrowly oblong. Fl. B. I. v. 4, p. 103 ; Grah. Cat. p. 123 ; Dalz. & Gibs. p. 158 ; Trim. Fl. Ceyl. v 3, p. 184 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169 ; Watt, Dict. Econ. Prod. v. 2, p. 128. *C. Lawii,* Wight, Icon. t. 1327 (*not* of C. B. Clarke).—Flowers : Oct.—Jan.

KONKAN : *Stocks* !, *Dalzell & Gibson* ; Matheran, growing 3—4 ft. high in the Rámbág, *H. M. Birdwood.* DECCAN : Sinhagad near Poona, *Bhiva* ! ; Mahableshwar, *Graham, Cooke* !, *H. M. Birdwood.* S. M. COUNTRY : Dharwar, *Ritchie,* 466 ! KANARA : Kála naddi, *Ritchie,* 1274 ! GUJARAT : Surat, *Kanitkar* !—DISTRIB. Throughout India ; Ceylon, Malaya, Australia, Tropical Africa.

2. **Canscora decurrens,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 136. A slender erect herb 1—1½ ft. high ; stem 4-winged ; branches opposite and alternate. Leaves sessile, thin, membranous, 3-nerved, decurrent along the stem for the whole length of the internode ; the lower leaves reaching sometimes 2 in. by ½—1 in., oblong, attenuated towards the base ; the upper leaves much smaller than the lower, ovate or lanceolate, acute. Flowers in subtrichotomous cymes ; pedicels 4-gonous, ½ in. long. Calyx not winged, ⅓ in. long ; teeth $\frac{1}{12}$ in. long, lanceolate, acute, with a broad sinus. Corolla pale rose-colored or sometimes white (*Dalzell*), rather more than ¼ in. long ; tube ⅓ in. long ; lobes shorter than the tube, oblong, obtuse. Stigma 2-lobed, the lobes large, ovate, obtuse. Fl. B. I. v. 4, p. 103 ; Dalz. & Gibs. p. 157 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169.—Flowers : Oct.—Dec.

KONKAN : *Stocks* ! ; rice-fields in the S. Konkan, *Dalzell* ! DECCAN : Poona, *Woodrow* ! KANARA : Kumpta, *Woodrow* ; Kála naddi, *Ritchie,* 1120 !—DISTRIB. India (W. Peninsula).

3. **Canscora pauciflora,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 136. Stem erect, 4-winged. Leaves sessile, 3-nerved, rough on the margin alone ; lower leaves ⅛—½ by ⅛—¼ in., ovate or obovate, obtuse ; upper leaves smaller, oblong, acute. Flowers in lax dichotomous cymes ; pedicels 4-winged, sometimes reaching 1 in. long, thickened at the apex ; bracts small, linear, acute. Calyx ¼ in. long, 12-ribbed, the ribs in threes running out to the tips of the calyx-teeth ; calyx-teeth $\frac{1}{16}$ in. long, lanceolate, acute. Corolla ⅜ in. long ; lobes equalling the tube, oblong, obtuse. Style exserted. Fl. B. I. v. 4, p. 103 ; Dalz. & Gibs. p. 157. *Canscora Lawii,* C. B. Clarke, in Journ. Linn. Soc. v. 14 (1875) p. 430 (*not* of Wight).—Flowers : Sept.

KONKAN : *Stocks* !, *Dalzell* ! ; Malwán in grassy places, *Dalzell* !, *Ritchie* (without locality), 1875 !—DISTRIB. India (W. Peninsula).

4. **Canscora concanensis,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 104. A small slender annual 3—5 in. high ; stem decumbent, then erect, obscurely quadrangular. Leaves ½—⅞ by ¼—½ in., ovate, subacute, sessile, 3-nerved. Flowers in weak terminal paniculate cymes at first dichotomous, the branches upwards subunilateral ; pedicels filiform, ⅛—¼ in. long ; bracts small, linear-lanceolate. Calyx ⅛ in. long ; teeth about $\frac{1}{16}$ in. long, deltoid, acute ; wings $\frac{1}{16}$—⅛ in. broad, semi-elliptic, membranous, prominently reticulately veined. Corolla ¾ in. long ; lobes ⅛—⅙ in. long, obovate, obtuse.

A very distinct species, of which there is but a single sheet in Herb. Kew. ticketed "Konkan, *Law* !"—DISTRIB. Apparently endemic.

5. **Canscora perfoliata,** *Lamk. Encyc. Méthod.* (1783) v. 1, p. 601. A erect annual 6—20 in. high ; stem 4-winged. Leaves of the stem ¾—1¼ by ⅛—⅜ in., oblong-lanceolate, acute or acuminate, sessile, 3-nerved, those of the branches perfoliate, circular, ¼—½ in. in diam., bract-like, 2-mucronate. Flowers in paniculate terminal cymes, usually in threes, but sometimes reduced to a single flower, each division of the cyme supported by a circular perfoliate bract ¼—½ in. in diam. ; pedicels very short, sometimes almost 0. Calyx ⅓—⅝ in. long, with 4 broad membranous reticulately veined semi-elliptic wings about ⅛ in. broad in the widest part ; lobes ⅛ in. long, acute or acuminate. Corolla reaching ¾ in. long ; limb as long as the tube ; lobes obovate, obtuse, rose-colored. Capsule ⅓—½ in. long. Fl. B. I. v. 4, p. 104 ; Grah. Cat. p. 123 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169. *Canscora alata,* Wall. Cat. 4363 A ; Dalz. & Gibs. p. 158. *C. grandiflora,* Wight, Icon. t. 1326.—Flowers : Feb.

KONKAN : *Law* !, *Gibson* ! ; Vingorla, *Dalzell* ! ; Salsette and Uran, *Graham* ; Marmagao, *Kanitkar* ! KANARA : Hulikal, *Woodrow* ! ; Karwar, *Woodrow* ; Kála naddi, *Ritchie,* 464 !—DISTRIB. India (W. Peninsula).

6. SWERTIA, Linn.

Annual or perennial herbs. Leaves opposite. Flowers blue, lurid, or white, sometimes with yellow nectaries, in terminal corymbose or paniculate cymes. Calyx deeply 4—5-partite ; tube 0 or very short ; segments acute or obtuse. Corolla subrotate ; tube very short, broad ; lobes 4—5, acute or obtuse, with 1 or a pair of glandular nectaries at

the base. Stamens 4—5, inserted at the base of the corolla and shorter than its lobes ; filaments subulate or flattened ; anthers oblong, versatile. Ovary 1-celled ; placentas slightly intruded ; ovules many ; style short or 0 ; stigma 2-lobed. Capsule ovoid or oblong, 2-valved. Seeds many, minute, compressed, often winged.—DISTRIB. Europe, Asia, and Africa, principally in the mountains ; species about 90.

Nectaries 2 at the base of each petal; small herb under 10 in. high	1. *S. minor.*
Nectary 1 at the base of each petal; herbs exceeding 10 in. high.	
Nectary without a covering scale	2. *S. decussata.*
Nectary with a fimbriate covering scale	3. *S. corymbosa* var. *Lawii.*

1. **Swertia minor,** *T. Cooke.* A small erect herb 2—9 in. high ; stem conspicuously 4-winged, not branched near the base. Leaves sessile, ½—¾ by ¼—½ in., ovate, acute, obscurely 3-nerved. Flowers 4-merous, in leafy paniculate cymes ; pedicels ⅛—1 in. long. Calyx divided almost to the base, somewhat enlarged in fruit ; segments 4, ovate, acute, ⅛—⅛ in. long. Corolla ¼ in. long ; tube very short, scarcely $\frac{1}{30}$ in. long ; lobes 4, ovate-oblong, acute, with 5 parallel nerves, each lobe with 2 triangular pockets near the base, the upper margin of the covering scale fimbriate. Filaments ⅛ in. long, flattened ; anthers versatile. Capsule ⅛—¼ in. long, ovoid. Seeds suborbicular, compressed, not winged. *Ophelia minor,* Griesb. in DC. Prodr. v. 9 (1845) p. 126 ; Wight, Icon. t. 1332 ; Dalz. & Gibs. p. 156. *Pleurogyne minor,* Benth. in Gen. Pl. v. 2, p. 816 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 120.—Flowers : Aug.—Sept.

KONKAN : wet springy ground on the highest Ghâts opposite Bombay, *Dalzell & Gibson.* DECCAN : Khandala, *Bhiva* ! ; Khadkala, *Kanitkar* ! ; Panchgani, *Cooke* ! S. M. COUNTRY : Belgaum, on hill tops ; *Ritchie,* 317 !—DISTRIB. India (hills of the W. Peninsula).

I have carefully examined several specimens of this plant in the dried state and have found the glands at the base of the petals to be as described above, although, in one or two cases of plants in fruit, the glands were hardly distinguishable. Griesbach remarks that in Hügel's collection the glands were covered by a laciniate scale, while in Perottet's specimens the glands were naked and very minute. Mr. C. B. Clarke (Fl. B. I. l. c.) is doubtful as to the propriety of placing the plant in the genus *Pleurogyne,* and I think it should certainly be restored to its pristine position.

2. **Swertia decussata,** *Nimmo, ex Grah. Cat. Pl. Bomb.* (1839) p. 249. Stem erect, 1—3 ft. high, densely leafy, obtusely quadrangular, more or less 4-winged. Leaves sessile, numerous, approximate, decussate, ¾—1¼ by ½—1 in., broadly ovate, obtuse, sometimes shortly apiculate, 5 (less commonly 3) -nerved. Flowers very numerous, in dense corymbose cymes ; pedicels $\frac{1}{10}$—½ in. long ; bracts foliaceous, lanceolate, 3-nerved. Calyx ⅓ in. long, tube about $\frac{1}{20}$ in. long ; lobes lanceolate, acute, with a strong midnerve. Corolla white with blue veins ; tube scarcely $\frac{1}{20}$ in. long ; lobes ⅓ by ⅓ in., broadly ovate, shortly acuminate, with a yellow circular pit at the base fringed all round with rather long scaly fimbriæ but without a covering scale. Filaments ⅛ in. long, dilated and connate at the base, flattened ; anthers $\frac{1}{16}$ in. long, oblong. Fl. B. I. v. 4, p. 127 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169 ; Watt, Dict. Econ. Prodr. v. 6,

part 3, p. 392. *Ophelia multiflora,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 135 ; Dalz. & Gibs. p. 156. *Ophelia alba,* Wight, Ill. t. 157 bis, fig. 3, *f.*—Flowers : Oct.—Jan. VERN. *Kadu* ; *Kavadi.*

Western Ghâts, *Dalzell* !, *Woodrow* ! DECCAN : Mahableshwar, *Cooke* !, *Ralph* !, *Wight* ! ; Panchgani, *Woodrow* !, abundant on the Table Rock above the Traveller's Bungalow, *Cooke* !—DISTRIBB. India (W. Peninsula).

The whole plant is bitter, but the roots are considered to be the most valuable part, and are sold in the bazaar at Mahableshwar as a substitute for gentian. See Watt, Dict. Econ. Prod. l. c.

3. **Swertia corymbosa** VAR. **Lawii,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 126. Stem erect, 1—2 ft. high, 4-winged, branched near the top only. Leaves sessile, ½—1½ by ¼—½ in., lanceolate, acuminate, 3-nerved, base broad, rounded-truncate. Flowers in lax cymes ; pedicels ½—¾ in. long ; bracts linear-lanceolate. Calyx divided almost to the base ; segments ⅛ in. long, narrowly lanceolate, acute. Corolla white with blue nerves, equalling or slightly exceeding the calyx ; tube hardly $\frac{1}{20}$ in. long ; ⅛ in. long, obovate, shortly apiculate and with a large circular pit with densely fimbriate margin at the base, covered by a large scale with a fimbriate margin. Filaments linear, flattened. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169. *Ophelia Lawii* (sp.), Wight, Ill. v. 2 (1850) p. 175, t. 157 bis, fig. 3, *c. O. pauciflora,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 211 ; Dalz. & Gibs. p. 156.—Flowers : Sept.

DECCAN : Sahyadri range, *Dalzell* ! S. M. COUNTRY : Belgaum, *Ritchie,* 461 ! ; Castlerock, *Bhiva* !, *Woodrow.* KANARA : Haliyál, *Woodrow.*—DISTRIB. Mountains of the W. Peninsula of India.

7. LIMNANTHEMUM, Gmel.

Aquatic herbs floating or creeping ; stems erect or runner-like, or resembling petioles. Leaves alternate (rarely subopposite), orbicular, elliptic or ovate, deeply cordate (rarely peltate with a closed sinus), entire or obscurely crenate. Flowers white or yellow, dimorphic, solitary, or in pairs or clusters at the nodes, or on the apparent petioles close to or a little below the leaf-blade. Calyx 4—7-partite ; segments lanceolate or oblong. Corolla subrotate ; lobes 4—7, induplicate-valvate with fimbriate or naked margins. Stamens 4—7, inserted on the corolla-tube ; filaments short. Ovary 1-celled ; placentas 2, parietal ; style short or long ; stigma 2-lobed. Capsule globose, ovoid or ellipsoid, indehiscent or bursting irregularly. Seeds usually numerous, smooth or tuberculate, sometimes winged.—DISTRIB. Wet places throughout the tropical and temperate regions of the globe ; species about 14.

Stems petiole-like with a single shortly-petioled leaf at the end (node); flowers white.	
Corolla more than ½ in. across; lobes 5—7.	
Corolla-lobes hairy, not crested down the middle.	1. *L. indicum.*
Corolla-lobes glabrous, with a longitudinal crest down the middle	2. *L. cristatum.*
Corolla less than ½ in. across; lobes 4, fimbriate	3. *L. parvifolium.*
Stems with several nodes and alternate leaves; flowers yellow	4. *L. aurantiacum.*

1. **Limnanthemum indicum,** *Thwaites, Enum.* (1861) p. 205. Rhizome horizontal or oblique, giving off from the axils of sheathing membranous scales several long slightly rough petiole-like branches which reach the surface of the water, there producing a node from which start a tuft of roots, a cluster of flowers, a single floating leaf and a single branch, which again proceeds in the same manner. Floating leaves 3—12 in. in diam., orbicular, deeply cordate, with obtuse basal lobes and a triangular sinus and with more or less sinuate margins, thick, glabrous, green beneath ; petioles stout, short, ¼—½ in. long. Flowers dimorphic, in clusters appearing above the water between the basal lobes of the leaves ; pedicels 2—5 in. long ; bracts ovate, acute, membranous. Calyx ⅓ in. long, deeply divided ; lobes ¼ in. long, oblong, subacute. Corolla 1¼ in. across when expanded, white with a yellow centre ; lobes usually 6, oblong, obtuse, ½ in. long, densely clothed with long cottony papillose hairs, not crested down the middle. Capsule subglobose, ¼—⅓ in. in diam. Seeds numerous (30 or more), not muriculate, shining, yellow. Fl. B. I. v. 4, p. 131 ; Dalz. & Gibs. p. 158 ; Trim. Fl. Ceyl. v. 3, p. 188 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169. *Limnanthemum Wightianum,* Griesb. in DC. Prodr. v. 9, p. 139 (as to long-styled form only). *Villarsia indica,* Venten. Choix, sub t. 9 ; Wight, in Hook. Bot. Misc. v. 3 (1833) p. 96, Suppl. t. 30 ; Grah. Cat. p. 123.—Flowers : Apr.—Sept. VERN. *Kumud.*

Tanks throughout the Presidency, but not so common as the next species. It may be found in the Konkan, the Deccan, Kanara, and Gujarat, and is abundant in a tank on the Table Rock at Panchgani.—DISTRIB. Throughout India ; Ceylon, Afghanistan, Malaya, Australia, Mascarene and Fiji Islands.

2. **Limnanthemum cristatum,** *Griesb. in DC. Prodr.* v. 9 (1845) p. 139. A smaller plant than *Limnanthemum indicum.* Rhizome short, erect, with petiole-like branches as in *L. indicum,* but shorter and more slender. Floating leaves 2—4 in. in diam., orbicular, deeply cordate, purplish and with green veins beneath ; petioles ¼—1¼ in. long. Flowers numerous, in dense clusters ; pedicels ¾—2½ in. long, unequal. Calyx divided almost to the base ; segments ¼ in. long, oblong-lanceolate, obtuse. Corolla white, ¾ in. across when expanded ; lobes ⅓ in. long, obovate, rounded at the apex, glabrous, with a broad longitudinal crest down the middle of each lobe, the margins not ciliate. Capsule broadly ovoid or subglobose, ⅓ in. in diam. Seeds 10 or more, strongly muriculate, pale yellowish-brown. Fl. B. I. v. 4, p. 131 ; Dalz. & Gibs. p. 158 ; Wight, Ill. t. 157 bis, fig. 4 ; Trim. Fl. Ceyl. v. 3, p. 189 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169 ; Watt, Dict. Econ. Prod. v. 4, p. 641. *Villarsia cristata,* Spreng. Syst. v. 1, p. 582 ; Grah. Cat. p. 123. *Menyanthes cristata,* Roxb. Cor. Pl. v. 2, p. 3, t. 105.—Flowers : Apr.—Sept. VERN. *Kumudini.*

Common in tanks throughout the Presidency, where it is much more abundant than the last species. It may be found in the Deccan in the tank at Khandala.—DISTRIB. Throughout India, common ; Ceylon, China.

3. **Limnanthemum parvifolium,** *Griesb. in DC. Prodr.* v. 9 (1845) p. 141. A small plant usually aquatic, but sometimes appa-

rently terrestrial. Rhizome small, erect, with numerous roots; branches very slender, 3—12 in. long, producing from the end a single leaf and a cluster of flowers, but neither roots nor branches. Leaves of 2 kinds, (1) radical leaves forming a rosette, and (2) leaves terminating the branches; the former ½—¾ in. long, and about as broad as long, spathulate or deltoid, obtuse, on very broad petioles ½—1½ in. long; the latter (floating leaves when the plant grows in water) ½—¾ by ⅛—½ in., broadly ovate-oblong, rounded at the apex, deeply cordate, and with a wide triangular sinus at the base, on a petiole ¼—¾ in. long. Flowers in clusters of 3—10 from the ends of the branches; pedicels ¼—½ in. long. Calyx divided almost to the base; segments 4, oblong, acute, 1/10 in. long. Corolla-lobes 4, oblong, subacute, fimbriate, slightly pilose, ⅛—¼ in. long. Capsule ⅛ by 1/12 in., oblong, apiculate, narrowed towards the base, the seeds bulging. Seeds 15 or more, orbicular, lentiform, about 1/30 in. in diam., shining, microscopically muriculate, brown. Fl. B. I. v. 4, p. 132; Dalz. & Gibs. p. 158; Trim. Fl. Ceyl. v. 3, p. 189.

Common in tanks, but difficult to find owing to its small size, *Dalzell & Gibson.* KONKAN: Malwán, *Dalzell & Gibson.* GUJARAT: Surat, *Dalzell & Gibson.*—DISTRIB. India (W. Peninsula, Chittagong); Ceylon.

4. **Limnanthemum aurantiacum,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 136. Rhizome elongate; branches often purplish-red, long, not petiole-like, but with several nodes producing leaves and flowers. Leaves alternate, 1—1½ by ¾—1¼ in., orbicular-ovate, rounded at the apex, deeply cordate with a narrow triangular sinus and subacute basal lobes, purple and dotted with black glands beneath; petioles of the radical leaves 4—6 in. long, those of the upper leaves ½—3 in. long, dilated and sheathing at the base, often purplish. Flowers deep-yellow, few (1—3) from each node; pedicels leaf-opposed 1—1½ in. long, with conspicuous bracts (? reduced or undeveloped leaves) beneath. Calyx ¼ in. long; lobes 5, oblong, acute, ⅓ in. long. Corolla-lobes 5, cuneate, emarginate, fimbriate, ⅓ in. long. Capsule subglobose, ¼ in. in diam., apiculate, 10—20-seeded. Seeds 1/16 in. in diam., almost spherical, very finely pubescent. Fl. B. I. v. 4, p. 132; Dalz. & Gibs. p. 158; Trim. Fl. Ceyl. v. 3, p. 190.—Flowers: Sept.

Without locality, *Ritchie*, ex Herb. *Dalzell*, 1873! KONKAN: *Stocks*!; Malwán, *Dalzell*!—DISTRIB. India (W. Peninsula); Ceylon.

ORDER LXXXVI. HYDROPHYLLACEÆ.

Herbs, rarely shrubs. Leaves radical or alternate (rarely opposite); stipules 0. Flowers hermaphrodite, regular, usually in scorpioid cymes, which are complete or reduced to geminate or solitary spikes or racemes, or solitary axillary or terminal flowers. Calyx inferior, 5-partite. Corolla gamopetalous, 5-lobed; lobes imbricate, rarely contorted. Stamens 5, inserted on the corolla-tube and alternate with its lobes; filaments filiform; anthers ovate, oblong or linear. Disk hypogynous, more or less conspicuous or 0. Ovary superior, 1—2-celled; ovules 2-many, anatropous or amphitropous; styles 1 or

2. **Capsule 2-valved or dehiscing irregularly. Seeds minute, oblong, globose or angular; albumen fleshy; embryo minute.**—DISTRIB. Chiefly American; only 3 or 4 species in the Old World; species 150.

1. HYDROLEA, Linn.

Herbs, rarely undershrubs. Leaves alternate, entire; stipules 0. Flowers blue, in short terminal racemes or cymes, regular, 5-merous. Calyx divided nearly to the base; segments lanceolate. Corolla rotate or campanulate, 5-cleft; lobes imbricate. Stamens 5, inserted on the short corolla-tube; filaments equal, filiform, usually dilated at the base; anthers sagittate. Ovary completely 2-celled; ovules many in each cell; styles 2, distinct; stigma capitate. Capsule globose or void, dehiscing septicidally by 2 valves or sometimes irregularly. Seeds many, with fleshy albumen, minute.—DISTRIB. N. & S. America, Tropical Africa, East India, Malaya, Australia; species about 14.

1. **Hydrolea zeylanica,** *Vahl, Symb. Bot.* v. 2 (1791) p. 46. Annual herb; stem 6—20 in., usually decumbent and often rooting at the lower nodes, glabrous, somewhat succulent; branches short, slender. Leaves 1—2½ by ⅛—⅜ in., lanceolate or linear-lanceolate, acute, glabrous, base tapering; petioles very short. Flowers numerous, in racemes on short lateral branches; pedicels ⅛—⅓ in. long, glandular-hairy; bracts leafy. Calyx ¼ in. long, glandular-hairy, enlarged in fruit; tube scarcely $\frac{1}{10}$ in. long; segments lanceolate, acute. Corolla of a fine blue with darker veins, deeply divided, ⅛—¼ in. long; tube about $\frac{1}{10}$ in. long; lobes ovate, acute. Stamens exserted; filaments dilated at the base; anthers sagittate. Styles 2, distinct, spreading. Capsule ⅛ by $\frac{1}{10}$ in., ovoid-oblong, enclosed in the enlarged persistent sepals. Seeds numerous, minute, oblong. Fl. B. I. v. 4, p. 133; Grah. Cat. p. 127; Dalz. & Gibs. p. 170; Wight, Icon. t. 601; Trim. Fl. Ceyl. v. 3, p. 191; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169; Watt, Dict. Econ. Prodr. v. 4, p. 315.—Flowers: Nov.—Dec. VERN. *Popti; Keriti.*

Margins of tanks and damp places throughout the Presidency. KONKAN: margins of tanks, *Graham, Dalzell & Gibson*; Máhad, *Woodrow*. DECCAN: Rohe, *Gangaram*! GUJARAT: Bulsar, *Woodrow*!—DISTRIB. Throughout India in wet places and rice-swamps; Ceylon, Malaya, Tropical Africa, America, and Australia.

ORDER LXXXVII. BORAGINACEÆ.

Herbs, shrubs, or trees, very rarely climbing. Leaves usually alternate; stipules 0. Inflorescence normally a 2-chotomous cyme with helicoid branches, sometimes a simple unilateral raceme or spike or an irregularly 3-chotomous panicle (rarely of 1—2 flowers in the axils of the leaves); flowers hermaphrodite (rarely polygamous), usually regular; bracts leafy, small or 0. Calyx inferior, sometimes persistent; tube campanulate or cylindric, sometimes very short; lobes 4—5 (rarely 6—8). Corolla various, 4—5 (rarely 6—∞) -lobed, often with scales or folds in the throat; lobes imbricate (rarely

plicate or contorted). Stamens as many as the corolla-lobes, inserted in the throat or tube of the corolla, equal or slightly unequal ; filaments filiform or dilated at the base, sometimes with a basal scale ; anthers ovate, oblong or linear, obtuse, or with produced connective, dorsifixed, more or less 2-lobed at the base, cells parallel, introrsely or laterally dehiscent. Disk annular, entire or 5-lobed, sometimes inconspicuous or obsolete. Ovary superior, confluent at the base with the disk, entire or more or less completely 2—4-lobed, 2-celled and 2-ovulate or 4-celled and 1-ovulate ; ovules erect or attached to the inner angle of the cell ; style terminal in the entire, gynobasic in the lobed ovary, filiform or columnar, entire or once or twice divided, or rarely partite into 2 styles ; stigma terminal or annular, entire or 2-lobed. Fruit drupaceous or dividing into 2—4 nutlets. Seeds erect, oblique or almost horizontal, straight or curved ; testa membranous ; albumen copious, scanty or 0 ; embryo straight or curved ; cotyledons flat, plano-convex or thick and fleshy, entire (rarely 2-fid or -plicate) ; radicle usually much shorter than the cotyledons—DISTRIB. Genera about 70 ; species about 1200, cosmopolitan.

Ovary entire or slightly 4-lobed ; style terminal.		
Style twice-forked	1.	CORDIA.
Style once-forked or styles 2.		
Trees or shrubs	2.	EHRETIA.
Prostrate herb	3.	COLDENIA.
Style 1, simple. A virgate shrub	4.	RHABDIA.
Style short (long and exserted in *Heliotropium ophioglossum*), entire or shortly 2-lobed (in *H. ophioglossum* divided into 2 long branches), usually with a broad sigmatic ring at the base of a conical or rarely oblong appendage. Herbs	5.	HELIOTROPIUM
Ovary deeply 4-lobed ; style gynobasic (except in *Trichodesma*) ; nutlets usually 4.		
Anthers connivent into a cone, subexserted ; connectives much produced, twisted together at the apex ; style subterminal	6.	TRICHODESMA.
Anthers not connivent into a cone, included ; connectives not much produced.		
Nutlets attached to a convex or conical carpophore, often prominently margined.		
Bases of the nutlets produced downwards	7.	CYNOGLOSSUM.
Bases of the netlets hardly produced downwards	8.	PARACARYUM.
Nutlets on a flat or nearly flat receptacle, not prominently margined.		
Branched cano-tomentose undershrubs ; corolla-throat villous	9.	SERICOSTOMA.
Hispid annual or perennial herbs ; corolla-throat naked	10.	ARNEBIA.

1. **CORDIA,** Linn.

Trees or shrubs rarely subscandent. Leaves alternate (rarely subopposite), petiolate, entire or toothed. Flowers polygamous ♂ and ☿), in cymes, spikes or heads. Calyx tubular or campanulate, smooth or ribbed ; teeth usually 5, short, often irregular, sometimes obscure. Corolla infundibuliform, hypocrateriform, or campanulate, usually white or orange ; lobes 4—8, imbricate, reflexed or spreading. Stamens

as many as the corolla-lobes, exserted or included ; filaments often hairy at the base. Ovary 4-celled ; ovule solitary in each cell, erect ; style terminal, elongate, bipartite, the branches again bipartite ; stigma capitate or clavate. Fruit usually with viscid pulp, drupaceous, of 4 or fewer 1-seeded cells ; putamen often bony. Seeds exalbuminous ; cotyledons plicate ; radicle short.—DISTRIB. Tropics ; species about 250.

Leaves alternate (sometimes almost subopposite in *C. Macleodii*), 3—5-nerved at base.		
Filaments hairy at the base.		
Calyx not ribbed.		
Leaves not tomentose beneath	1.	*C. Myxa.*
Leaves stellately tomentose beneath	2.	*C. Wallichii.*
Calyx ribbed.		
Leaves reaching 6 in. in diam., ovate, cordate, densely tomentose beneath	3.	*C. Macleodii.*
Filaments glabrous.		
Leaves reaching 6 in. long; petioles 1—¼ in. long	4.	*C. fulvosa.*
Leaves not exceeding 3 in. long; petioles less than ½ in. long	5.	*C. monoica.*
Leaves subopposite, feather-nerved	6.	*C. Rothii.*

1. **Cordia Myxa,** *Linn. Sp.* (1753) p. 190. A moderate-sized deciduous tree reaching 40 ft., or a large shrub ; bark dark-colored, rough, fissured ; branchlets usually glabrous. Leaves alternate, 3—5 by 2½—4½ in., broadly ovate, obtuse, entire or the margins more or less sinuate-dentate, glabrous and more or less scabrous above without white discs (*cystoliths*) on the upper surface, base rounded or cordate or sometimes shortly cuneate ; basal nerves 3 (rarely 5) ; petioles ¾—1½ in. long. Flowers white, polygamous (♂ and ☿), in large lax terminal and axillary pedunculate cymose panicles ; peduncles 1—2 in. long ; pedicels short ; buds pyriform. Calyx ⅛—¼ in. long, glabrous or nearly so outside, pubescent inside, entirely closed over the corolla in bud, afterwards irregularly splitting on the expansion of the flower into about 5 shallow lobes. Corolla-tube as long as the calyx ; lobes 5, oblong, obtuse, sometimes emarginate, narrow, recurved, equalling the tube. Filaments hairy at the base. Drupe ovoid, ½—1 in. long, pinkish-cream-colored or nearly black, shining, minutely rugose, apiculate with the remains of the style, supported by the saucer-shaped irregularly 5—10-lobed more or less longitudinally striate glabrous calyx. Fl. B. I. v. 4, p. 136 ; Grah. Cat. p. 136 ; Dalz. & Gibs. p. 173 ; Bedd. Flor. Sylvat. t. 245, A ; Trim. Fl. Ceyl. v. 3, p. 193 ; Talb. Trees, Bomb. ed. 2, p. 243 ; Woodr. in Journ. Bomb. Nat v. 12 (1898) p. 169 ; Watt, Dict. Econ. Prod. v. 2, p. 563. *Cordia obliqua* (sp.), Willd. Phytogr. (1794) p. 4 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 137 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169 ; Var. *β. obliqua,* Trim. Fl. Ceyl. v. 3, p. 193. *C. latifolia,* Roxb. Fl. Ind. ed. Carey, v. 2, p. 330 ; Grah. Cat. p. 136 ; Dalz. & Gibs. p. 173.—Flowers : Mar.—Apr. VERN. *Bhokar ; Gondani.*

Throughout the Presidency and Sind in deciduous forests. KONKAN : *Stocks* !, *Law* ! ; on the Ghâts and about villages, *Graham* ; Rambâg Matheran, *H. M. Birdwood.* DECCAN : Poona, *Cooke* ! ; Sakkar Pathár hill, *Woodrow* ; Lanoli wood, *Gammie.* GUJARAT : common, *Dalzel & Gibson.*—DISTRIB.

Throughout India, wild and cultivated; Ceylon, Egypt, Cochinchina, and Tropical Australia, often planted.

The tree is often cultivated. The fruit, known as *Sebesten*, is officinal. It is very mucilaginous and is employed as a demulcent. The ripe fruit is eaten and the unripe fruit is pickled by the natives. See Watt, Dict. Econ. Prod. l. c.

Note.—I have included with the above *Cordia obliqua*, Willd. Phytogr. (1794) p. 4, n. 16, t. 4, fig. 1; Sp. Pl. v. 1 (1797) p. 1072, which is maintained as a separate species by Mr. C. B. Clarke (Fl. B. I. v. 4, p. 137). There are no type-specimens of Willdenow's plant either at Kew or at the British Museum, which renders it next to impossible to determine accurately the plant to which Willdenow refers in his description. The figure which accompanies that description certainly points to *C. Myxa*. De Candolle (Prodr. v. 9, p. 479) says that it seems at most a variety of *C. Myxa*, but is unknown to him, while Trimen (Fl. Ceyl. v. 3, p. 193) makes it a variety of that plant, but is at the same time doubtful as to the identity of the Ceylon plant with Willdenow's species. Wight (Icon. v. 4, part 2, p. 15) is doubtful as to *C. obliqua* being distinct from *C. Myxa*, and curiously enough gives but one figure (t. 1378) for both plants. Talbot, who has had a large experience of the trees of W. India, unites *C. obliqua* and *C. Myxa*. The variation in the size of the leaves, flowers, and fruit may be due to conditions of soil and climate. I have seen specimens of *C. Myxa* grown in the Botanic Garden at Poona with larger flowers than any of those whose dimensions are given in the Flora of British India; and, as the tree named *C. obliqua* is very common in Gujarat, the soil and climate of that Province, which has been styled the garden of W. India, may be a powerful factor in promoting luxuriance of growth.

2. **Cordia Wallichii,** *G. Don, Gen. Syst.* v. 4 (1837) p. 379. A moderate-sized tree. Leaves 4—5 in. long and about as broad as long, orbicular-ovate, glabrous or nearly so and without white discs (*cystoliths*) above, densely clothed with stellate, fulvous or white tomentum beneath, base subcordate or truncate, rarely shortly cuneate, 3—5 (usually 3) -nerved; petioles 1—1½ in. long. Flowers white, in terminal and lateral paniculate cymes. Calyx ¼—⅓ in. long, closed round the corolla in bud, irregularly splitting into 5 lobes on the expansion of the flower, pubescent inside; tube slightly tomentose or nearly glabrous; the teeth densely tomentose. Corolla about twice as long as the calyx. Filaments hairy at the base. Drupe ovoid, long-acuminate (*Talbot*). Dalz. & Gibs. p. 174; Bedd. Flor. Sylvat. t. 245; DC. Prodr. v. 9, p. 479; Talb. Trees, Bomb. ed. 2, p. 243. *Cordia obliqua* var. *Wallichii*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 137.—Flowers: Dec.—Jan.

Drier parts of the Presidency, tolerably common. DECCAN: between Malsej Ghât and Ahmednagar, *Dalzell & Gibson*. KANARA: Mandgod division of N. Kanara in deciduous forests, *Talbot*. GUJARAT: common, *Talbot*.—DISTRIB. India (W. Peninsula).

I have retained this as a separate species, to which rank it seems more entitled than *C. obliqua*. There is no type-specimen of Don's plant either at Kew or at the British Museum, and it would appear that his original specimen of *C. Wallichii* cannot be traced. Don says of *C. Wallichii* that the leaves are glabrous above and densely clothed with tomentum beneath, and that the calyx is campanulate and downy.

3. **Cordia Macleodii,** *Hook. f. & Thoms. in Journ. Linn. Soc.* v. 2 (1858) p. 128. A tree 30—40 ft. high; trunk reaching 2 ft. in diam. (*Talbot*); bark smooth, white, soft. Leaves alternate or sometimes almost subopposite, firm and hard when mature, 2—6 in. long, and nearly as broad as long, ovate, obtuse, 3—5-nerved at the base,

the upper surface pubescent when young, rough but shining, usually with white discs, and with impressed nerves when old, the lower surface densely clothed with grey or tawny woolly tomentum consisting of more or less branched (hardly stellate) hairs ; the basal as well as the secondary and transverse tertiary nerves prominent ; petioles 1—2 in. long, densely woolly-tomentose. Flowers polygamous, subsessile, in dense paniculate terminal and axillary tomentose cymes ; male flowers with a rudimentary ovary but without style or stigma. Calyx ⅓ in. long, obconic, densely tomentose, ribbed ; lobes short, obtuse. Corolla ⅜ in. long ; lobes ⅓ by $\frac{1}{10}$—⅛ in., exceeding the tube, spathulate-oblong, obtuse, veined. Stamens usually 6, exserted ; filaments hairy at the base ; anthers of male flowers large, those of hermaphrodite flowers smaller. Drupe ½—¾ in. long, ovoid, acute, supported on the cup-shaped ribbed tomentose persistent crenate or denticulate calyx, not edible. Fl. B. I. v. 4, p. 139 ; Talb. Trees, Bomb. ed. 2, p. 244 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169 ; Watt, Dict. Econ. Prod. v. 2, p. 563.—Flowers : Mar.—Apr. VERN. *Dahiván.*

Forests of N. Kanara, Belgaum, and the Konkan, often planted as a roadside tree in southern drier districts. DECCAN : Rohe and Poona, *Bhivæ* ! ; Máwal, *Woodrow* ! ; Sinhagad, *Sirpati* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1902 !—DISTRIB. Central India and W. Peninsula.

The timber is excellent, hard and tough, and is largely used in Kanara in the construction of country carts. The species has become rare in the Haliyál subdivision of N. Kanara owing to the large demand for the timber for cart-building (*Talbot*).

4. **Cordia fulvosa,** *Wight, Icon.* v. 4, part 2 (1850) p. 15, t. 1380. A small tree ; branches terete, glabrous ; young shoots clothed with short fulvous pubescence. Leaves 2½—6 by 1¾—3½ in., ovate-oblong or suborbicular, obtuse or subacute, entire or crenate, scabrous and with white discs (*cystoliths*) above, obscurely 3-nerved, the mature leaves with hard (not woolly) thin fulvous tomentum beneath ; petioles 1—1¼ in. long. Flowers in rather dense, short, paniculate, terminal and axillary fulvous-tomentose cymes ; pedicels short. Calyx ⅓ in. long, obconic, clothed outside with short fulvous tomentum, glabrous inside ; teeth usually 5, deltoid, with a small tuft of short hairs at the apex of each. Corolla ½ in. long ; tube ⅛ in. long ; lobes 4—6 (usually 6), spreading, obovate-oblong with undulate margins, bifid at the apex. Stamens as many as the corolla-lobes ; filaments glabrous. Drupe when immature ovoid-conical, apiculate with the remains of the style, seated on the persistent cup-shaped calyx. Fl. B. I. v. 4, p. 140 ; Bedd. For. Man. in Flor. Sylvat. p. clxvi ; Talb. Trees, Bomb. ed. 2, p. 244.—Flowers ; June—Aug.

KONKAN : *Stocks* !, *Law* !, *Talbot*. S. M. COUNTRY : Belgaum in dry forests, *Talbot* ; south hills, Belgaum, *Ritchie*, [illegible] ! KONKAN : Jagalbet, *Ritchie*, 1904 !—DISTRIB. India (W. Peninsula).

5. **Cordia monoica,** *Roxb. Cor. Pl.* v. 1 (1795) p. 43, t. 58. A small tree. Leaves 1¼—3 by ¾—1½ in., ovate or elliptic, obtuse or subacute, subentire or crenate, rough with white discs (*cystoliths*) above, pubescent or villous beneath, base rounded or shortly cuneate,

3-nerved; petioles round, $\frac{1}{8}$—$\frac{1}{3}$ in. long. Flowers subsessile, in small dense paniculate tomentose cymes; male and fertile flowers on separate branches (*Brandis*). Calyx $\frac{1}{4}$ in. long, obconic, densely fulvous-hairy or -tomentose outside, glabrous inside; lobes 5, short, triangular, often obscure. Corolla $\frac{1}{3}$ in. long; lobes longer than the tube, $\frac{1}{8}$ in. long, oblong, obtuse, reflexed. Stamens exserted; filaments glabrous. Drupe size of a cherry, ovoid, apiculate, smooth, bright-yellow, seated on the cup-shaped, fulvous-pubescent, veined, irregularly lobed, persistent calyx; stone 4-celled, drilled at the apex, 3 of the cells barren and 1 one-seeded (*C. B. Clarke*). Fl. B. I. v. 4, p. 137; Grah. Cat. p. 136; Bedd. For. Man. in Flor. Sylvat. p. clxvi; Trim. F. Ceyl. v. 3, p. 193; Talb. Trees, Bomb. ed. 2, p. 244; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169.—Flowers: Aug.—Sept.

Rare. I have found it only near Badami, a Railway Station on the S. Mahratta Railway, where it has also been found by *Talbot* and *Woodrow*.—DISTRIB. India (Central Provinces and W. Peninsula); Ceylon.

6. **Cordia Rothii,** *Roem. & Schult. Syst.* v. 4 (1819) p. 798. A small tree 20—40 ft. high; bark grey, furrowed. Leaves subopposite, $2\frac{1}{2}$—4 by $\frac{3}{4}$—$1\frac{1}{4}$ in., oblanceolate-oblong, rounded at the apex, rough above, more or less pubescent beneath, inconspicuously feather-nerved (not 3-nerved at the base), base tapering into the petiole; petioles $\frac{1}{2}$ in. long. Flowers small, white, usually tetrandrous, in lax terminal or axillary pedunculate cymes; peduncles $\frac{3}{4}$—1 in. long; pedicles short, Calyx $\frac{1}{8}$—$\frac{1}{3}$ in. long, veined, obconic at the time of flowering, minutely pubescent outside and with shining silky hairs inside; lobes obtuse, small. Corolla $\frac{1}{4}$ in. long; lobes usually 4, equalling the tube, oblong, obtuse, reflexed. Filaments glabrous. Drupe usually 1-seeded, ovoid, acute, mucronate, $\frac{3}{8}$—$\frac{1}{2}$ in. long, glabrous, longitudinally striate, yellow or reddish-brown when ripe, with a gelatinous pellucid edible pulp. Fl. B. I. v. 4, p. 138; Dalz. & Gibs. p. 174; Bedd. For. Man. in Flor. Sylvat, p. clxvi; Wight, Icon. t. 1379; Talb. Trees, Bomb. ed. 2, p. 244; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169; Watt. Dict. Econ. Prod. v. 2, p. 565. *Cordia angustifolia,* Roxb. Fl. Ind. ed. Carey, v. 2, p. 338 (*not* of Roem. & Schult.); Grah. Cat. p. 136.—Flowers: Nov. VERN. *Gundi*; *Gondáni*; *Liári.*

Dry districts of the Presidency, often planted near villages, very common in Sind and Rajputana. DECCAN: in gardens, *Ritchie,* 503! GUJARAT: Deesa, *Raoji*! SIND: *Dalzell*!, *Stocks,* 427!, *Vicary*!, *Ritchie*!; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Panjáb, W. Peninsula); Ceylon, Arabia, Abyssinia.

A decoction of the bark possesses astringent properties, and is used as a gargle. The fruit is eaten by the poorer classes and is also pickled. The wood is used for fuel and in the manufacture of agricultural implements. See Watt, Dict. Econ. Prod. l. c.

Cordia Sebestena, Linn. Sp. Pl. (1753) p. 190. A small tree 15—30 ft. high, a native of Cuba, with rough coarse ovate or elliptic leaves 4—6 in. long, and abundant large cymes of showy scarlet

flowers, followed by pure white fruits 1½ by ¾ in., is occasionally cultivated in gardens. Woodr. Gard. in Ind. ed. 5, p. 389.—Flowers: Jan.—Mar.

2. EHRETIA, Linn.

Trees or shrubs, glabrous, pubescent, or scabrous. Leaves alternate. Flowers small, usually white, in terminal and axillary corymbose cymes or panicles, rarely solitary. Calyx small, 5-partite. Corolla-tube short; lobes 5, spreading, imbricate. Stamens 5, inserted on the corolla-tube, usually exserted; filaments filiform; anthers ovate or oblong. Ovary 2-celled with 2 ovules in each cell, or 4-celled with 1 ovule in each cell; style terminal, 2-fid or 2-partite, or styles 2; stigma capitate or clavate. Drupe small, subglobose, 4 (or by suppression 3—1) -seeded; endocarp hard, consisting of 1 four-celled or 2 two-celled or 4 one-celled pyrenes (3—1 pyrenes or cells sometimes suppressed). Seeds straight; albumen scanty; cotyledons ovate or oblong, not plicate.—DISTRIB. Warmer parts of the hemispheres, more numerous in the eastern; species about 50.

Style bifid less than ½-way down.
Leaves sometimes reaching 5 in. long, glabrous beneath ..... 1. *E. lævis.*
Leaves not reaching 3 in. long, persistently hairy beneath ..... 2. *E. aspera.*
Styles 2, or 1 style divided almost to the base.
Leaves not exceeding 1 in. long..... 3. *E. buxifolia.*

1. **Ehretia lævis,** *Roxb. Cor. Pl.* v. 1 (1795) p. 42, t. 56. A small tree 25—40 ft. high, glabrous or more or less pubescent; bark grey, thick, smooth, scaly. Leaves 2½—5 by 1½—3 in. very variable, often unsymmetric, elliptic-oblong or obovate, subacute, acuminate, obtuse or emarginate at the apex, entire, glabrous or nearly so when mature, paler beneath, usually unequally cuneate, but sometimes rounded or almost truncate at the base; main nerves 6—10 pairs; petioles ⅜—¾ in. long. Flowers white, sessile or nearly so, in much-branched glabrous or pubescent corymbose axillary and terminal cymes composed of unilateral spikes or racemes; peduncles ¼—½ in. long; bracts 0. Calyx ⅒ in. long, pubescent; segments ⅕ in. long, ovate, acute. Corolla ⅛ in. long; lobes ⅛ in. long, obtuse, spreading. Filaments glabrous; anthers not apiculate. Style staut, more or less deeply bifid; stigmas capitate. Drupe sub-2-lobed, rather broader than long (about ⅛ in. long by ⅛ in. broad), red at first, black and wrinkled when dry. Fl. B. I. v. 4, p. 141; Grah. Cat. p. 137; Dalz. & Gibs. p. 170; Wight, Icon. t. 1382; Bedd. Flor. Sylvat. t. 246; Trim. Fl. Ceyl. v. 3, p. 195; Talb. Trees, Bomb. ed. 2, p. 245; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169; Watt, Dict. Econ. Prod. v. 3, p. 203.—Flowers: Jan.—June. VERN. *Dátrang.*

Throughout the Presidency in deciduous forests. KONKAN: *Stocks!*; foot of Matheran Ghát, *H. M. Birdwood*; near Malwán, *Dalzell & Gibson.* DECCAN: Bhimashankar, *Gibson* ex *Graham.* S. M. COUNTRY: Rámghát, *Ritchie,* 924!; Belgaum, *Ritchie,* 924! KANARA: Karwar, *Woodrow*; Kála naddi, *Ritchie,* 924!

GUJARAT: jungles to the south-east of Surat, *Law* ex *Graham*; Dangs, *Bhiva*! —DISTRIB. Throughout India; Ceylon, Persia, China, Australia.

VAR. 1. *floribunda*, Brandis, For. Flor. (1874) p. 340. Leaves acuminate, softly pubescent and ciliate. C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 142. *Ehretia floribunda* (sp.), Benth. in Royle, Ill. p. 306. Scarcely deserving of being classed as a variety.

SIND: Shah-Bilawal, *Stocks*, 607!
There is only 1 specimen in Herb. Kew.

VAR. 2. *canarensis*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1883) p. 142, which is described as having broadly oblong symmetric strongly-nerved leaves narrowed at both ends, cannot, in my opinion, be maintained as a good variety. The leaves of the plant are very variable, a fact to which Trimen (Fl. Ceyl. v. 3, p. 196) calls attention, and notes that the leaves in moist regions are larger and acuminate. I have found on the same specimen of the so-called variety both symmetric and unsymmetric leaves, so that the chief distinguishing character is not a constant one. The so-called variety is abundant in the moist Konkan and N. Kanara forests.

2. **Ehretia aspera,** *Roxb. Cor. Pl.* v. 1 (1795) p. 41, t. 55. A shrub; branches usually glabrous, short, terete. Leaves very variable, ¾—2½ by ½—1½ in., elliptic-oblong or obovate, rounded or shortly acuminate, sometimes retuse, scabrous, slightly hairy of glabrous above, persistently hairy beneath; petioles ¼—¾ in. long. Flowers white, in paniculate cymes which are at first close, corymbose and apparently terminal, afterwards lax and lateral. Calyx $\frac{1}{10}$ in. long, hairy outside; segments $\frac{1}{10}$ in. long, ovate-oblong, subacute, ciliate. Corolla ¼—⅓ in. long; tube longer than the calyx; lobes about equalling the tube, oblong, obtuse. Ovary ovoid; style ⅛—¼ in. long, bifid about ⅓ the way down; stigmas capitate. Drupe depressed-globose, ¼ in. across; pyrenes usually 4, bony. Bedd. For. Man. in Flor. Sylvat. p. clxvi. *Ehretia obovata,* R. Br. in Salt, Abyss. (1814) App. v. lxiv (*name only*). *Ehretia obtusifolia,* Hochst. ex DC. Prodr. v. 9 (1845) p. 507; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 142; Rich. Tent. Flor. Abyss. v. 2 (1851) p. 83; Talb. Trees, Bomb. ed. 2, p. 245; Watt, Dict. Econ. Prod. v. 3, p. 204. *Ehretia lævis* var. *aspera,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 142.—Flowers: Mar.—May.

DECCAN: Poona, *Woodrow*, 974!; Bowdhán, *Bhiva*!; plains about Poona (small shrub 3 ft. high), *Dalzell*! SIND: *Stocks*!, *Dalzell*!; Shah-Bilawal, *Stocks*, 539!—DISTRIB. India (Panjáb, Peninsula); Beluchistan, Abyssinia.

3. **Ehretia buxifolia,** *Roxb. Cor. Pl.* v. 1 (1795) p. 42, t. 57. A small shrub 3—4 ft. high; branches numerous, slender, divaricate; bark reddish-brown, cracked. Leaves numerous, subsessile, fascicled on arrested branchlets, ⅜—1 by ⅛—⅓ in. obovate, cuneate, rounded and sometimes with a few crenatures at the apex, rough above with short bristly hairs with a white spot at the base of each when dried, shining and polished above, paler and with conspicuous venation beneath. Flowers white, axillary, solitary or 2 together on slender hairy peduncles 0—⅓ in. long. Calyx hairy, $\frac{1}{10}$ in. long; segments

$\frac{1}{16}$ in. long, lanceolate or spathulate-oblong, acute. Corolla $\frac{1}{8}$ in. long, campanulate; lobes $\frac{1}{10}$ in. long, broadly ovate, obtuse, spreading or recurved. Stamens exserted. Styles 2, longer than the stamens, undivided, or 1 style 2-partite to near the base. Drupe $\frac{1}{8}$ in. in diam., globose, apiculate, shining, scarlet; pyrene 1, four-celled. Fl. B. I. v. 4, p. 144; Bedd. For. Man. in Flor. Sylvat. p. clxvii; Trim. Fl. Ceyl. v. 3, p. 196; Talb. Trees, Bomb. ed. 2, p. 245, Watt, Dict. Econ. Prod. v. 3, p. 203.—Flowers: Mar.

Rare. Without locality, *Gibson*!, *Dalzell*! DECCAN: dry forests, *Talbot*. S. M. COUNTRY: common on the stony hills near Dharwar, *Talbot*.—DISTRIB. India (W. Peninsula); Ceylon, Malaya to Formosa and the Philippines.

3. COLDENIA, Linn.

Branched usually diffuse or prostrate herbs. Leaves, alternate, small, crisped. Flowers white or yellow, axillary, sessile or nearly so, the upper sometimes in a 1-sided leafy spike. Calyx 4—5-partite; segments lanceolate or linear. Corolla-tube short, rather broad, naked or with 4—5 scales within; lobes 4—5, spreading, imbricate in bud. Stamens 4—5, inserted on the corolla-tube included; filaments short; anthers ovate. Ovary ovoid, slightly 4-lobed, 2-celled with 2 ovules, or sub-4-celled with 1 ovule in each cell; styles 2, distinct from the base or cohering to the middle, but easily separable, terminal; stigmas capitate. Drupe almost dry, of 4 subconnate 1-seeded pyrenes. Seeds exalbuminous or with scanty albumen; cotyledons flat, broad; radicle short, straight, incurved or incumbent on the cotyledons.—DISTRIB. All American but 1, the following, which is widely dispersed throughout the warmer regions of the globe; species 11.

1. **Coldenia procumbens,** *Linn. Sp. Pl.* (1753) p. 125. A procumbent herb usually lying quite flat on the ground; stems reaching 18 in. long, shaggy with white hairs; branches often numerous; young parts silky with white hairs. Leaves crisped, $\frac{1}{2}$—$1\frac{1}{2}$ by $\frac{1}{4}$—$\frac{3}{4}$ in., obovate-oblong, rounded at the apex, coarsely serrate or subpinnatifid, very hairy on both sides, base tapering; petioles $\frac{1}{8}$—$\frac{3}{8}$ in. long, shaggy. Flowers pale-yellow, solitary, axillary, nearly sessile. Calyx divided to the base or nearly so, very hairy; segments 4, ovate, acute, $\frac{1}{10}$ in. long, ciliate. Corolla $\frac{1}{10}$ in. long; lobes 4, oblong, rounded at the apex, $\frac{1}{10}$ in. long. Stamens 4, scarcely higher than the corolla-tube. Fruit a dry 4-lobed pyramid about $\frac{1}{8}$ in. high and $\frac{1}{8}$ in. across at the widest part, grooved on two and ribbed on the other two sides, with a sharp central double beak, hairy, muriculate, ultimately separating into 1-celled beaked pyrenes. Seeds albuminous. Fl. B. I. v. 4, p. 144; Grah. Cat. p. 135; Dalz. & Gibs. p. 171; Aitch. Pb. & Sind Pl. p. 93; Trim. Fl. Ceyl. v. 3, p. 197; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169; Watt, Dict. Econ. Prod. v. 2, p. 502.—Flowers: Sept.—Oct. VERN. *Tripakshi*; *Tripanki*.

Moist ground round tanks and in rice-fields. KONKAN: *Law*! DECCAN: Lanoli, *Woodrow*. S. M. COUNTRY: Badami, *Cooke*!, *Woodrow*!, *Bhiva*!

KANARA: Yellapur, *Ritchie*, 413! SIND: *Stocks*, 549!—DISTRIB. Throughout India in moist places, Ceylon, Tropics generally.

4. RHABDIA, Mart.

A shrub; branches twiggy, glabrous or more or less pubescent. Leaves alternate, often fascicled, entire or obscurely toothed. Flowers small, few, at the apices of the branchlets between the leaves, rarely laxly racemose. Calyx 5-partite; segments lanceolate, acuminate, imbricate. Corolla deeply 5-cleft; tube short, subcampanulate; lobes oblong, imbricate in bud. Stamens 5, inserted on the corolla-tube, included or exserted; filaments filiform; anthers oblong or ovate. Ovary ovoid, 2-celled with 2 ovules, or sub-4-celled with 1 ovule in each cell; style filiform, simple; stigma capitate or minutely 2-lobed. Drupe with 4 crustaceous 1-seeded pyrenes. Seeds oblong; albumen scanty; cotyledons ovate.—DISTRIB. Warmer regions of both hemispheres; species 1.

1. **Rhabdia lycioides,** *Mart. Nov. Gen. & Sp.* v. 2 (1826) p. 137, t. 195. A small much-branched shrub 2—6 ft. high; branches virgate, with numerous short lateral arrested branchlets; young parts pubescent. Leaves ¼—1 by ⅛—¼ in., nearly sessile, crowded or fasciculate, spathulate, usually rounded at the apex, sometimes very shortly apiculate, usually entire, more or less hairy or glabrous, rarely densely hispid; petioles very short. Flowers pink, shortly pedicellate, solitary or 2 or 3 terminating short lateral branches; bracts at the base of the pedicels lanceolate, acute. Calyx ⅛ in. long, more or less hairy, somewhat fleshy, divided almost to the base; segments 5, imbricate, the 3 outer slightly larger than the 2 inner, all ovate-lanceolate, acuminate, ciliate. Corolla nearly ⅛ in. long; lobes twice as long as the tube, oblong, rounded at the apex, spreading. Stamens exserted beyond the corolla-tube; filaments ⅛ in. long. Ovary ovoid; style ⅛ in. long; stigma capitate or minutely 2-lobed. Fruit ⅛ in. in diam., nearly dry, subglobose, shorter than the persistent calyx, tipped with the remains of the style, orange when ripe. Fl. B. I. v. 4, p. 145; Trim. Fl. Ceyl. v. 3, p. 197; Talb. Trees, Bomb. ed. 2, p. 245; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169. *Rhabdia viminea,* Dalz. in Hook. Icon. Pl. (1852) t. 823; Dalz. & Gibs. p. 170. *Ehretia cuneata,* Wight, Icon. t. 1385.—Flowers: Oct.—Dec. VERN. *Machim.*

KONKAN: *Stocks*!, *Law*!; banks of the river Pen, *Dalzell*!; beds of Konkan rivers pretty common, *Dalzell & Gibson.* DECCAN: Koina valley below Mahableshwar, *Cooke*!; Kirkee, bed of Mula river near the Powder Works, *Woodrow*!; 12 miles W. of Poona, *Bhiva*! S. M. COUNTRY: Castlerock, *Kanitkar*! KANARA: beds of streams in N. Kanara, *Woodrow*!, *Talbot*; Kála naddi, *Ritchie*, 1905!; Gairsoppa, *Dalzell*!—DISTRIB. Throughout India in river beds; Ceylon, Tropical S. E. Asia, Africa, and Brazil.

5. HELIOTROPIUM, Linn.

Herbs or undershrubs (rarely shrubs), villous or scabrid, rarely quite glabrous. Leaves alternate (rarely subopposite). Flowers usually small, often unilateral along the branches of forked terminal

scorpioid cymes, sometimes all axillary or arranged in simple leafy racemes. Calyx more or less deeply 5-cleft ; lobes linear or lanceolate. Corolla-tube cylindric, usually naked at the throat ; lobes 5, imbricate or induplicate, usually spreading in flower. Stamens 5, inserted in the corolla-tube, included ; filaments very short ; anthers ovate, oblong or lanceolate, obtuse, mucromate, or with a small discoid appendage at the apex. Ovary completely or imperfectly 4-celled, 4-ovulate ; ovule pendulous from the inner angle of the cell near its apex ; style terminal, short or long, usually with a depressed conic or broad stigmatic ring below the apex. Fruit somewhat fleshy, 2- or 4-sulcate or -lobed, at length dividing into 4 distinct or geminately cohering nutlets (sometimes 1 or 2 of the nutlets suppressed). Seeds straight or curved ; albumen usually scanty ; cotyledons plano-convex ; radicle short.—DISTRIB. Throughout the tropical and temperate zones of both hemispheres ; species about 150.

Leaves reaching 4 in. long ; fruit mitriform, 4-beaked	1. *H. indicum.*
Leaves 2 in. long at most; fruit of 2—4 nutlets, not beaked.	
Corolla-lobes patent, caudate-acuminate.	
Stigma simple	2. *H. zeylanicum.*
Corolla-lobes not caudate-acuminate.	
Stigma with 2 linear branches exserted from the corolla	3. *H. ophioglossum.*
Stigma not exserted from the corolla.	
Anthers free, not connate by their connectives.	
Calyx-lobes short, not ½ the length of the tube.	
A prostrate villous herb	4. *H. supinum.*
Calyx deeply divided.	
Stamens inserted above the middle of the corolla-tube; stigma short, subcapitate	5. *H. rariflorum.*
Stamens inserted at or below the middle of the corolla-tube; stigma elongate, conical above.	
Leaves elliptic or obovate, the lower with long petioles.	
Corolla-lobes with intermediate teeth.	
Spikes reaching 2 in. long	6. *H. Eichwaldi.*
Corolla-lobes without intermediate teeth.	
Spikes 6—8 in. long; leaves reaching 1¼ in.; calyx-segments subequal	7. *H. calcareum.*
Spikes 2—4 in. long; leaves not exceeding ¾ in.; calyx-segments very unequal	8. *H. ovalifolium.*
Leaves lanceolate, sessile.	
An erect shrub with stiff hairs from bulbous bases	9. *H. tuberculosum.*
Anthers connate by their produced connectives, afterwards separating and with a small disc at their apex.	
An erect semi-shrubby herb; racemes reaching 6 in. long	10. *H. paniculatum.*
A prostrate or decumbent herb; spikes reaching 2 in. long	11. *H. marifolium.*

1. **Heliotropium indicum,** *Linn. Sp. Pl.* (1753) p. 130. A coarse somewhat succulent annual ½—2 ft. high, with stout stem and ascending branches more or less densely hirsute with spreading hairs. Leaves alternate or often subopposite, 1¾—4 by 1—2 in.,

ovate or ovate-oblong, obtuse or subacute, usually with a few scattered hairs above, minutely pilose beneath, the margins much undulate or subserrate, base rounded or sometimes cordate or narrowed, often unequal-sided and then suddenly contracted and decurrent into the petiole ; nerves and veins conspicuous on the lower side ; petioles ¾—1½ in. long, more or less winged. Flowers pale-violet, numerous, sessile, 2-ranked, in simple or rarely forked usually extra-axillary bristly ebracteate spikes 2—6 in. long. Calyx $\frac{1}{10}$ in. long, bristly with a few long hairs outside ; segments $\frac{1}{16}$ in. long, linear-lanceolate, acute, unequal. Corolla $\frac{1}{8}$ in. long ; tube $\frac{1}{8}$ in. long, hairy outside, narrowed upwards ; limb infundibuliform ; lobes about $\frac{1}{20}$ in. long, orbicular-oblong. Stamens inserted below the middle of the corolla-tube ; filaments very short ; anthers $\frac{1}{20}$ in. long, ovate, acute. Style $\frac{1}{40}$ in. long ; stigma $\frac{1}{20}$ in. long, with an annular frill at the base and with a short obtuse apex. Fruit $\frac{1}{8}$ in. long, deeply 2-lobed, each lobe compressed, bluntly 4-ribbed, produced above into a short blunt bidentate beak and containing 2 angular beaked hard 1-seeded pyrenes which have each an empty cavity on the inner side. Fl. B. I. v. 4, p. 152 ; Trim. Fl. Ceyl. v. 3, p. 200 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 ; Watt, Dict. Econ. Prod. v. 4, p. 214. *Tiaridium indicum*, Lehm. Asperifol. p. 14 ; Wight, Ill. t. 171 ; Grah. Cat. p. 135 ; Dalz. & Gibs. p. 172.—Flowers : Oct.—Dec. VERN. *Bhurundi.*

A common weed, often found on rubbish-heaps and in waste places by roadsides. KONKAN : Ajeru salt-swamps, Bombay, *Woodrow* ; Bombay, *Bhiva* ! ; Banda near Sawantwari, *Kanitkar* ! S. M. COUNTRY : Rámghàt, *Ritchie*, 494 ! ; Dharwar, *Cooke* ! KANARA : Kála naddi, *Ritchie*, 494 !—DISTRIB. Throughout India ; Ceylon, Malaya, Tropical Africa, and America.

The plant is used in Bombay as a local application to boils, sores, and the stings of insects and reptiles. See Watt, Dict. Econ. Prod. l. c.

2. **Heliotropium zeylanicum,** *Lam. Encyc. Méthod.* v. 3 (1789) p. 94 (*not* of Wall.). An erect annual 1—3 ft. high, scabrous and coarsely hairy with stiff hairs arising from white bulbous bases, the globose bases shewing distinctly in dried specimens. Leaves 1—2 by ⅛—½ in., sessile or nearly so, lanceolate, acute, entire, densely clothed with stiff hairs arising from white bulbous bases, base tapering. Flowers sessile, in elongate spikes 2—6 in. long, usually in one rank along the rhachis, but sometimes (especially towards the apex of the spike) 2-ranked. Calyx $\frac{1}{10}$ in. long, hairy on both sides, divided to the base ; sepals ovate, acute, densely ciliate. Corolla-tube ⅛—¼ in. long, the upper half slightly swollen and setose outside ; lobes $\frac{1}{10}$—⅛ in. long, caudate-acuminate, spreading. Stamens inserted in the swollen part of the corolla, surrounding the style ; anthers sessile, $\frac{1}{20}$ in. long, ovate-oblong, bifid at the apex. Style glabrous, $\frac{1}{12}$ in. long ; stigma $\frac{1}{10}$ in. long, the stigmatic ring surmounted by a long cone which is penicillate at the apex with erect white glistening hairs. Nutlets 4, ovate in longitudinal section, $\frac{1}{12}$ in. long, slightly incurved, rounded and rugose or tuberculate on the back, cuneate on the inner face, 2-seeded. (The Fl. B. I. says there are 2 nutlets, but I have invariably found 4 in the mature fruit.) Fl. B. I. v. 4, p. 148 ; Wight, Icon. t. 892 ; Gürke,

in. Engl. & Prantl, Pflanzenf. v. 4, part 3, A, p. 93, fig. 38, C—F; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 169. *Heliotropium subulatum*, Hochst. ex Martelli, Fl. Bogos. (1886) p. 95. *Tournefortia subulata*, Hochst. in DC. Prodr. v. 9 (1845) p. 528; Dalz. & Gibs. p. 171. *Tournefortia zeylanica*, Wight, Ill. t. 170.—Flowers: Oct.—Jan.

KONKAN: *Law*! S. M. COUNTRY: Badami, *Cooke*! GUJARAT: Deesa, *Stocks*, 12!; Chandod, *Kanitkar*! SIND: *Bhola Puran*!; Karachi, *Woodrow*.—DISTRIB. India (Panjáb, W. Peninsula); Tropical Africa.

Note.—It seems strange that this plant with the specific name "*zeylanicum*" should not occur in Ceylon. Trimen (Fl. Ceyl. v. 3, p. 199) is of opinion that the original plant figured by Burmann (Fl. Ind. p. 41, t. 16, fig. 2), from which Lamarck took his description, is *H. paniculatum*, R. Br. The fact that both Burmann and Lamarck have overlooked the most distinctive characteristic of the species, the caudate-acuminate corolla-lobes, certainly strengthens Trimen's contention, but the specific name has been so long established that it would be inconvenient to change it to *H. subulatum*, Hochst. [ex Martelli, Fl. Bogos. (1886) p. 59], which would apparently be the name to be substituted for it.

3. **Heliotropium ophioglossum**, *Stocks, ex Aitch. Pb. & Sind Pl.* (1869) p. 94. Suffruticose, 6—15 in. high, branched from near the base; stems and branches hoary with soft hairs and also clothed with stiff hairs arising from white bulbous bases which are easily seen in dried specimens. Leaves ¾—1½ by ¼—½ in., densely hirsute with stiff hairs from bulbous bases and also clothed with a softer pubescence, the lower leaves petiolate (often obscurely so), elliptic, acute, running down into the petiole, the upper leaves subsessile, lanceolate, acute, all with sub-entire undulate margins. Flowers sessile, distant, 1—2-ranked, in simple geminate or ternate densely hairy spikes 2—6 in. long. Calyx divided almost to the base, coarsely hairy with stiff hairs; segments 5, linear, acute, ⅛ by $\frac{1}{30}$ in., strongly ciliate. Corolla slightly exserted beyond the calyx; tube ⅛ in. long, cylindric, slightly pubescent outside, the throat plicate; lobes 5, about $\frac{1}{20}$ in. long, broadly ovate or suborbicular, obtuse or subacute, undulate, veined, usually with small intermediate teeth between the lobes. Stamens inserted below the middle of the corolla-tube; anthers linear-oblong, rounded at the tip. Style very short; stigma shortly conical at the base, prolonged above into a long subulate appendage about ⅛ in. long divided at the apex to about ⅓ the way down into 2 filiform recurved acute arms which are exserted beyond the corolla. Fruit $\frac{1}{16}$ in. long, glabrous, black; nutlets 4, rounded on the back and at their apex, 1-seeded. Fl. B. I. v. 4, p. 149; Gürke, in Engl. & Prantl, Pflanzenf. v. 4, part 3, A, p. 93, fig. 38, K, L; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers: Jan.—Mar.

In the Bombay Presidency confined to Sind. SIND: *Woodrow, W. Strachan*!, *Stocks*, 466!, *Dalzell*, 16!; Jemadar ka Landa near Karachi, *Stocks*, 466!; Malir (near Karachi), *Bhola Puran*!—DISTRIB. Beluchistan, Tropical Africa.

4. **Heliotropium supinum**, *Linn. Sp. Pl.* (1753) p. 130. A prostrate softly villous herb; stems numerous, spreading to 6—12 (rarely 18) in. from the centre, thickly clothed with soft white hairs. Leaves ½—1 by ¼—½ in., alternate (rarely opposite), elliptic, obtuse,

plicate, softly villous on both sides, more or less crenate, base acute ; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long, slender, villous. Flowers subsessile, in simple or once-forked densely villous cymes. Calyx $\frac{1}{8}$—$\frac{1}{6}$ in. long, very hairy on both sides ; lobes about $\frac{1}{30}$ in. long, ciliate, the divisions between the lobes marked down the calyx-tube by a thin easily tearable membrane, which, if torn, makes the calyx seem 5-partite. Corolla $\frac{1}{8}$—$\frac{1}{6}$ in. long, much exserted, being pushed up by the expansion of the ovary ; lobes very short (about $\frac{1}{40}$ in. long), rounded. Stamens inserted a little below the middle of the corolla-tube ; anthers $\frac{1}{20}$ in. long, lanceolate, acute. Style $\frac{1}{30}$ in. long ; stigma. $\frac{1}{40}$ in. long, the stigmatic ring conspicuous, surmounted by a small conical or subcylindric appendage which is penicillate at the apex. Fruit of 2—3 (rarely 4) dark-brown nutlets, ovate in horizontal section, rounded and obscurely tuberculate on the back, usually with strong light-brown margins, the face nearly flat when the fruit consists of 2 nutlets (making the nutlets plano-convex), but angled when there are more than 2. Fl. B. I. v. 4, p. 149 ; Dalz. & Gibs. p. 171 ; Wight, Icon. t. 1387 ; Trim. Fl. Ceyl. v. 3, p. 199 ; Gürke, in Engl. & Prantl, Pflanzenf. v. 4, part 3, A, p. 93, fig. 38, M, N ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170. *Piptoclaina malabarica*, G. Don, Gen. Syst. v. 4, p. 364 ; Grah. Cat. p. 135.—Flowers : Mar.

Common in rice-fields. KONKAN : *Gibson*! DECCAN : *Sinhagad*, *Woodrow* ; Poona, *Woodrow*, *Kanitkar*! ; Máwal, *Kanitkar*! ; Karli, *Ranade*! S. M. COUNTRY : Dharwar, *Cooke*!, *Woodrow* ; Belgaum, *Ritchie*, 499! GUJARAT : *Kanitkar*! SIND : *Stocks*, 244!—DISTRIB. India (Panjáb, Upper Gangetic plain, W. Peninsula) ; Ceylon, S. Europe, N. & S. Africa, Canary Islands.

I have found 3 nutlets as often as 2 in the Bombay specimens, and frequently, when there were only 2, there was a vacant space for a third.

VAR. *malabarica*, C. B. Clarke, in Fl. B. I. l. c., the fruit of which consists of 4 nutlets without conspicuous margins, cannot, in my opinion, stand as a variety. I have, many years ago, examined a very large number of living specimens and have found 2, 3, or occasionally 4 nutlets on the same plant, so that the number of nutlets cannot be regarded as a distinctive character. In the case when there are only 2 nutlets the margins are large and conspicuous, but when the nutlets increase to 4 the margins naturally dwindle in size, as they have less room to expand, and sometimes almost disappear.

5. **Heliotropium rariflorum,** *Stocks, in Kew Journ. Bot.* v. 4 (1852) p. 174. A stiff undershrub 6—18 in. high with a perennial root ; stems erect, branched, rigid and, as well as the branches, hoary with appressed hairs. Leaves $\frac{1}{6}$—1 by $\frac{1}{16}$—$\frac{1}{8}$ in., linear, subacute, with more or less revolute margins, densely clothed with appressed hairs ; petioles very short. Flowers distant, in terminal or extra-axillary slender bracteate spikes 1—3 in. long, often paniculately arranged ; bracts $\frac{1}{8}$—$\frac{1}{6}$ in. long, stalked or not, lanceolate, hairy, scattered along the rhachis. Calyx hairy, 5-partite ; tube scarcely $\frac{1}{30}$ in. long ; segments $\frac{1}{16}$ in. long, linear-lanceolate, ciliate. Corolla $\frac{1}{10}$ in. long, hairy outside ; tube broad, cylindric, with hairs in the throat ; lobes $\frac{1}{25}$ in. long, ovate, subacute. Stamens

inserted above the middle of the corolla-tube ; filaments filiform, short ; anthers broadly ovate, acuminate. Ovary ovoid, glabrous ; style $\frac{1}{30}$ in. long ; stigma about $\frac{1}{3}$ the length of the style, subcapitate. Fruit 4-lobed, about $\frac{1}{10}$ in. across, projecting above the persistent spreading calyx-segments, hispid with appressed hairs. Fl. B. I. v. 4, p. 152 ; Boiss. Fl. Orient. v. 4, p. 144.

In the Bombay Presidency confined to Sind. SIND : *Dalzell*, 171, *Bhola Puran*!, *Woodrow*; Tata district, *Bhola Puran*!; Jemadar ka Landa near Karachi, *Stocks*, 492!—DISTRIB. India (Panjáb); Afghanistan, Beluchistan, Nubia, Socotra.

6. **Heliotropium Eichwaldi,** *Steud. ex DC. Prodr.* v. 9 (1845) p. 535. Herbaceous, erect, branched from a woody base ; stems and branches clothed with soft hairs usually arising from glistening bulbous bases. Leaves 1—1¾ by ½—1 in., elliptic-oblong or obovate, usually obtuse, hairy on both sides with hairs usually arising from small glistening bulbous bases, base usually tapering ; nerves more or less conspicuous beneath ; petioles of the lower leaves reaching 1 in. long or more, those of the upper leaves much shorter. Flowers usually 2-ranked, in dense geminate or ternate ebracteate spikes which are short and helicoid at the apex when young, reaching about 2 in. long when older. Calyx densely hairy on both sides, divided almost to the base ; segments $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate-lanceolate, acute. Corolla $\frac{1}{8}$—$\frac{1}{4}$ in. long ; tube pubescent outside, glabrous inside ; lobes $\frac{1}{20}$ in. long, orbicular-oblong, with undulate margins and often with intermediate teeth between the lobes. Stamens inserted below the middle of the corolla-tube ; anthers $\frac{1}{16}$ in. long, linear-oblong, rounded at the tip. Style scarcely any ; stigma $\frac{1}{20}$ in. long, the conical appendage broad at the base, acute and bifid at the apex, the stigmatic ring not conspicuous. Fruit usually leaving the calyx behind when falling ; nutlets 4, ellipsoid, obtuse at both ends, $\frac{1}{12}$ in. long, minutely verrucose and finely puberulous. Fl. B. I. v. 4, p. 149 ; Watt, Dict. Econ. Prod. v. 4, p. 214. *Heliotropium europæum*, Aitch. Pb. & Sind Pl. p. 94 (*not* of Linn.). *H. calcareum*, Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 (*not* of Stocks).—Flowers : Nov.—Jan.

In the Bombay Presidency apparently confined to Sind. SIND : Karachi, *Stocks*, 457!; Magar Pir, *Stocks*!; Sehwan, *Bhola Puran*, 61, *Kanitkar*!; Hyderabad, *Cooke*!—DISTRIB. India (Panjáb, Kashmir); W. and Central Asia, Australia.

7. **Heliotropium calcareum,** *Stocks, in Kew Journ. Bot.* v. 4 (1852) p. 174. Erect, branched, herbaceous with woody base ; stem and branches clothed with soft ash-colored pubescence. Leaves ½—1¼ by ⅛—¾ in., elliptic or obovate, obtuse or subacute, softly hairy on both sides, base acute ; nerves prominent beneath ; petioles ⅛—½ in. long, those of the lower leaves the longest. Flowers 1-ranked, in solitary or geminate ebracteate spikes, scorpioid when young, elongate reaching 6—8 in. long (*Stocks*) when older. Calyx densely hairy on both sides with silvery hairs, divided almost to the base ; segments $\frac{1}{10}$ in. long, linear-lanceolate, subacute, densely ciliate with very long white silky hairs. Corolla ⅛ in. long ; tube ⅛ in. long, cylindric, pubescent outside ; lobes orbicular, with crenulate

margins and without intermediate teeth between the lobes. Stamens inserted at the middle or very little below the middle of the corolla-tube; anthers $\frac{1}{12}$ in. long, lanceolate, acuminate, the tips reaching to the level of the top of the corolla-tube. Style very short, about $\frac{1}{60}$ in. long; stigma $\frac{1}{20}$—$\frac{1}{16}$ in. long, broadly conical at the base, tapering towards the tip, pubescent and bifid at the apex, the stigmatic ring not sharply defined. Fruit usually deciduous with the calyx; nutlets 4, ovate in longitudinal section, subacute, $\frac{1}{10}$ in. long, closely covered with silvery hairs, not verrucose, slightly margined. Fl. B. I. v. 4, p. 150; Boiss. Fl. Orient. v. 4, p. 128. *Heliotropium cinerascens*, Aitch. Pb. & Sind Pl. p. 94 (*not* of Steud.).

Hills of Sind, *Stocks*, ex Kew Journ. Bot. l. c.

I have not seen any specimens from Sind. Those in Herb. Kew. are from Beluchistan.—DISTRIB. Beluchistan.

8. **Heliotropium ovalifolium**, *Forsk. Fl. Ægypt.-Arab.* (1775) p. 38. Herbaceous, 6—15 in. high, erect or decumbent, sometimes with diffusely spreading more or less prostrate branches; stem and branches densely clothed with long silky appressed white hairs. Leaves $\frac{1}{4}$—$\frac{3}{4}$ by $\frac{1}{8}$—$\frac{1}{3}$ in., elliptic or obovate, mucronate, closely hairy with appressed long silky hairs, base tapering; petioles of the lower leaves $\frac{3}{8}$—$\frac{1}{2}$ in. long, those of the upper leaves usually shorter. Flowers white, 2-ranked, approximate, in slender ebracteate, hairy, usually once-forked spikes 2—4 in. long. Calyx $\frac{1}{10}$ in. long, divided almost to the base, hairy on both sides with soft appressed hairs; segments bristle-pointed, thick, unequal, one of them about twice as broad as any of the other 4, the larger segment $\frac{1}{20}$ in. wide, ovate, acute, the smaller segments linear-oblong, subacute, all densely ciliate. Corolla $\frac{1}{8}$ in. long; tube cylindric, scarcely swollen over the stamens, hairy outside and with hairs in the throat inside; lobes $\frac{1}{24}$ in. long, ovate-oblong, acute, without intermediate teeth. Stamens inserted below the middle of the corolla-tube; anthers $\frac{1}{40}$ in. long, lanceolate, acute, the connective produced. Ovary glabrous; style almost 0; stigma $\frac{1}{40}$ in. long, conical, slightly penicillate at the very apex; stigmatic ring inconspicuous. Nutlets $\frac{1}{20}$ in. long, ovate in longitudinal section, subacute, densely hairy with silky white hairs on the convex back, cuneate on the face, 1-seeded, the nutlets when falling leaving the calyx behind on the rhachis. Fl. B. I. v. 4, p. 150; Aitch. Pb. & Sind Pl. p. 94; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170. *Heliotropium coromandelianum*, Retz. Obs. fasc. 2 (1781) p. 9; Grah. Cat. p. 135; Dalz. & Gibs. p. 171; Wight, Icon. t. 1388.—Flowers: Jan.—Feb. The calyx-lobes, which are persistent on the rhachis, are erroneously described as *bracts* in Hook. f. Fl. B. I. l. c.

Stocks (without locality) in Herb. Wight. 548! DECCAN: Poona, *Ranade*!, *Woodrow*!; Bijapur, *Woodrow*!; Bhimashankar, *Gibson* ex *Graham*. S. M. COUNTRY: Belgaum, *Ritchie*, 1901! KANARA: *Law*!—DISTRIB. India (Bengal, W. Peninsula); Tropical Africa, Australia.

9. **Heliotropium tuberculosum**, *Boiss. Fl. Orient.* v. 4 (1879) p. 147. Erect, rigid, 6—20 in. high from a woody base, turning

black in drying, very harsh and scabrid with stiff white hairs springing from white tubercular bases; branches leafy, erect. Leaves ½—2 by $\frac{1}{10}$—⅓ in., subsessile, lanceolate, acute, densely clothed with stiff hairs from white bulbous bases, margins more or less crenulate, often revolute, base tapering. Flowers usually 2-ranked, in solitary conjugate or sometimes paniculately arranged dense short spikes. Calyx rather more than ⅛ in. long; segments $\frac{1}{10}$ in. long, linear-lanceolate, acute or subobtuse, densely hairy outside with long stiff hairs, slightly hairy inside and with more or less membranous margins. Corolla tubular, ⅛ in. long, densely hairy outside; tube scarcely swollen at the middle; limb crisped and plicate, truncate, scarcely distinctly lobed. Stamens inserted about the middle of the corolla-tube; anthers $\frac{1}{25}$ in. long, subsessile, narrowly linear-lanceolate. Style $\frac{1}{25}$ in. long; stigma $\frac{1}{20}$ in. long, the apex conical, slightly pubescent, shortly bifid, the stigmatic ring conspicuous. Fruit about $\frac{1}{10}$ in. long and as broad as long, glabrous or softly hairy; nutlets connate by pairs (sometimes more or less easily separable into 4). *Heliotropium undulatum*, Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 (*not* of Vahl). *H. undulatum* var. *tuberculosum*, Boiss. Diagn. v. 1, fasc. 11 (1849) p. 89.—Flowers: Dec.

In the Bombay Presidency confined to Sind. SIND: *Stocks*!; Hyderabad, *Cooke*!; Magar Pir, *Kanitkar*!; Karachi, *Cooke*!—DISTRIB. Persia.

10. **Heliotropium paniculatum**, *R. Br. Prodr.* (1810) p. 494 (*not* of Roxb.). Herbaceous, 1—2 ft. high, with numerous twiggy ascending branches; stem and branches clothed with appressed hairs (especially so in the arid climate of Sind), or sometimes quite glabrous. Leaves ¼—1 by $\frac{1}{20}$—⅛ in., subsessile or very shortly petiolate, linear, acute, clothed with appressed hairs on both sides or sometimes glabrous above, the margins recurved. Flowers shortly pedicellate, in slender simple or forked racemes 2—6 in. long, usually with linear-lanceolate hairy sessile bracts ⅛ in. long. Calyx appressedly hairy outside, divided almost to the base; segments $\frac{1}{10}$ in. long, unequal. Corolla ⅛ in. long, hairy outside; tube slightly swollen and with a ring of hairs in the throat; lobes about $\frac{1}{20}$ in. long, ovate-deltoid, with plicate sinuses between. Stamens inserted rather low down in the corolla-tube; filaments filiform, short; anthers $\frac{1}{30}$ in. long, broadly ovate, acute, at first connate by the produced connectives, afterwards separating, each anther carrying away a portion of the swollen connective so as to form a small disc on the tip of the anther. Style about $\frac{1}{30}$ in. long; stigma a little longer than the style, conical at the apex, the stigmatic ring conspicuous. Fruit globose, shorter than the spreading calyx-segments which are persistent on the rhachis after the fruit falls; nutlets 4, hairy on the convex back, acute at the apex, cuneate on the face, $\frac{1}{16}$ in. long. Fl. B. I. v. 4, p. 151; Trim. Fl. Ceyl. v. 3, p. 200; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170. *Heliotropium linifolium*, Lehm. Aperifol. p. 35; Wight, Icon. t. 1391.

Not very common in the Bombay Presidency, where it chiefly occurs in Sind. S. M. COUNTRY: Badami, *Bhiva*! SIND: *Bhola Puran*!; Magar Pir near Karachi, *Kanitkar*!—DISTRIB. India (W. Peninsula, Pegu); Ceylon, Siam, Australia.

11. **Heliotropium marifolium,** *Retz. Obs.* fasc. 2 (1781) p. 8. A much-branched decumbent perennial herb with a woody base ; stems and branches usually spreading from near the root, often to a distance of several inches from the centre, clothed with appressed hairs. Leaves ¼—½ by $\frac{1}{10}$—⅛ in. (rarely reaching 1 by ⅛ in.), ovate or lanceolate, acute, sometimes oblanceolate, densely clothed with appressed hairs ; petioles very short. Flowers in short axillary and terminal bracteate spikes 1—2 in. long ; bracts conspicuous, foliaceous, lanceolate, scattered along the rhachis. Calyx ⅛ in. long, hairy on both sides with long slender hairs ; segments ⅛ in. long, slightly unequal, lanceolate, ciliate. Corolla ¼ in. long ; tube cylindric, hairy outside, glabrous inside ; lobes $\frac{1}{20}$ in. long, ovate-deltoid, acute, distant, with broad plicate sinuses and minute teeth between the lobes. Stamens inserted below the middle of the corolla ; filaments filiform, very short ; anthers about $\frac{1}{20}$ in. long, ovate, lanceolate, at first united at the apex by the produced connectives which are fused together into a small ball, afterwards separating, each anther carrying away a part of the ball as a small disc at its tip. Ovary ovoid ; style $\frac{1}{50}$ in. long ; stigma $\frac{1}{40}$ in. long, the apex bluntly conical or subcylindric, the stigmatic ring large and prominent. Fruit subglobose, pubescent, separating into 4 nutlets with a much rounded back. Wall. Cat. 2092 ; Wight, Icon. t. 1390 ; Dalz. & Gibs. p. 171 ; Trim. Fl. Ceyl. v. 3, p. 200 *in adnot. H. marifolium* var. *Wallichii,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 152. *H. scabrum,* Retz. Obs. fasc. 2, p. 8 ; Trim. Fl. Ceyl. v. 3, p. 200. *H. Rottleri,* Dalz. & Gibs. Bo. Fl. p. 171.

KONKAN : *Law* ! ; vingorla, *Dalzell & Gibson.* KANARA : Chandavar, *Ritchie,* 533 ! GUJARAT : Domas near Surat, *Dalzell* !—DISTRIB. Throughout India ; Ceylon.

I cannot see how this plant, which is described as var. *Wallichii* in Hook. f. Fl. B. I. l. c., differs from the type. Retzius describes the stems as "fruticulose, procumbent, ramous, hispid." The var. *Wallichii* would seem to be quite unnecessary.

VAR. *laxiflora.* Suberect. Leaves lanceolate, densely clothed with appressed hairs tending obliquely from the midrib towards the edges. Spikes rather lax, slender. Roth, Nov. Pl. Sp. (1821) p. 102 (*sp.*) ; Dalz. & Gibs. p. 171. *H. bracteatum* var. *laxiflora,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1883) p. 152 ; Trim. Fl. Ceyl. v. 3, p. 200 (*in adnot.*)

KONKAN : Worli hill, Island of Bombay, *Dalzell & Gibson.* DECCAN : *Dalzell & Gibson.*

This has been included on the authority of Dalzell & Gibson. I have seen no specimens from the Bombay Presidency.

Heliotropium peruvianum, Linn. Sp. Pl. ed. 2 (1762) p. 187. A native of Peru, as its name denotes, often grown in gardens. It is the well-known *Cherry Pie* of English gardens and its fragrant flowers are too well known to need description. The plant was introduced into Western India by the Earl of Clare. Grah. Cat. p. 135 ; Dalz. & Gibs. Suppl. p. 60 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 & Gard. in Ind. ed. 5, p. 390.

6. TRICHODESMA, R. Br.

Erect herbs usually hispid. Leaves opposite or alternate, quite entire. Flowers in racemose terminal unilateral cymes simple or bifid, usually bracteate. Calyx deeply 5-lobed, enlarged in fruit, angled, winged, or auricled at the base ; lobes imbricate. Corolla-tube broadly cylindric or 5-gonous, throat naked or slightly closed by the intrusion of the sinuses ; lobes 5, shortly ovate or lanceolate, often long-acuminate, contorted, overlapping to the left. Stamens 5 ; filaments short, broad, and, as well as the connectives, usually hairy on the back ; anthers linear-oblong, acuminate, erect, conniving. Ovary 4-lobed ; ovules subhorizontal, attached to the inner angles of the cell ; style subterminal, slender ; stigma small. Fruit pyramidal ; nutlets 4, broad, tuberculate or smooth, with or without a raised entire or pectinate or glochidiate margin, the lower face almost entirely adnate to the torus. Seeds suborbicular or obovoid ; embryo straight or slightly curved ; cotyledons plano-convex ; radicle short.—DISTRIB. Tropical and Subtropical Africa, Asia, and Australia ; species about 10.

Nutlets with or without a faint entire margin.
Calyx at flowering time cordate or hastate at the base ..... 1. *T. indicum.*
Calyx at flowering time rounded at the base..... 2. *T. zeylanicum.*
Nutlets with a raised white spiny margin on the inner edge.
Calyx at flowering time truncate at the base..... 3. *T. africanum.*

1. **Trichodesma indicum,** *R. Br. Prodr.* (1810) p. 496. Annual, erect, much-branched, very hispid, 6—18 in. high. Leaves 1½—4 by ¼—2 in., variable, sessile, ovate or oblong, or lanceolate-oblong, obtuse or subacute, clothed above with stiff hairs springing from white (when dry) circular tubercles, less harshly hairy and more or less densely villous beneath, cordate or hirsute at the base. Flowers pale violet-blue, solitary and leaf-opposed and in terminal few-flowered cymes ; pedicels ¼—½ in. long, slender, nodding, hispid. Calyx $\frac{7}{16}$—½ in. long (including the auricles), deeply divided, hispid with long hairs ; segments lanceolate, acute, cordate or hastate at the base, connate by the basal auricles. Corolla ½ in. long ; tube ¼ inch long ; limb oblique, infundibuliform, thinly hairy inside ; lobes ⅛—⅜ in. long (not including the acumen which is sometimes short, sometimes very long), ovate-deltoid, suddenly acuminate. Cone of anthers large and very pointed, clothed on the back with dense white hairs ; anthers included or exserted, with a few hairs at the base, inserted on the corolla-tube, the produced connectives linear, very acute, finally twisted together. Ovary ovoid, acute, tapering into the style, glabrous ; style nearly ¼ in. long. Fruit pyramidal, subtruncate at the apex, tipped with the persistent style, 4-ribbed ; nutlets ⅛ in. long, ovoid, smooth and polished on the back, rugose on the inner face, not or scarcely margined, bluish-white or nearly white when fully ripe, leaving 5 deep ovate pits on the membranous axis when falling. Fl. B. I. v. 4, p. 153 ; Grah. Cat. p. 134 ; Dalz. & Gibs. p. 173 ; Wight, Illustr. t. 172 ; Trim. Fl. Ceyl. v. 3, p. 201 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898)

p. 170; Watt, Dict. Econ. Prod. v. 6, part 4, p. 80.—Flowers: Aug.—Oct. VERN. *Chota-kalpa.*

Tolerably common throughout the Presidency. KONKAN: *Stocks*!, *Law*!; Kalyan, *Woodrow*. DECCAN: common, *Gibson* ex *Graham*; Poona, *Cooke*!, *Woodrow*, *Ranade*! S. M. COUNTRY: Belgaum, *Ritchie*!—DISTRIB. Throughout the greater part of India in the plains; Ceylon, Cabul, Beluchistan, Persia, Mauritius.

VAR. *amplexicaulis*. Bristly with hairs arising from tubercles, but hardly at all villous, glabrous beneath except on the nerves and veins. *Trichodesma amplexicaule* (sp.), Roth, Nov. Pl. Sp. (1821) p. 104; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 153; Dalz. & Gibs. p. 173; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.

Scarcely deserving of even varietal rank. Mr. C. B. Clarke (Fl. B. I. l. c.) suggests that it may probably be a form of *T. indicum*. I have often endeavoured to find even one reliable character by which to distinguish between the species *T. indicum* and *T. amplexicaule*, but have failed to do so. The amount of hairiness of the lower side of the leaves cannot be relied upon as a constant character. I have seen specimens, authoritatively recognized as *T. amplexicaule*, which were more densely villous than many of the other species. In fact, what R. Brown (Prodr. p. 496) says of *Trichodesma zeylanicum*, viz. that it is "a polymorphous plant especially in the amount of coarse hairs and pubescence," is equally true of *T. indicum*.

2. **Trichodesma zeylanicum,** *R. Br. Prodr.* (1810) p. 496. Annual, erect, 1—2 ft. high; stem stout, often purplish, and, as well as the branches, clothed with long soft hairs. Leaves 2—4 by ½—1 in., lanceolate-oblong, acute or subobtuse, densely clothed above with short stiff hairs from bulbous white bases, finely pubescent and with a few pustular hairs beneath, base usually narrowed; petioles ⅛—½ in. long, often obscure or almost 0. Flowers light-blue, numerous, usually in terminal bracteate paniculate cymes (occasionally a few solitary flowers in the upper axils); pedicels ½—¾ in. long, slender, hairy, nodding; bracts foliaceous. Calyx divided to the base or nearly so, clothed with soft appressed hairs, rounded at the base; segments ⅓ in. long at flowering time, lanceolate, acute, with strong midrib, pubescent inside. Corolla-tube ⅓ in. long, campanulate; lobes about 1/10 in. long, somewhat obovate, rounded, plicate, with a sudden spirally-twisted acumination 1/10 in. long from a triangular base. Cone of the anthers ¼ in. long, densely hairy at the back; anthers lanceolate, hairy at the base, the produced linear acute connectives about as long as the cells and finally spirally twisted at the apex. Ovary ovoid, glabrous; style ¼ in. long, slender, glabrous; stigma minute. Nutlets ⅛—⅕ in. long, broadly ovoid, subobtuse, faintly margined, the inner face slightly rugose, the back smooth and polished, grey when ripe. Fl. B. I. v. 4, p. 154; Grah. Cat. p. 134; Dalz. & Gibs. p. 173; Trim. Fl. Ceyl. v. 3, p. 202; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170; Watt, Dict. Econ. Prod. v. 6, part 4, p. 80. *Borago zeylanica*, Jacquin, Icon. Pl. Rar. v. 2 (1789) t. 314 (corolla-lobes not properly shewn).—Flowers: Jan.

KONKAN: Matheran, *H. M. Birdwood*. DECCAN: Poona districts, *Woodrow*; Ambeghât, *Kanitkar*! S. M. COUNTRY: Belgaum, *Ritchie*, 1843!; Badami,

Woodrow. KANARA: *Woodrow.* GUJARAT: Baroda, *Cooke*!; on the Atavesi south of the Tapti river, *Gibson* ex *Graham.*—DISTRIB. India (W. Peninsula); Ceylon, Malaya, Australia, Mascarene Islands.

3. **Trichodesma africanum,** *R. Br. Prodr.* (1810) p. 496. A branched herb 1—1½ ft. high, densely clothed with very stiff sharp white prickly hairs springing from bulbous bases which are white when dry. Leaves opposite, ½—3 by ¼—1½ in., ovate-oblong, acute, clothed like the stem with prickly hairs from bulbous bases, base usually acute; petioles of the lower leaves sometimes reaching 1 in. long, the upper leaves sessile. Flowers in many-flowered panicles; pedicels ¼—½ in. long, filiform, densely clothed with long white hairs. Calyx clothed with stiff white hairs which are often ½ in. long, truncate, not cordate nor hastate at the base when flowering, in fruit sometimes very slightly cordate; segments ¼ in. long at flowering time, lanceolate, acute. Corolla blue, with yellow throat and 5 purple spots; tube 1/10—⅛ in. long, narrowly campanulate; lobes ⅛ in. long (including a long acute apiculus), ovate-deltoid. Cone of the anthers about ¼ in. long, slightly pubescent on the back; anthers lanceolate, the produced connectives nearly as long as the cells, twisted together at the apex. Ovary ovoid, tapering into the style; style slender, rather more than ⅛ in. long, glabrous; stigma minute. Nutlets ovoid, ⅛ in. long, rugose on the inner, smooth on the outer face, with a raised white spiny margin on the inner edge. Fl. B. I. v. 4, p. 154; Aitch. Pb. & Sind Pl. p. 97; Boiss. Fl. Orient. v. 4 (1879) p. 280; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170; Watt, Dict. Econ. Prod. v. 6, part 4, p. 80.—Flowers: Aug.

SIND: *Stocks,* 575!; Thano-Bula-Khán, *Woodrow;* Laki, *Woodrow.*—DISTRIB. India (Panjáb); Tropical and South Africa, Cabul, Persia, Arabia.

7. CYNOGLOSSUM, Linn.

Perennial or biennial erect hairy herbs. Leaves alternate, the radical often with long petioles. Flowers in usually elongate, generally ebracteate, sparingly branched or loosely paniculate racemes, bluish or purple, ultimately distant, pedicelled or subsessile. Calyx 5-partite scarcely enlarged in fruit, patent or reflexed. Corolla distinctly veined; tube short, the throat closed with obtuse or arched scales; lobes 5, imbricate, obtuse, patent. Stamens 5, inserted on the corolla-tube, included beneath the scales; filaments short; anthers ovoid or shortly oblong, obtuse. Ovary with 4 distinct lobes from an almost flat receptacle; ovules horizontal, attached to the inner angle of the cell; style short or long, usually persistent, rigid and sometimes split to the base into laciniæ deciduous with the nutlets. Fruit a depressed pyramid formed of 4 nutlets adnate by their inner halves to a linear carpophore with a shortly conic base, the nutlets rather convex or flat on the dorsal side with or without an elevated margin, scarcely produced at the apex, the base rounded or almost saccate, produced downwards. Seeds straight or slightly curved; cotyledons wide, flat; radicle short.—DISTRIB. Tropical

or subtropical regions of both hemispheres, rare on mountains in the Tropics ; species about 60.

Nutlets with a deep margin	1.	*C. denticulatum* var. *zeylanica.*
Nutlets scarcely margined	2.	*C. Ritchiei.*

1. **Cynoglossum denticulatum,** VAR. **zeylanica,** *C. B. Clarke, in Hook, f. Fl. B. I.* v. 4 (1883) p. 157. Annual, erect, branched, 1—2 ft. high ; stem and branches more or less angular, the older clothed with spreading, the young branches with appressed hairs. Leaves 1¾—3 by ⅝—1 in. (larger when grown in cultivated ground), lanceolate, usually acute, clothed above with stiff short hairs arising from small bulbous bases which are white when dry, usually appressed-hairy beneath, with ciliate and more or less subdenticulate margins, base narrowed and decurrent ; nerves strong and densely hairy on the lower side ; petioles of the lower leaves sometimes reaching 1 in. long, those of the upper leaves very short, obscure, or 0. Flowers distant in terminal and axillary ebracteate racemes 6—8 in. long, the racemes usually in pairs when terminal, often simple when axillary ; pedicels distinct all along the raceme, short, filiform. Calyx at flowering time ⅛ in. long, softly hairy ; lobes $\frac{1}{10}$ in. long at flowering time, enlarged to about ⅛ in. in fruit, ovate-oblong, obtuse, ciliate, with a strong midrib conspicuous on the inner face. Corolla ⅛ in. long ; lobes about $\frac{1}{16}$ in. long, oblong or sub-orbicular, rounded at the apex, tender. Anthers $\frac{1}{20}$ in. long, oblong, the tips just level with the top of the corolla-tube. Nutlets attached to the carpophore for less than half their length, glochidiate all over, ovoid, $\frac{1}{12}$—$\frac{1}{10}$ in. long inside the margin, the margin deep, furnished on the rim with long stout prickles with a conspicuous head and with 5 or 6 small decurved hooks from the apex. *Cynoglossum canescens,* Grah. Cat. p. 135 (*not* of Willd.). *C. glochidiatum,* Dalz. & Gibs. p. 172 (*not* of Wall.). *C. lanceolatum,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 (*not* of Forsk.).—Flowers : Oct.—Nov. VERN. *Lichardi.*

KONKAN : in various parts, *Dalzell.* DECCAN : Poona, a common weed, *Woodrow* ! ; Koina valley below Mahableshwar, *Cooke* ! ; Párghát, *Dalzell* ; Panchgani, *Woodrow* ; Khandala, *Graham.*—DISTRIB. India (W. Peninsula).

Though named *C. zeylanicum* by Thunberg the plant is not known in Ceylon.

2. **Cynoglossum Ritchiei,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 157. An erect slender annual 12—18 in. high ; older stems with spreading, the younger branches with appressed soft hairs. Radical leaves 3—3½ by ⅝—⅞ in., with petioles 1—1½ in. long ; cauline leaves 1—1¼ by ¼—⅜ in., shortly petiolate or sessile, all lanceolate, acute, hairy above with hairs usually springing from small bulbous bases which are white when dry, base acute, narrowed. Flowers pale blue, in terminal and axillary ebracteate, often forked racemes ; pedicels slender, up to ¼ in. long. Calyx softly hairy, $\frac{1}{12}$ in. long in flower, enlarging to about ⅛ in. long in fruit ; segments ovate-oblong or linear-oblong, obtuse, ciliate. Corolla ⅛—¼ in. long ; lobes equalling the tube, oblong, obtuse. Anthers $\frac{1}{40}$ in.

long, oblong, obtuse. Nutlets ⅛—¼ in. long, attached to the carpophore by the upper half, not or scarcely margined, glochidiate on all sides with headed prickles furnished with several deflexed hooks.

Belgaum, *Ritchie*, 493!

There is but 1 specimen in Herb. Kew. marked as above. I have seen no others.—DISTRIB. India (W. Peninsula).

EXCLUDED SPECIES.

CYNOGLOSSUM LANCEOLATUM, Forsk. Fl. Ægypt.-Arab. (1775) p. 41 (*not* of Heyne). This has been given by Mr. C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 156, as occurring in Bombay (*Law*) and Mr. Clarke cites *C. micranthemum*, Dalz. & Gibs. Bo. Fl. p. 172, as a synonym. I have seen no specimens from Bombay; there are none in Herb. Kew. either from Bombay or from any part of India. The nutlets are described in Fl. B. I. l. c. as not or obscurely margined. The nutlets of the species of *Cynoglossum* which is common in the Bombay Presidency have a very conspicuous margin, and that plant is in my opinion *Cynoglossum denticulatum* var. *zeylanica*, C. B. Clarke.

8. **PARACARYUM**, Boiss.

Perennial or biennial hairy herbs. Leaves alternate. Flowers small, blue or violet, pedicellate or subsessile, in elongate usually ebracteate racemes sometimes laxly and widely paniculate. Calyx deeply 5-fid or 5-partite, not or rarely enlarged in fruit. Corolla infundibuliform; tube short or rather long, the throat closed with obtuse scales; lobes 5, imbricate, obtuse, short, erect or spreading. Stamens 5, inserted on the corolla-tube; filaments short; anthers oblong, obtuse, included or the tips sometimes slightly exserted. Ovary 4-lobed; lobes distinct from a flat receptacle; ovules attached to the inner angle. Nutlets 4 (2 sometimes suppressed), depressed on the back, the face and inner keel almost entirely attached to the whole conical or columnar carpophore, their apices scarcely prominent and their bases hardly produced downwards, usually girt with a membranous usually inflexed, dentate, crested or glochidiate (rarely entire) margin, the backs glochidiate within the margin except (except in *P. Lambertianum*).—DISTRIB. S. Europe, W. and Central Asia; species about 20.

The difference between this genus and the genus *Cynoglossum* is so slight and ill-defined that their separation is a matter of no small difficulty. Sir J. D. Hooker makes the following remarks on the subject [Bot. Mag. (1897) t. 7520]: "The genus *Paracaryum* is distinguished from the typical species of *Cynoglossum* by the nutlets of the fruit being more erect on the gynobase and their bases not being rounded or subacute, characters of scarcely appreciable value and which may possibly disappear on a revision of the genera of *Boragineæ*."

Nutlets glochidiate.	
Stems red; flowers pale blue with a darker centre	1. *P. cœlestinum*.
Stems green; flowers dark blue, uniform in color without a darker centre	2. *P. malabaricum*.
Nutlets not glochidiate	3. *P. Lambertianum*.

1. **Paracaryum cœlestinum**, *Benth. in Gen. Pl.* v. 2 (1876) p. 850 (in *adnot.*). Erect, branched, 3—5 ft. high; stem and branches

red, the younger pubescent, the older glabrous. Leaves submembranous: radical very large reaching sometimes 9 by 7 in., broadly ovate, acute, entire, wrinkled, with a few scattered hairs above, glabrous except on the nerves beneath, deeply cordate at the base and with red channelled petioles reaching nearly 1 ft. long; lower cauline leaves reaching 6 by 4 in., the leaves becoming smaller upwards, the upper 2—4 by ¾—2 in., ovate, acute, cuneate at the base, more or less scabrid on their upper surfaces with short hairs often arising from bulbous bases, the lower surface usually glabrous except the nerves, the petioles short, often obscure, gradually diminishing upwards till the upper leaves are sessile. Flowers in ebracteate, hairy, often twice-forked racemes; pedicels very short. Calyx ⅛ in. long, softly hairy, slightly enlarged in fruit; lobes ⅛ in. long, ovate, obtuse, ciliate. Corolla ¼ in. long, pale blue with a darker centre, often tinged with pink; tube about equalling the suborbicular spreading lobes; scales in the mouth of the tube notched at the apex. Anthers 1/20 in. long, oblong, included; filaments short. Ovary deeply 4-lobed; style 1/10 in. long; stigma small, capitate. Fruit pyramidal; nutlets 4, broadly ovate, acute, ⅛ in. long, with nearly erect prominent margins and with hooked bristles along the margins and on the faces between. Fl. B. I. v. 4, p. 160; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170. *Cynoglossum cœlestinum*, Lindl. Bot. Reg. (1839) t. 36; Dalz. & Gibs. p. 173. *Echinospermum cœlestinum*, Wight, Icon. t. 1394.—Flowers: Oct.—Nov. VERN. *Nisurdhi*.

KONKAN: *Law*!, *Stocks*!; Vingorla, *Dalzell & Gibson*. DECCAN: Khandala, *Cooke*!; Mahableshwar, very common, *Cooke*!, *Woodrow*, *H. M. Birdwood*. S. M. COUNTRY: Belgaum, *Ritchie*, 492! KANARA: *Law*!—DISTRIB. India (W. Peninsula).

2. **Paracaryum malabaricum,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 160. Erect, branched, 1—3 ft. high; stems smooth below, strigose above, usually green, but sometimes tinged with brownish-red. Radical leaves broadly ovate or deltoid, acute, cordate at base with a very wide sinus with petioles 6—12 in. long, the upper surface strigose with hairs arising from bulbous bases (which are white when dry), the lower surface clothed with dense hairs on the prominent reticulate nerves and veins. Cauline leaves gradually becoming smaller towards the inflorescence, ovate, acute not cordate, the lower petiolate, the petioles becoming shorter till the leaves are at last sessile, the lower cauline leaves cuneate, the uppermost usually rounded at the base, all reticulately veined, strigose with hairs from bulbous bases on the upper side, and densely hairy with spreading hairs on the nerves and veins beneath. Flowers in numerous terminal racemes forming a dense corymb; pedicels always present but short. Calyx ⅛—¼ in. long in flower, appressedly hairy; lobes ⅛ in. long, enlarged to nearly ¼ in. in fruit, ovate, subacute, densely ciliate. Corolla nearly ½ in. long, of a fine uniform blue, much darker than the last species, with slightly darker veins but without a darker centre. Anther-tips just exserted beyond the top of the corolla-tube. Style ⅛ in. long; stigma minute.

Fruit pyramidal, of 4 nutlets; nutlets ovoid, acute, nearly ¼ in. long, with a prominent erect or incurved margin, glochidiate on the faces, margins and all over with very short, stout, hooked prickles. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers: Oct.—Nov. VERN. *Kálanisurdhi.*

DECCAN: abundant at Mahableshwar in the open space near the Dharamsala, *Cooke*!; on the bund of the lake at Mahableshwar, *Cooke*!, *H. M. Birdwood.* KANARA: *Law*!—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Paracaryum Lambertianum,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 161. Erect, 1—3 ft. high; stems stout, the lower part nearly smooth, the upper part rough, green; young branches densely clothed with appressed hairs. Leaves light-green, lanceolate, acute, clothed on the upper surface with short hairs from bulbous bases and with soft hairs on the prominent and numerous nerves and veins beneath: radical leaves 4—6 by 2—3 in., with petioles varying in length from 2½—5 in., base cuneate, decurrent into the petiole; cauline leaves with narrowed bases, sessile, except some near the base of the stem which are more or less shortly petiolate. Flowers pedicellate in forked ebracteate racemes (in appearance like those of *P. cœlestinum*); rhachis and pedicels softly hairy, the latter short. Calyx softly hairy, ⅛—¼ in. long at flowering times; lobes ⅛ in. long in flower, enlarged to more than ¼ in. in fruit, ovate-oblong, obtuse, ciliate. Corolla pale-blue with darker centre; tube ⅛ in. long; lobes ⅛—¼ in. long, suborbicular; scales fleshy, shortly bifid, puberulous. Anthers not exserted. Style stout, 1/16 in. long, conical; stigma capitate. Nutlets usually 2 (2 others suppressed in numerous growing specimens examined at Mahableshwar), reaching ⅛ by 1/16 in. (including the margin, which is sometimes 1/16 in. broad), broadly ovate, flattened, not glochidiate on the margins or faces, the margin entire, flat, extending in the same plane as the face or very slightly curved upwards. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers: Oct.—Nov.

DECCAN: abundant at Mahableshwar on the cliff opposite the Dhobi's waterfall below the bungalow known as General Barr's, *Cooke*!; Fitzgerald Ghát, below Mahableshwar, *H. M. Birdwood.*—DISTRIB. India (W. Peninsula), apparently endemic.

Paracaryum asperum, Stocks, in Kew Journ. Bot. v. 4 (1852) p. 175. Erect, 1—2 ft. high; stems leafy. Leaves lanceolate, acute; the radical (including the petiole) 3—6 by ⅜—½ in.; the cauline linear, sessile. Flowers distant, in elongate panicles; pedicels erect. Calyx ⅛—⅛ in. long. Corolla of a fine violet-blue, ⅛ in. long.

This plant is given by Stocks as occurring in Upper Beluchistan. Woodrow, in Journ. Bomb. Nat. v. 12 (1898) p. 170, mentions that it has been found by Sir Evan James on the Kirthar mountains which divide Sind from Beluchistan, but the precise locality has not been mentioned, so that it is not known whether the plant exists in Sind or not. I have not seen any specimens from Sind, those in Herb. Kew. collected by Stocks and Lace being from Beluchistan.

9. **SERICOSTOMA,** Stocks.

Much-branched often cano-tomentose undershrubs. Leaves small, alternate. Flowers small, axillary, sessile, solitary, or the upper arranged in a bracteate raceme. Calyx 5-fid or sub-5-partite ; lobes narrow, enclosing the nutlets in fruit. Corolla-tube short, the throat without scales, but nearly or entirely closed by hairs ; lobes 5, imbricate, obtuse, spreading. Stamens 5, inserted on the corolla-tube, subincluded ; filaments short ; anthers oblong, obtuse. Ovary distinctly 4-lobed ; ovules erect ; style short ; stigma dilated or annulate, often with a prominent central apiculus. Nutlets 4 (2 sometimes suppressed), ovoid or shortly acuminate, erect, substipitate ; scar basal ; receptacle flat. Seeds straight ; cotyledons ovate, flat.—DISTRIB. W. Asia from India to Arabia ; species 3.

1. **Sericostoma pauciflorum,** *Stocks, in Wight Icon.* (1850) t. 1377. A small straggling undershrub 6—18 in. high ; stems woody at the base, decumbent, and, as well as the herbaceous branches, clothed with short appressed hairs. Leaves variable in size (larger when growing near the sea than inland), ¼—1¼ by $\frac{1}{16}$—¼ in., sessile, linear-lanceolate, subobtuse, clothed with stiff appressed hairs usually from bulbous bases. Flowers in short 2—5-flowered subscorpioid leaf-opposed racemes with a terminal bract, the flowers shortly pedicellate, one of them remote. Calyx at flowering time ⅛ in. long, clothed with appressed hairs ; lobes $\frac{1}{16}$ in. long, the 2 outer larger than the other 3, lanceolate, acute, enlarged to ⅓ in. in fruit, ciliate. Corolla white, ⅛ in. long ; tube broad, somewhat infundibuliform, densely clothed with silky hairs in the throat, which radiate towards the centre and quite close the entire corolla ; lobes equalling the tube, oblong, rounded at the apex, slightly crisped on the margin, strongly veined. Stamens inserted at the sinuses of the corolla ; filaments very short ; anthers about $\frac{1}{24}$ in. long, oblong, at length exserted beyond the corolla-lobes. Ovary 4-lobed ; style $\frac{1}{24}$ in. long, cylindric, slender ; stigma capitate, sub-2-lobate. Nutlets $\frac{1}{16}$ in. long, usually 2, with a short sublateral stalk, keeled or angled on the ventral face, rounded and granular on the back, acuminate at the apex, longer than the style, but shorter than the closed persistent calyx. Fl. B. I. v. 4, p. 175 ; Dalz. & Gibs. p. 172 ; Hook. Icon. t. 804 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers : Nov.—Dec.

GUJARAT : Baikar near Deesa, *Stocks*, 61 ! ; Broach, *Kanitkar* ! ; coast of Kathiawar, very common, *Dalzell* ! ; Veráwal (Kathiawar), *Woodrow* ; Pahlanpur, *Woodrow*. SIND : *Stocks*, 473 ! ; Jemadar ka Landa near Karachi, *Stocks*, 61 ! ; Karachi, *Vicary* !—DISTRIB. India (W. Peninsula), apparently endemic.

10. **ARNEBIA,** Forsk.

Annual or perennial erect or diffuse hispid herbs ; root often staining red. Leaves alternate. Flowers dimorphic, yellow or violet, sessile or very shortly pedicellate, in simple racemes or spikes or slightly branched cymes ; bracts foliaceous. Calyx deeply 5-fid or 5-partite ; lobes lanceolate or linear, not or slightly enlarged in fruit. Corolla-tube slender, straight, the throat naked inside ; lobes 5,

imbricate, obtuse, spreading. Stamens 5, much below the mouth of the tube in the long-styled, or in the throat and ½-exserted in the short-styled forms; anthers small, oblong, obtuse. Ovary deeply 4-lobed; ovules erect, with short funicles; style filiform, 2-partite; stigmas capitate. Nutlets usually 4 (rarely fewer by abortion), erect, oblong or acuminate from a broad base, rugose or more or less tuberculate; scar basal, large, triangular, flat, shortly produced up the inner face.—DISTRIB. N. Africa, W. & Central Asia; species about 12.

Calyx-lobes linear-subulate, nearly ¼ in. long; corolla with purple spots at the base of the lobes	1. *A. Griffithii.*
Calyx-lobes lanceolate, ¼ in. long; corolla without purple spots at the base of the lobes	2. *A. hispidissima.*

1. **Arnebia Griffithii,** *Boiss. Diagn.* sér. ii. n. 3 (1856) p. 135. A small annual 3—6 in. high, hirsute with white spreading hairs mostly from bulbous bases. Leaves reaching 2 by ¼ in., oblong or oblong-lanceolate, sessile, obtuse or subacute, densely hairy on both sides with stiff hairs from bulbous bases. Flowers dimorphic, secund, in racemes or spikes 1—3 in. long; pedicels 0—1/10 in. long. Calyx densely hairy, nearly ½ in. long, divided to the base or nearly so; segments linear-subulate. Corolla yellow with 5 purple spots at the base of the lobes which fade as the flowers grow old, and which are considered in Afghanistan to be the impression of the 5 fingers of the prophet Mahomet; tube ⅜ in. long, a little swollen from the middle upwards and then slightly constricted below the hypocrateriform limb, which is about ¼ in. long; lobes ⅛ in. long, suborbicular. Anthers 1/10 in. long, oblong; filaments very short. Style slender, very long in the long-styled flowers, 2-partite; stigmas suborbicular, flattened. Nutlets 4, triangular in horizontal cross-section, acuminate, rugose, hardly tuberculate, 1/10 in. long. Fl. B. I. v. 4, p. 176; Boiss. Flor. Orient. v. 4 (1879) p. 213; Bot. Mag. t. 5266.

This species has been included on the authority of the Flora of Br. India, in which Col. Thompson is stated to have obtained the plant from Sind. There is in Herb. Kew. a paper capsule containing a few fragments of the plant, and "Sind Col. Thompson" appears in pencil on the outside. Col. Thompson, who commanded the 7th Dragoon Guards at *Sealkote*, sent seeds of the plant to Kew, from which specimens were grown and figured in Bot. Mag. l. c. It is very doubtful if Col. Thompson ever was in Sind, and the specimen alluded to has not been authenticated by his signature.—DISTRIB. India (Panjáb); Beluchistan, Afghanistan.

2. **Arnebia hispidissima,** *DC. Prodr.* v. 10 (1846) p. 94. Annual or biennial 3—15 in. high, diffusely branched from a woody base, clothed all over with long white spreading stiff hairs often from bulbous bases. Leaves sessile, ¾—2 in. (rarely longer) by 1/10—¼ in., linear-lanceolate, subobtuse, clothed with stiff white hairs from bulbous bases. Flowers dimorphic, in dense secund racemes or spikes; pedicels very short or 0; bracts foliaceous, ⅓—⅔ in. long, linear-lanceolate, densely hispid. Calyx ¼ in. long, very hispid, divided to the base or nearly so; segments lanceolate, acute, unequal. Corolla yellow, pubescent outside; tube ⅓ in. long, slender, lobes 1/10 in. long, oblong, obtuse. Stamens inserted much below the mouth of the corolla in the long-styled, at or in the throat and ½-exserted in the

short-styled forms ; anthers $\frac{1}{20}$ in. long, oblong ; filaments very short. Style slender, 2-partite ; stigmas small, flattened on the inside, rounded on the outside. Nutlets 4, very small, $\frac{1}{20}$—$\frac{1}{18}$ in. long, triangular in horizontal cross-section, acute, tuberculate on all sides. Fl. B. I. v. 4, p. 176 ; Wight, Icon. t. 1393 ; Boiss. Flor. Orient. v. 4, p. 213 ; Aitch. Pb. & Sind Pl. p. 96 : C. B. Clarke, in Journ. Linn. Soc. v. 18, p. 524 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers : Mar.

GUJARAT : Pahlanpur, *Woodrow*. SIND : *Cooke*!, *Bhola Puran*!, *Stocks*, 417!, *Dalzell*! ; Mulir, *Woodrow*! ; Jemadar ka Landa near Karachi, *Stocks*! —DISTRIB. W. Asia to Egypt and Nubia.

The roots are imported into Bombay and used as a substitute for *Alkanet*.

ORDER LXXXVIII. **CONVOLVULACEÆ.**

Herbs or shrubs often twining (rarely trees). Leaves alternate, petiolate, usually exstipulate (0 in *Cuscuta*). Flowers regular, usually hermaphrodite, various in size and color, often showy, solitary or in pedunculate axillary bracteate cymes. Calyx free, often persistent, 5-partite ; segments equal or unequal, usually distinct to the base, sometimes accrescent. Corolla campanulate, infundibuliform or rotate, often plicate in bud, entire or shortly lobed. Stamens 5, inserted in the corolla-tube opposite the sepals ; anthers 2-celled, dorsifixed, linear or oblong, dehiscing longitudinally. Ovary superior, 1—4-celled, rarely with almost distinct carpels ; ovules 2, less commonly 1 or 4 in each cell ; style filiform, simple or forked ; stigma capitate, 2-lobed or stigmas 2. Fruit capsular or indehiscent, or circumscissile or irregularly breaking up. Seeds as many as the ovules or fewer ; albumen scanty or 0 ; cotyledons usually broad and much folded (obscure or 0 in *Cuscuta*).—DISTRIB. Throughout the world, more abundant in the warmer regions ; genera 42 ; species about 800.

Coorolla-tube usually uniformly enlarged from base to apex, the 5 bands rarely clearly defined from the intervening spaces; pollen not echinulate.
- Yellow parasitic leafless twining herbs ..... 1. CUSCUTA.
- Green non-parasitic leafy herbs or shrubs.
  - Fruit indehiscent; style 0 ..... 2. ERYCIBE.
  - Fruit dehiscent, or, if indehiscent, small, with thin fragile walls; style or styles present.
    - Sepals much enlarged in fruit; capsule 1-seeded, indehiscent or rarely 2-valved 3. PORANA.
    - Sepals not or slightly enlarged in fruit; capsule valvate or opercular, rarely dehiscing irregularly.
      - Styles 2, free or partly united below.
        - Capsule sessile in the middle of a large flat bract ..... 4. NEUROPELTIS.
        - Capsule not sessile in the middle of a large bract.
          - Corolla-lobes imbricate; flowers axillary, solitary; styles 2, quite free; stamens exserted 5. CRESSA.

Corolla-lobes induplicate-contorted; flowers cymose; stamens not exserted.
Capsule 4-valved; styles free, each 2-branched; stigmas on inner face of style-arms ..... 6. EVOLVULUS
Capsule irregularly dehiscent; styles usually partly united below, not branched above; stigmas 2, capitate ..... 7. BREWERIA.
Styles entire; stigmas usually 2.
Ovary 1-celled; capsule 4-valved, 3-seeded; stigmas short, oblong 8. HEWITTIA.
Ovary 2 (sometimes 4) -celled.
Outer sepals larger than the inner and decurrent on the pedicel; stigmas capitate ..... 9. ANISEIA.
Outer sepals not larger than the inner, not decurrent on the pedicel.
Stigmas elongate.
Stems erect or prostrate, rarely twining; stigmas oblong or linear; capsule 4-valved ..... 10. CONVOLVULUS.
Stems twining, rarely prostrate; stigmas elliptic; capsule usually 8-valved ..... 11. JACQUEMONTIA.
Stigmas globose.
Capsule 4-valved; stems not winged ..... 12. MERREMIA.
Capsule operculately dehiscent; stems winged ..... 13. OPERCULINA.

Corolla-tube not uniformly enlarged from base to apex, the 5 bands on the lobes clearly defined by 2 prominent lines; pollen echinulate.
Fruit dehiscent, or, if indehiscent, then with thin fragile walls.
Corolla more or less campanulate; sepals never aristate; stamens not exserted ..... 14. IPOMŒA.
Corolla more or less hypocrateriform; sepals usually aristate; stamens exserted ..... 15. CALONYCTION.
Fruit indehiscent, woody, mealy or fleshy.
Fruit woody; corolla hypocrateriform; stigmas elliptic-oblong ..... 16. RIVEA.
Fruit mealy or fleshy; corolla not or very rarely hypocrateriform; stigmas globose.
Ovary 4-celled ..... 17. ARGYREIA.
Ovary 2-celled ..... 18. LETTSOMIA.

1. **CUSCUTA,** Linn.

Leafless yellow or reddish, twining, parasitic annuals. Stems slender, sometimes filiform. Flowers small, white or rose-colored, sessile or pedicellate, solitary or in lateral fascicles or short racemes; bracts small or 0. Calyx usually deeply divided; segments 5 (rarely

4), distinct or connate at the base, subequal. Corolla campanulate, ovoid or globose, usually with fimbriate or lobed scales near the base or below the stamens within ; lobes 5 or 4, short, imbricate in bud. Stamens 5 or 4, inserted in or below the throat of the corolla-tube ; filaments short ; anthers short, obtuse, partially exserted. Ovary perfectly or imperfectly 2-celled ; ovules 2 in each cell ; styles 1 or 2 ; stigmas 2. Capsule globose or ovoid, dry or succulent, circumscissile or irregularly breaking up, 4—2-seeded. Seeds glabrous ; albumen fleshy ; embryo slender, spiral ; cotyledons 0 or obscure.—DISTRIB. Warm and temperate regions ; species 80.

Style 1, short, stout; stigmas ovoid, thick and fleshy 1. *C. reflexa.*
Styles 2, distinct, elongate, slender; stigmas capitate.
Scales on the corolla-tube 0 ..... 2. *C. hyalina.*
Scales on the corolla-tube fimbriate ..... 3. *C. chinensis.*

1. **Cuscuta reflexa,** *Roxb. Cor. Pl.* v. 2 (1798) p. 3, t. 104. Stems very long, rather stout, closely twining, branched, glabrous, pale greenish-yellow, sometimes dotted with red. Flowers solitary or in umbellate clusters of 2—4 or in short racemes ; pedicels short, glabrous, usually curved (rarely 0) ; bracts $\frac{1}{16}$ in. long, ovate-oblong, obtuse, fleshy. Calyx divided almost to the base ; lobes $\frac{1}{8}$ in. long, slightly unequal, broadly ovate, obtuse, glabrous, fleshy. Corolla white; tube $\frac{1}{4}$—$\frac{1}{3}$ by $\frac{1}{8}$ in., almost cylindric ; lobes $\frac{1}{16}$—$\frac{1}{8}$ in. long, deltoid, acute, reflexed ; scales almost at the base of the corolla-tube, large, oblong, subquadrate or somewhat obovate, fimbriate and incurved at the apex. Staments in the throat of the corolla-tube ; filaments scarcely any ; anthers about $\frac{1}{2}$-exserted beyond the top of the corolla-tube. Ovary ovoid ; style simple, very short and thick ; stigmas 2, distinct, large, thick and fleshy, $\frac{1}{16}$ in. long, ovoid. Capsules $\frac{1}{4}$—$\frac{1}{3}$ in. in diam., depressed-globose, glabrous, circumscissile near the base. Seeds 2—4, large, black, glabrous. Fl. B. I. v. 4, p. 225 ; Grah. Cat. p. 134 ; Hook. Exot. Fl. t. 150 ; Trim. Fl. Ceyl. v. 3, p. 229 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Engelm. Cuscut. p. 68 ; Watt, Dict. Econ. Prod. v. 2, p. 671.—Flowers : Jan.—Feb. VERN. *Amarvel ; A'káshvel.*

KONKAN : *Stocks* !, *Dalzell* ! S. M. COUNTRY : Dharwar, *Woodrow* ! GUJARAT : common, *Vaupel* ex *Graham*.—DISTRIB. Throughout India ; Ceylon, Malaya.

The stems and seeds have some repute in native medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Cuscuta hyalina,** *Roth, Nov. Pl. Sp.* (1821) p. 100 (*not* of Wight). Stems very slender, closely twining, much-branched, forming often a tangled mass. Flowers in fascicles or in shortly pedunculate cymes or racemes ; pedicels 0—$\frac{1}{8}$ in. long ; bracts $\frac{1}{8}$ in. long, lanceolate, acute. Calyx $\frac{1}{8}$ in. long, divided rather more than $\frac{1}{2}$-way down ; lobes 5 (rarely 4), ovate, acute or acuminate, slightly unequal. Corolla $\frac{1}{8}$ in. long, 5 (rarely 4) -lobed ; lobes $\frac{1}{12}$ in. long, ovate-lanceolate, very acute, or acuminate ; scales 0. Filaments distinct, $\frac{1}{40}$—$\frac{1}{30}$ in. long. Styles 2, slender, distinct, $\frac{1}{16}$ in. long. Capsules $\frac{1}{16}$ in. in diam., subglobose, membranous, irregularly breaking up from the base. Seeds 2—4, ovoid or suborbicular, compressed, $\frac{1}{16}$ in. in diam., crowned by the persistent styles. Fl. B. I. v. 4,

p. 226 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Engelm. Cuscut. p. 40. *Cuscuta arabica*, Wight, Icon. t. 1371 (*not* of Fresen.). *C. oxypetala*, Boiss. Diag. sér. ii, v. 3, fasc. 3, p. 130 ; Aitch. Pb. & Sind Pl. p. 101.—Flowers : June—Aug. VERN. *Ambar.*

In the Bombay Presidency apparently confined to Sind. SIND : *Wight* !, *Woodrow*, *Bhola Puran*, 164 ! ; Magar Pir, *Kanitkar* ! ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (W. Peninsula) ; Beluchistan, Abyssinia.

3. **Cuscuta chinensis,** *Lamk. Encyc. Méthod.* v. 2 (1786) p. 229. Stems filiform, twining, much-branched, often forming a tangled mass. Flowers solitary or in shortly pedunculate cymes ; pedicels short ; bracts ovate, $\frac{1}{20}$ in. long. Calyx $\frac{1}{10}$ in. long, divided rather less than $\frac{1}{2}$-way down ; lobes deltoid-ovate, subobtuse, often with a tubercular keel on the back. Corolla $\frac{1}{10}$ in. long ; lobes about equalling the tube, ovate-oblong, subobtuse ; scales at the base of the filaments fimbriate. Filaments $\frac{1}{30}$ in. long. Styles 2, distinct, $\frac{1}{25}$ in. long. Capsules hardly $\frac{1}{10}$ in. in diam., globose, hyaline, divided into 2 lobes by a deep furrow on top. Seeds $\frac{1}{16}$ in. long, usually 4. Fl. B. I. v. 4, p. 226 ; Wight, Icon. t. 1373 ; Trim Fl. Ceyl. v. 3, p. 229 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Engelm. Cuscut. p. 29. *Cuscuta sulcata*, Roxb. Hort. Beng. p. 12 ; Grah. Cat. p. 134.—Flowers : June—July.

Not common. DECCAN : Poona, *Cooke* ! ; Nasik, *Vadekar* !—DISTRIB. Throughout the greater part of India ; Ceylon, Persia, Australia.

2. ERYCIBE, Roxb.

Scandent or rambling shrubs (rarely trees). Leaves alternate, entire, coriaceous. Flowers small, in axillary or terminal racemes or panicles ; bracts small, lanceolate. Sepals subequal, orbicular, coriaceous, appressed to the base of the fruit. Corolla white or yellowish ; tube shortly campanulate, hairy outside ; limb plaited in bud ; lobes 5, imbricate, each lobe deeply cut into 2 induplicate plaited segments, so that the limb appears 10-lobed. Stamens 5, subincluded, inserted on the corolla-throat ; filaments short ; anthers ovate-lanceolate. Ovary 1-celled ; ovules 4 ; style 0 ; stigma large, subglobose or conic, 5- or 10-ridged. Fruit a berry, ovoid or ellipsoid. Seed solitary, glabrous ; albumen scanty, intruded between the folds of fleshy cotyledons ; radicle inferior.—DISTRIB. Asia and Tropical Australia ; species about 12.

1. **Erycibe paniculata,** *Roxb. Cor. Pl.* v. 2 (1798) p. 31, t. 159. A large scandent shrub ; branches long, flexuose, more or less angular, covered when young with reddish-brown tomentum. Leaves 3—5 by $1\frac{1}{2}$—$2\frac{1}{2}$ in., elliptic-oblong or obovate-oblong, suddenly acuminate, glabrous or nearly so, base acute ; main nerves arcuate, 4—6 pairs ; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long. Flowers numerous, yellow, in terminal (less commonly axillary) panicles often reaching 6 or 7 in. long, densely clothed with reddish-brown tomentum ; buds globose ; pedicels $\frac{1}{8}$—$\frac{1}{6}$ in. long. Calyx divided to the base, covered outside with dense reddish-brown, more or less stellate pubescence ; sepals $\frac{1}{8}$ in. long, orbicular, strongly ciliate. Corolla $\frac{1}{3}$ in. long, $\frac{1}{2}$ in. or

more across when expanded ; tube ⅛ in. long, broadly infundibuliform ; lobes 5, fleshy or leathery, each deeply divided at the apex into 2 obtuse lobules, hairy on the back below the division with reddish-brown hairs, the margins plaited and slightly sinuate. Stamens inserted near the base of the corolla-tube ; filaments short, broad at the base, flattened ; anthers with a long curved apiculation. Berry about ½ in. long, ellipsoid, supported on the persistent sepals, black and pulpy when ripe. Fl. B. I. v. 4, p. 180 ; Grah. Cat. p. 137 ; Dalz. & Gibs. p. 169 ; Wight, Ill. t. 180 ; Trim. Fl. Ceyl. v. 3, p. 205 ; Talb. Trees, Bomb. ed. 2, p. 247 ; Watt, Dict. Econ. Prod. v. 3, p. 268.—Flowers : Apr.

KONKAN : *Nimmo* ex *Graham, Dalzell & Gibson.*—DISTRIB. Throughout India ; Ceylon, the Nicobars.

VAR. *Wightiana*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 181. Leaves much reticulately veined beneath. Flowers white, fragrant. Talb. Trees, Bomb. ed. 2, p. 247 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170. *Erycibe Wightiana* (sp.), Grah. Cat. Bo. Pl. (1839) p. 137 ; Dalz. & Gibs. p. 170.—Flowers : Nov.

More common than the type *E. paniculata* in the Bombay Presidency. *Dalzell* without locality in Herb. Kew. S. M. COUNTRY : Rámghát, *Gibson, Ritchie*, 1907 ! ; Castlerock, *Woodrow*.

3. **PORANA,** Burm.

Large climbers. Leaves petiolate, ovate, entire. Flowers white, blue or purple, in cymes which are often extensively paniculate ; bracts persistent ; bracteoles subulate, or 0. Sepals 5, small and narrow in flower, in fruit the 3 outer or all much enlarged, membranous, spreading, nerved. Corolla campanulate or infundibuliform, usually small with a wide or narrow mouth ; limb 5-plaited, subentire or lobed. Stamens 5, subincluded ; filaments filiform or linear. Ovary 1- or 2-celled ; ovules 2 or 4 ; style long or short, entire or 2-fid with a single 2-lobed or with 2 capitate stigmas. Capsule globose, oblong or obconic, membranous, indehiscent or 2-valved, 1-seeded. Seed glabrous ; cotyledons plicate.—DISTRIB. East Indies, Malay Archipelago, and Australia ; species about 10.

1. **Porana malabarica,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 223. An extensive climber ; stems and branches slender, glabrous or nearly so. Leaves 2½—5 by 1½—4½ in., ovate, deeply cordate, acuminate, very acute, thin, with a few scattered hairs above, glabrous or nearly so and reticulately veined beneath ; petioles ½—3 in. long, slender, glabrous or nearly so. Flowers white, in lax racemes or panicles ; bracts at the forks large, leafy, cordate, persistent, those of the pedicels smaller upwards, the uppermost linear ; pedicels slender, ¼—⅓ in. long. Sepals ⅛—⅙ in. long, more or less pubescent, narrowly ovate-oblong, subacute when in flower, all much and almost equally enlarged up to ¾ by ⅜ in. or even more when in fruit, often tinged with pink, glabrous, persistent, strongly nerved and reticulately veined between the nerves. Corolla rather more than ½ in. long, divided about ½-way down into 5 ovate acute

lobes. Stigma shortly 2-lobed. Capsules ⅜ in. long, subcylindric, scarious, slightly depressed at the apex round a raised somewhat pyramidal centre. Seed ¼ in. long, oblong, reddish-brown, glabrous. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Peter, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, p. 24, fig. 11, C ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 328. *Porana racemosa,* Grah. Cat. p. 133 (*not* of Roxb.) ; Dalz. & Gibs. p. 162.—Flowers : Oct. VERN. *Bhauri.*

KONKAN : *Stocks* !, *Law* ! ; Matheran, *H. M. Birdwood.* DECCAN : Párghát, *Dalzell* ! ; Mahableshwar, *Cooke* !, *H. M. Birdwood* ; Panchgani, *Woodrow* !—DISTRIB. India (W. Peninsula).

Porana paniculata, Roxb. Cor. Pl. v. 3 (1819) p. 31, t. 235, is a powerful climber cultivated in gardens. Its small white flowers occur in large panicles terminating every branchlet with innumerable flowers which give the plant the appearance of being covered with snow. In Poona the panicles of flowers are used effectively for table decoration. The plant is not indigenous in the Bombay Presidency, but is so in many parts of India. Fl. B. I. v. 4, p. 222 ; Firminger, Man. Gard. ed. 3, p. 509.—Flowers : Sept.—Oct.

4. **NEUROPELTIS,** Wall.

Large scandent shrubs, glabrous except the inflorescence which is usually rufous-tomentose or rufous-pubescent. Leaves alternate, coriaceous, petiolate. Flowers small, numerous, pedicellate, in racemes which are axillary or subpaniculate towards the ends of the branches ; bract under the calyx inconspicuous in flower, much enlarged in fruit. Sepals suborbicular, subequal, scarcely enlarged in fruit. Corolla broadly campanulate, deeply 5-fid ; lobes induplicate-valvate in bud. Stamens attached near the base of the corolla, exserted or included ; filaments filiform ; anthers oblong. Ovary imperfectly 2-celled, 4-ovulate ; styles 2, distinct, short, thick ; stigmas large, globose. Capsule globose, 4-valved, 1-seeded, sessile or shortly stalked, almost in the middle of the flat enlarged bract. Seed globose, glabrous, albuminous ; cotyledons plicate.—DISTRIB. Species 2, the following and an African one.

1. **Neuropeltis racemosa,** *Wall. in Roxb. Fl. Ind. ed. Carey,* v. 2 (1824) p. 43. A large woody climber ; stems glabrous in age. Leaves coriaceous, 3—4½ by 1½—2¼ in., elliptic or ovate-oblong with a long or short acumination, entire, glabrous, base usually acute ; main nerves 6—9 pairs ; petioles ½—¾ in. long. Flowers in straight rusty-pubescent racemes 2—4 in. long, which are axillary or from the scars of fallen leaves, solitary or 2—3 together ; pedicels short, densely rufous-hairy ; bract beneath the calyx about ⅛ in. long at flowering time, ovate, acute, densely rufous-hairy ; at fruiting time scarious, ultimately glabrous, veined, suborbicular, enlarged to 1—2 in. in diam. with a rounded or cordate base and rounded or retuse apex. Calyx rufous-hairy ; sepals suborbicular, 1/10 in. long, ciliate. Corolla ¼ in. long, divided to a little below the middle, appressedly rufous-villous outside ; lobes oblong, obtuse, veined. Ovary rufous-

villous. Capsules $\frac{1}{8}$—$\frac{1}{4}$ in. in diam., ovoid or subglobose, glabrous or minutely appressedly silky, situated a little below the middle of the bract on a short pedicel which is more or less wholly or partially adnate to the bract. Seed subglobose, glabrous, black. Fl. B. I. v. 4, p. 225 ; Wall. Cat. 1322 ; Bedd. Icon. Pl. Ind. Or. t. 291 ; Talb. Trees, Bomb. ed. 2, p. 253 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172. *Neuropeltis ovata*, Wall. Cat. 1323 ; Peter, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, p. 16, fig. 8, A.—Flowers : Jan.—Feb.

In the Bombay Presidency apparently confined to N. Kanara.

KANARA : evergreen forests of the Supa sub-division of N. Kanara, rare, *Talbot*; near Potelli (N. Kanara), *Talbot*, 2735! ; Bankeri (N. Kanara), *Woodrow*! ; Honaver (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula); Malay Peninsula, Borneo.

5. **CRESSA,** Linn.

Small branched undershrubs, erect or diffuse, usually grey-pubescent. Leaves small, entire. Flowers small, sessile in the upper axils or in terminal clusters or spikes ; bracts 2 beneath the calyx, not enlarging in fruit. Sepals 5, subequal, small, not enlarging in fruit, thin, imbricate. Corolla infundibuliform ; tube short ; lobes 5, distinct, imbricate. Stamens 5, exserted ; filaments filiform ; anthers oblong. Ovary 2-celled ; ovules 2 in each cell ; styles 2, distinct from the base, equal ; stigmas capitate. Capsule 2—4-valved, 1—4-seeded. Seeds glabrous ; cotyledons linear, plicate.—DISTRIB. Warmer regions of the world ; species 3.

1. **Cressa cretica,** *Linn. Sp. Pl.* (1753) p. 223. An erect dwarf shrub 6—15 in. high ; stem slender, much-branched, very hairy. Leaves numerous, subsessile, $\frac{1}{8}$—$\frac{1}{4}$ by $\frac{1}{16}$—$\frac{1}{10}$ in., ovate, acute, densely silky-hairy. Flowers white or pink, usually in small clusters in the axils of the upper leaves ; pedicels very short ; bracts 2, linear, hairy, $\frac{1}{10}$ in. long, appressed to the calyx. Calyx densely silky ; sepals $\frac{1}{8}$ in. long, elliptic, obtuse, concave, ciliate. Corolla $\frac{1}{5}$ in. long, divided $\frac{1}{2}$-way down ; lobes oblong, subobtuse, reflexed, hairy on the back near the tip. Capsules $\frac{1}{6}$—$\frac{1}{5}$ in. long, ovoid, pointed and pubescent at the apex. Seeds in fully ripe capsules usually solitary. Fl. B. I. v. 4, p. 225 ; Dalz. & Gibs. p. 162 ; Peter, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, p. 15, fig. 7, D—G ; Aitch. Pb. & Sind Pl. p. 98 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Watt, Dict. Econ. Prod. v. 2, p. 588. *Cressa indica*, Retz. Obs. fasc. 4, p. 24 ; Wight, Ill. t. 168, B, n. 11 ; Grah. Cat. p. 133.—Flowers. Nov.—Jan. VERN. *Kardi* ; *Lona*.

Common in cultivated fields throughout the Presidency in the cold season. KONKAN : *Woodrow*! DECCAN : common, *Cooke*! KANARA : *Law*! GUJARAT : *Bhiva*! ; Balsár, *Kanitkar*! SIND : *Dalzell*!, *Woodrow*; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. Throughout India; Ceylon and all warm regions.

6. **EVOLVULUS,** Linn.

Small herbs or undershrubs, prostrate or erect, never climbing, often sericeo-pubescent or pilose. Leaves small, entire, often distichous. Flowers small, white or bluish, axillary, solitary or in few-

flowered pedunculate cymes. Sepals 5, subequal, not enlarged in fruit. Corolla infundibuliform or subrotate ; limb plicate, subentire. Stamens 5, included or exserted ; filaments slender ; anthers ovate or oblong. Ovary 2 (rarely 1) -celled ; ovules 4 ; styles 2, distinct from the base, each cleft into 2 linear or subclavate stigmas. Capsule 4—2-valved. Seeds 4 or 2 (rarely solitary) ; cotyledons twice folded ; radicle terete, much incurved—DISTRIB. Species about 80, in most warm climates, numerous in Brazil.

1. **Evolvulus alsinoides,** *Linn. Sp. Pl.* ed. 2 (1762) p. 392. A perennial herb with a small woody branched rootstock ; stems numerous, often more than 1 ft. long, prostrate, spreading, slender, wiry, usually clothed with long spreading hairs, but sometimes quite glabrous. Leaves numerous, ¼—¾ by ⅛—⅓ in., elliptic-oblong, obtuse, strongly apiculate, usually acute at the base, densely clothed with appressed silky hairs ; petioles very short, sometimes almost 0. Flowers light-blue, solitary, or sometimes 2 from a pair of lanceolate bracts on the peduncle ; peduncles very long, filiform, axillary ; pedicels filiform. Calyx densely silky ; sepals ⅛ in. long, lanceolate, very acute. Corolla ⅓ in. long. Capsules ⅛—⅙ in. in diam., globose, thin, 4-valved. Seeds usually 4, glabrous. Fl. B. I. v. 4, p. 220 ; Trim. Fl. Ceyl. v. 3, p. 227 ; Watt, Dict. Econ. Prod. v. 3, p. 305 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Aitch. Pb. & Sind Pl. p. 98. *Evolvulus hirsutus,* Lamk. Encyc. Méthod. v. 3, p. 538 ; Grah. Cat. p. 133 ; Dalz. & Gibs. p. 162.—Flowers : July—Nov. VERN. *Vishnukranta ; Shankaveli.*

Common in grassy places throughout the Presidency, *Dalzell & Gibson.* KONKAN : Bombay, *Lambert* ! DECCAN : common during the rains in the Deccan plains, *Graham* ; Poona, *Cooke* ! GUJARAT : Baroda, *Kanitkar* ! SIND : *Bhola Puran* !—DISTRIB. Tropical and subtropical countries. Used in Ceylon as a bitter tonic and febrifuge (*Trimen*).

7. BREWERIA, R. Br.

Herbs or undershrubs large and twining or small and erect. Leaves entire. Flowers in axillary pedunculate heads or terminal close panicles, or 1—3 together, sessile and axillary. Sepals equal or unequal, in the Indian species scarcely enlarged in fruit. Corolla campanulate or infundibuliform ; limb 5-plaited or very shortly and broadly lobed. Stamens included ; filaments filiform, often dilated at the base. Ovary 2-celled ; ovules 4 ; style filiform, equally or unequally 2-fid, or styles 2 free from the base ; stigmas capitate. Capsule globose or ovoid, 4-valved, membranous or coriaceous. Seeds normally 4, glabrous or pilose.—DISTRIB. Tropics of both hemispheres, Australia, N. America ; species 25.

This genus includes the genus *Seddera,* Hochst.

Note.—Asa Gray (Proc. Am. Acad. v. 5 [1862] p. 337) suggested the reduction of the genus to *Bonamia,* Thouars, a suggestion which Bentham & Hooker (Gen. Pl. v. 2, p. 877) do not accept. The genus *Bonamia,* of which there are only 2 species, was founded by Du Petit-Thouars (Hist. Veg. Isl. Aust. Afr. [1805] p. 17 & p. 32, t. 8), and is distinguished from the genus

Breweria by its exserted stamens and deeply lobed corolla. The 'Index Kewensis,' both in its original first volume (1895) and in its first supplement (1902), maintains *Breweria* as a separate genus, as does Prof. Peter, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, pp. 14 & 16. There does not seem to be sufficient reason for the change advocated by Gray, and more recently by Hallier f. (Engl. Jahrb. v. 16, p. 528), which would have the effect of upsetting the nomenclature of 25 species of a genus which has been in existence for upwards of 50 years prior to Gray's suggestion.

Twining; leaves exceeding 1 in. long; flowers large, in pedunculate cymes; styles united for about ½ their length	1. *B. cordata.*
Erect; leaves less than 1 in. long; flowers small, axillary, 1—3 together; styles distinct nearly to the base	2. *B. latifolia.*

1. **Breweria cordata,** *Blume, Bijdr.* (1825) p. 722. Stems stout, twining, terete, densely fulvous-pubescent or tomentose. Leaves 2½—4½ by 1½—3 in., ovate, acuminate, finely pubescent above, densely velvety with fulvous hairs beneath, base cordate with rounded lobes ; main nerves 7—9 pairs, prominent ; petioles ½—1½ in. long. Flowers pure white, 2—10 (commonly 4 or 5) in rusty-pubescent heads on the tops of terete pubescent peduncles 1—4 in. long ; pedicels ⅛—¼ in. long. Calyx silky with fulvous hairs ; sepals ⅛—½ in. long, subequal, ovate-oblong, acute or acuminte. Corolla 1—1½ in. long, widely infundibuliform, with 5 hairy narrowly-triangular bands (*mesopetala*) outside ; limb subentire. Capsules ½ in. in diam., subglobose, glabrous, surrounded by the slightly enlarged concave sepals. Seeds glabrous, dull-black. Fl. B. I. v. 4, p. 223 ; Trim. Fl. Ceyl. v. 3, p. 227 ; Talb. Trees, Bomb. ed. 2, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172. *Breweria Roxburghii,* Choisy, in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 493 ; Wight, Icon. t. 1370 ; Dalz. & Gibs. p. 162. *Convolvulus semidigynus,* Roxb. Hort. Beng. (1814) p. 13. *Bonamia semidigyna,* Hallier f. in Engl. Jahrb. v. 16, p. 528, & Monogr. Convolv. in Bull. Herb. Boiss. v. 5, p. 814.—Flowers : Oct.—Dec.

KONKAN : Vingorla, *Dalzell* !, *Kanitkar* ! ; along the Railway line to Marmagão, *Cooke* !, *Woodrow* !. KANARA : N. Kanara, rather rare, *Talbot.*—DISTRIB. India (E. Bengal and W. Peninsula); Ceylon, Malaya.

2. **Breweria latifolia,** *Benth. ex C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 224. A low much-branched erect shrub rarely reaching 1 ft. high ; stems and branches argenteo-canescent. Leaves ¼—½ in. long, elliptic-oblong, obtuse, densely silky, base usually acute ; petioles $\frac{1}{20}$—$\frac{1}{12}$ in. long. Flowers 1—3 together, sessile in the upper axils ; bracteoles 2 beneath the calyx, linear-lanceolate, acute, $\frac{1}{12}$ in. long. Calyx silky outside, veined inside ; sepals ⅛—⅓ in. long, ovate, acuminate. Corolla scarcely, if at all, exceeding the calyx ; limb very shortly 5-lobed, with hairy bands (*mesopetala*) between the folds. Styles free nearly to the base. Capsules ovoid, acute, ⅛ in. long, pubescent near the apex, splitting into 4 valves to the base. Seeds usually 2, dark brown, glabrous, ⅛ in. long. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172. *Seddera latifolia,* Hochst. & Steud. in Flora (1844) Beibl. 8, t. 5, fig. B, C ; Aitch. Pb. & Sind Pl. p. 98.—Flowers : Dec.

In the Bombay Presidency confined to Kathiawar and Sind. GUJARAT: Veráwal (Kathiawar), *Woodrow*. SIND: *Bhola Puran*!, *Stocks*, 443!, *Dalzell*, 55!, *Vicary*!; Mulir, *Woodrow*; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Panjáb); Tropical Africa.

8. **HEWITTIA,** Wight & Arn.

A pubescent twining herb. Leaves cordate, entire, angled or lobed. Flowers axillary, solitary, or in few-flowered cymes; bracts 2 on the pedicel, linear-lanceolate. Sepals 5, acute, the 3 outer larger, ovate, enlarged in fruit, the 2 inner narrowly lanceolate. Corolla campanulate, yellow or white, with a purple eye; limb plicate. Stamens 5, included; filaments linear, dilated at the base. Ovary hirsute, 1 (or imperfectly 2) -celled; ovules 4; style filiform; stigma of 2 ovate-oblong lobes. Capsules globose, 4-valved, 1-celled. Seeds normally 4, black, glabrous.—DISTRIB. India, Malaya, Tropical Africa; species about 5.

1. **Hewittia bicolor,** *Wight & Arn. in Madras Journ. Lit. & Sc.* v. 5 (1837) p. 22. Stems long, twining or prostrate, pubescent or glabrous. Leaves numerous, rather variable, 2—4 in. long, ovate, sometimes angular or somewhat palmately lobed, acute or obtuse, usually cordate at the base, more or less softly pubescent on both sides; petioles ½—1½ in. long, pubescent. Flowers pale-yellow, with a purple eye, solitary, a few together on the top of a peduncle ½—5 in. long; pedicels short; bracts on the pedicel a little below the calyx ⅓ in. long, linear-lanceolate, herbaceous, hairy. Calyx in flower rather more than ¼ in. long, the 3 outer sepals broadly ovate, acute, the 2 inner lanceolate, all softly pubescent and ciliate. Corolla 1 in. long with pubescent bands outside. Ovary clothed with long silky erect hairs; style long, filiform, hairy. Capsules ¼ in. in diam., subglobose, hairy, surrounded by the moderately enlarged sepals. Seeds glabrous. Fl. B. I. v. 4, p. 216; Wight, Icon. t. 835 (by misprint *Heivetia*); Trim. Fl. Ceyl. v. 3, p. 226; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172; Peter, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, p. 25, fig. 12, B. *Convolvulus bicolor*, Bot. Mag. v. 48, t. 2205. *Shutereia bicolor*, Choisy, in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 486; Grah. Cat. p. 133. *Palmia bicolor*, Endl. ex Dalz. & Gibs. Bo. Fl. p. 163.—Flowers: Nov.

In the Southern districts of the Presidency, not common. KONKAN: *Stocks*!, *Nimmo* ex *Graham*; near Pen, *Dalzell & Gibson*; Savantvádi, *Woodrow*! Marmagão, *Woodrow*!—DISTRIB. India (S. E. and W. Peninsula); Ceylon, Malaya, Tropical Africa.

9. **ANISEIA,** Choisy.

Twining or prostrate herbs. Leaves ovate or oblong, often mucronulate. Flowers axillary, solitary, or in few-flowered cymes. Sepals 5, herbaceous, acuminate, the outer larger decurrent on the pedicel, slightly enlarged in fruit, the inner lanceolate, not enlarged in fruit. Corolla campanulate or infundibuliform; limb subentire. Stamens 5, included; filaments filiform. Ovary 2-celled, glabrous; ovules 4; style filiform; stigma 2-globose. Capsule 2-celled,

4-valved. Seeds 4.—DISTRIB. Tropical countries pretty widely distributed ; species about 15.

1. **Aniseia uniflora,** *Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv.* v. 6 (1834) p. 483, t. 2, fig. 9.—Stems creeping or twining, slender, glabrous or nearly so. Leaves 1½—3 by ½—1 in., oblong, entire, obtuse or emarginate, mucronate, glabrous above, glabrous or more or less pubescent beneath, base acute ; petioles ¼—¾ in. long. Peduncles axillary, solitary, with 8 small persistent bracts at the top, from which issues the slender solitary pedicel which is usually shorter than the peduncle. Sepals in flower ⅛—¾ in. long, the outer elliptic, decurrent on the pedicel, ultimately slightly enlarged in fruit, the inner lanceolate. Corolla campanulate, ¾—1¼ in. long, white, with hairy bands outside. Capsules ½ in. long, ovoid, glabrous, silky within. Seeds black, fringed with a ring of short scaly hairs round the margin, otherwise glabrous. Wight, Icon. t. 850 ; Grah. Cat. p. 133 ; Dalz. & Gibs. p. 163. *Aniseia martinicensis,* Choisy, Convolv. Rar. in Mém. Soc. Phys. Genèv. v. 8, part 1 (1838) p. 66. *Ipomœa uniflora,* Rœm. & Sch. Syst. v. 4 (1819) p. 247 (*not* of Blume) ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 201.

Rare. KONKAN : S. Konkan, *Dalzell & Gibson.*—DISTRIB. Throughout India ; Malaya, Fiji Islands, Tropical Africa.

10. CONVOLVULUS, Linn.

Herbs or undershrubs erect, prostrate or rarely twining, sometimes spinescent. Leaves entire, toothed or lobed. Flowers axillary, solitary or in cymes. Sepals 5, usually subequal. Corolla campanulate or infundibuliform ; limb plicate, subentire. Stamens 5, attached near the base of the corolla, included ; filaments filiform, often unequal. Ovary 2-celled ; ovules 4 ; style filiform ; stigmas 2, linear or oblong, distinct. Capsule 2-celled, 4-valved or irregularly rupturing. Seeds normally 4, glabrous.—DISTRIB. Tropical and temperate climates ; species about 160.

Erect undershrubs, not prostrate nor twining.	
Leaves obovate or spathulate, plicate, ½—1 in. long	1. *C. scindicus.*
Leaves linear, acute, not plicate, 1—2 in. long	2. *C. Rottlerianus.*
Prostrate herbs or undershrubs not twining (except in *C. glomeratus* var. *volubilis*).	
Stigmas filiform.	
Corolla infundibuliform; mouth wide, very shallowly lobed; seeds not tuberculate	3. *C. microphyllus.*
Corolla tubular, deeply lobed; seeds minutely tuberculate	4. *C. rhyniospermus.*
Stigmas clavate or elliptic-oblong	5. *C. glomeratus.*
A twining herb; stems often twisted together	6. *C. arvensis.*

1. **Convolvulus scindicus,** *Stocks, in Kew Journ. Bot.* v. 4 (1852) p. 173 (*not* of Boiss. Diagn. sér. ii. n. 3, p. 123). A much-branched rigid erect bush 1 or rarely 2 ft. high and 2—3 ft. in circumference, with intricate grey or fulvous velvety-tomentose stiff close branches spreading on all sides ; branchlets ending abruptly, sometimes spinescent. Leaves small on the flowering branches ¼ by ⅛ in. almost sessile, on the young leafy shoots ½ by ⅛ in. with a

petiole ⅛ in. long, obovate or spathulate, entire, plicate, densely velvety, the nerves prominent beneath. Flowers sessile, in congested rufous-hirsute heads at the ends of the branchlets; bracts beneath the calyx ovate-lanceolate, densely hairy. Sepals ¼ in long, unequal, linear-lanceolate, densely hirsute with long fulvous or rufous hairs. Corolla ½ in. long, white with pink hairy bands (*Stocks*), infundibuliform, the limb with 5 distinct acute lobes. Ovary glabrous. Capsules not seen. Fl. B. Ind. v. 4, p. 217; Boiss. Fl. Orient. v. 4, p. 90; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172. *Convolvulus brachyphyllus*, Boiss. Diagn. sér. ii. n. 3, p. 122.—Flowers: Aug.

In the Bombay Presidency occurs in Sind. SIND: Garra, *Stocks*, 433!; 12 miles east of Bula-Khán, *Woodrow*.—DISTRIB. Beluchistan.

2. **Convolvulus Rottlerianus,** *Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv.* v. 6 (1834) p. 477. Perennial, erect, 9—10 in. high during its first year with scarcely-branched leafy silky-villous stems, afterwards branching, the plant ultimately reaching a height of 18 in. or more. Leaves sessile or very shortly petiolate, 1—2 by ⅛—¼ in., linear, acute, silky-hairy. Flowers 1—3 in a lax raceme; peduncles axillary, very slender, silky-hairy, ultimately reaching sometimes 1½ in. long or more; pedicels ⅒—⅓ in. long, filiform; bracts 2 beneath each pedicel, ⅛—⅓ in. long, linear-lanceolate, very acute, silky. Sepals ¼ in. long, the outer ovate, very acute, hirsute outside, the inner membranous, acuminate, hairy near the apex. Corolla tubular, less than ½ in. long, hairy outside near the top; limb shortly 5-lobed. Stamens unequal. Ovary glabrous; stigmas filiform, ⅛ in. long. Capsules ⅛ in. in diam., subglobose, glabrous. Seeds puberulous. Fl. B. I. v. 4, p. 219; Dalz. & Gibs. p. 164; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.—Flowers: Sept.—Oct.

Rare in the Bombay Presidency. DECCAN: Junnar, *Woodrow*!; Lenyadi Hill (Poona districts), *Kanitkar*!—DISTRIB. India (W. Peninsula); Afghanistan.

VAR. *tenella*, C. B. Carke, in Hook. f. Fl. B. Ind. v. 4, p. 219. Sepals glabrous outside. *Convolvulus tenellus* (sp.), Stocks, in Kew Journ. Bot. v. 4 (1852) p. 172.

Dalzell, no. 57! (without locality). SIND: *Stocks*, 598!—DISTRIB. Beluchistan.

3. **Convolvulus microphyllus,** *Sieb. ex Spreng. Syst.* v. 1 (1825) p. 611. Procumbent or suberect, not twining, fulvous-villous; stems suffruticose at the base, 6-20 in. long, often floriferous from near the base. Leaves ½—1 in. long, linear-oblong or the upper elliptic, obtuse, mucronate, subsessile, villous on both sides, base tapering. Flowers axillary or on short lateral branches, solitary or 2—4 together, sessile or shortly pedunculate; bracts beneath the calyx ⅛ in. long, linear-lanceolate, hairy. Sepals ¼ in. long, ovate lanceolate, acute, hairy on both sides, the 3 outer slightly broader than the 2 inner. Corolla rose-yellow (*C. B. Clarke*), ⅓—½ in. long, infundibuliform, with hairy bands outside; limb shallowly 5-lobed, the lobes deltoid, acute, with a tuft of hair at the apex of each. Stamens unequal. Ovary glabrous, seated on a cup-shaped disk; stigmas ⅛ in. long, filiform. Capsules ellipsoid or subglobose, ⅛ in. long, smooth. Seeds ⅒ in. long,

glabrous, scarcely papillose. Fl. B. I. v. 4, p. 218 ; Wight, Icon. t. 1367 ; Dalz. & Gibs. p. 164 ; Boiss. Fl. Orient. v. 4, p. 103 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.—Flowers : Oct.

Confined in the Bombay Presidency to Gujarat and Sind. GUJARAT : common, *Dalzell* ! ; Kathiawar, *Chester Macnaghten* ! ; Porbandar (Kathiawar), *Cooke* ! SIND : *Dalzell & Gibson, Stocks*, 402 ! ; Landi near Karachi, *Cooke* ! ; Hyderabad, *Woodrow* !, *Bhola Puran* ! ; Jemadar ka Landa near Karachi, *Stocks*, 82 ! ; Mulir, *Woodrow* ; Boogta hills, *Vicary* !—DISTRIB. Beluchistan to Egypt and Nubia.

4. **Convolvulus rhyniospermus,** *Hochst. ex Choisy, in DC. Prodr.* v. 9 (1845) p. 405. Stems many from a woody rootstock, 6—15 in. long, terete, slender, more or less pubescent. Leaves oblong-lanceolate, ½—1 in. long, acute or subobtuse, mucronulate, sparsely hairy ; petioles 1/12 in. long, hairy. Flowers in axillary few-flowered densely villous clusters, sessile on the top of a hairy peduncle 1/30—⅛ in. long ; bracts ¼—⅓ in. long, oblong-lanceolate, subacute, densely villous. Calyx very densely silky with long hairs which often exceed ⅛ in. long ; outer sepals ⅓ in. long, ovate-lanceolate, acute ; inner shorter and much narrower. Corolla ⅜ in. long, tubular, divided about ¼ the way down into 5 ovate acute lobes which are penicillate at the apex. Ovary glabrous ; stigmas 1/12 in. long, filiform. Capsules globose, ⅛ in. in diam., glabrous. Seeds minutely tuberculate. Fl. B. I. v. 4, p. 218 ; Wight, Icon. t. 1368 ; Aitch. Pb. & Sind Pl. p. 99 (by error *rhynchospermus*) ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.—Flowers : Oct.

In the Bombay Presidency confined to Sind. SIND : *Stocks*, 474 !, *Dalzell*, 56 !, *Cooke* !, *Bhola Puran* !, *Woodrow* ; Jemadar ka Landa near Karachi, *Stocks*, 474 ! ; Karachi to Magar Pir, *Wykeham Perry* !—DISTRIB. Cordofan.

5. **Convolvulus glomeratus,** *Choisy. ex DC. Prodr.* v. 9 (1845) p. 401. Stems 1½—3 ft. long, many from a vertical root, prostrate, slender, more or less pubescent. Leaves 1—1½ by ⅜—½ in., oblong, acute, mucronulate, more or less sparsely pubescent, base rounded or subcordate ; petioles ⅛ in. long, slender. Flowers in dense globose villous heads, on axillary solitary hairy slender peduncles ½—3 in. long ; bracts foliaceous, ovate-lanceolate, ½—¾ in. long, hairy and with densely ciliate margins. Sepals nearly ½ in. long, ovate-lanceolate, acuminate, very densely clothed with long silky hairs, the 2 outer sepals broader than the 3 inner. Corolla tubular, ½ in. long, the upper part slightly pubescent outside ; limb with 5 broadly deltoid shallow, acute lobes, with a small tuft of hairs at the apex of each. Stamens equal. Ovary glabrous ; stigmas 1/16—1/12 in. long, clavate or elliptic-oblong. Capsules ⅛ in. in diam., subglobose, glabrous. Seeds smooth, not tuberculate. Fl. B. I. v. 4, p. 219 ; Wight, Icon. t. 1366 ; Boiss. Fl. Orient., v. 4, p. 102 ; Aitch. Pb. & Sind Pl. p. 98 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.—Flowers : Dec.

The stigmas are more like the stigmas of *Jacquemontia* than of *Convolvulus*.

In the Bombay Presidency confined to Gujarat (Kathiawar) and Sind. GUJARAT : Porbandar (Kathiawar), *Woodrow*. SIND : *Stocks*, 376 !, *Dalzell*,

53!, *Woodrow, Bhola Puran*!; Jemadar ka Landa near Karachi, *Stocks*, 376! —DISTRIB. India (Panjáb); Afghanistan, Beluchistan, W. Tropical Africa.

VAR. *volubilis*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 219. Stems twining; leaves larger, sometimes 2½ by 1 in.; petiole ¼—⅓ in. long; heads of flowers larger.

GUJARAT: Veráwal (Kathiawar), *Cooke*! SIND: *Dalzell*! Seems hardly more than a luxuriant specimen of the type.

6. **Convolvulus arvensis,** *Linn. Sp. Pl.* (1753) p. 153. Root-stock creeping. Stem trailing or twining when near support, often twisted upon itself, more or less angular, glabrous or pubescent. Leaves 1—2½ in. long, variable in breadth, ovate or oblong, glabrous or nearly so, obtuse and apiculate at the apex, auriculate or hastate at the base, the lower leaves often lobed; petioles ¼—¾ in. long. Peduncles 1—2 in. long, axillary, solitary, slender, with a pair of small linear bracts at the apex from which the pedicels issue; pedicels ⅛—1 in. long, solitary or 2—3, in which case each pedicel except the primary one has 2 small bracts beyond the middle. Sepals ⅛—¼ in. long, broadly elliptic, obtuse or truncate, glabrous or nearly so, unequal. Corolla reaching ¾ in. long, broadly infundibuliform, pink or nearly white, glabrous. Stamens unequal. Ovary glabrous; stigmas ⅒ in. long, filiform. Capsules ¼—⅓ in. in diam., globose, glabrous. Seeds subtrigonous, dark reddish-brown, glabrous or puberulous. Fl. B. I. v. 4, p. 219; Grah. Cat. p. 132; Dalz. & Gibs. p. 163; Syme, Eng. Bot. ed. 3, v. 6 (1866) p. 85, t. 923; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172; Watt, Dict. Econ. Prod. v. 2, p. 518.—Flowers: Dec.—Feb. VERN. *Chándvel*; *Hiranpag*.

DECCAN: Jeur, *Woodrow;* Poona, *Cooke*!; Kirkee, *G. M. Woodrow*!, *J. G. Woodrow*!; Máwal (Poona districts), *Kanitkar*!; black soil of the Deccan, *Gibson* ex *Graham*. KANARA: *Law*! GUJARAT: common, *Dalzell & Gibson*. SIND: Karachi, *Woodrow*!; Sibi, *Cooke*!—DISTRIB. A common plant widely distributed throughout the world; known in England as the *Small Bindweed*.

11. JACQUEMONTIA, Choisy.

Twining (rarely prostrate) herbs or undershrubs, usually pubescent with hairs that are often 3- or more-branched. Leaves often cordate, entirely or rare toothed or lobed. Flowers in axillary compound umbellate or capitate cymes, rarely solitary; bracts small. Sepals 5, equal or unequal. Corolla small, tubular or infundibuliform; limb plicate, the vertical bands ending in 2 distinct nerves. Stamens 5, included. Ovary glabrous, 2-celled; ovules 4; style filiform; stigmas 2, large, flattened, elliptic. Capsule globose, usually 8-valved, 2-celled. Seeds normally 4, usually glabrous, often slightly winged on the margins.—DISTRIB. Species about 40, chiefly tropical American.

1. **Jacquemontia paniculata,** *Hallier f. in Engl. Jahrb.* v. 16 (1893) p. 541 & v. 18 (1894) p. 95. Stems twining, terete, glabrous or pubescent; young parts pubescent. Leaves 1½—3 by 1—2 in., ovate, acuminate, very acute, nearly glabrous, base shallowly cordate; petioles ½—1¼ in. long, pubescent. Flowers white, in pedunculate

many-flowered umbellate cymes ; peduncules 1—1½ in. long, pubescent ; pedicels ⅛—¼ in. long, pubescent ; bracts beneath the pedicels ⅛ in. long, narrowly linear, pubescent. Sepals ⅛ in. long, ovate-lanceolate, acuminate, pubescent. Corolla tubular, ½ in. long, with 5 distinct glabrous bands which are 2-nerved at the apex ; limb with 5 ovate-deltoid acute lobes ⅛ in. deep. Stamens equal. Ovary glabrous ; stigmas 2, flattened, $\frac{1}{10}$ in. long, elliptic-oblong, revolute. Capsules ¼ in. in diam., globose, glabrous, 8-valved. Seeds when fully ripe trigonous, rounded and slightly tuberculate on the back, slightly winged on the margin. *Ipomœa paniculata,* Burm. Fl. Ind. (1768) p. 50, t. 21, fig. 3. *Convolvulus parviflorus,* Vahl, Symb. v. 3 (1794) p. 29 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 220 ; Dalz. & Gibs. p. 163 ; Trim. Fl. Ceyl. v. 3, p. 226 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Watt, Dict. Econ. Prod. v. 2, p. 519.—Flowers : Oct.—Nov.

KONKAN : island of Karanja, *Dalzell & Gibson;* Marmagão, *Cooke* !, *Woodrow* ! DECCAN : Dongergaon near Ahmednagar, *Woodrow* ! ; Mutha hills, *Bhiva* ! S. M. COUNTRY : Castlerock, *Kanitkar* ! GUJARAT : Surat, *Dalzell & Gibson;* Chandod, *Kanitkar* !—DISTRIB. India (Assam, W. Peninsula) ; Ceylon, Malaya, Australia, Tropical Africa.

Jacquemontia cœrulea, Choisy, in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 476. A well-known slender twiner, a native of S. America, very common in gardens. It has slender stems, cordate leaves, and a small broadly infundibuliform corolla. Fl. B. I. v. 4, p. 220.

12. **MERREMIA,** Dennst.

Shrubs or herbs usually climbing ; stems not or rarely winged. Leaves alternate, entire, lobed or divided. Flowers axillary, solitary or in few-flowered (rarely many-flowered) cymes ; peduncles usually long. Sepals 5, subequal, elliptic or lanceolate usually acuminate (rarely rounded or truncate), convex, usually slightly enlarged and thickened in fruit. Corolla campanulate or infundibuliform, usually white, with 5 vertical bands which are usually marked by 5 dark violet lines ; limb plicate, margin slightly lobed. Stamens 5, unequal, included or exserted ; filaments filiform ; anthers usually twisted ; pollen usually with longitudinal folds never echinulate. Ovary 2—4-celled ; ovules 4 ; style filiform ; stigma 2-globose. Capsule 4-valved, 1—4-celled, the style sometimes separating with a small operculum. Seeds 4 (rarely fewer), dull, usually glabrous.—DISTRIB. Species about 40 in the warmer regions of the world.

Leaves entire or occasionally 3-lobed in *M. chryseides.*
- Inner sepals 2-lobed at the apex.
  - Leaves reniform, ½—1 in. broad ..... 1. *M. emarginata.*
- Inner sepals not lobed at the apex.
  - Flowers in compound umbellate cymes; seeds clothed with long spreading hairs ..... 2. *M. umbellata.*
  - Flowers 1-3 on axillary peduncles; seeds glabrous.
    - Peduncles less than 1 in. long; sepals elliptic, sub-obtuse, mucronate ..... 3. *M. tridentata.*

Peduncles exceeding 1 in. long; sepals lanceolate, acuminate with recurved points	4. *M. hastata.*
Flowers in dense axillary racemose cymes; seeds with fulvous velvety pubescence; sepals oblong, truncate	5. *M. chryseides.*
Leaves palmately 5—7-lobed.	
Root tuberous	6. *M. rhyncorhiza.*
Root fibrous	7. *M. vitifolia.*
Leaves digitately 5-partite	8. *M. pentaphylla.*

1. **Merremia emarginata,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. Stems numerous, filiform, creeping and rooting at the nodes, not twining, clothed with scattered long soft hairs. Leaves ½—1 in. broad, usually broader than long, reniform or ovate-cordate, obtuse, crenate, glabrous; petioles ¼—1 in. long, hairy. Flowers yellow, axillary, solitary or few (usually 2—3) together on a very short (often almost obsolete) peduncle; bracts small, ovate, acute, hairy; pedicels short. Sepals slightly hairy on the back, strongly ciliate on the margins, the 2 outer ⅛ in. long, ovate, mucronate, the 3 inner longer reaching nearly ¼ in. long, subquadrate, deeply divided at the apex into 2 truncate divaricate lobes. Corolla ¼ in. long; lobes of the limb acute. Capsules ⅛—⅙ in. in diam., subglobose, smooth, surrounded by the slightly enlarged ciliate sepals. Seeds glabrous, dark chestnut-colored (*Clarke*).

The strongly ciliate 2-lobed inner sepals are a marked character. *Evolvulus emarginatus,* Burm. Fl. Ind. p. 77, t. 30, fig. 1. *Ipomœa reniformis,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 446; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 206; Grah. Cat. p. 131; Dalz. & Gibs. p. 164; Trim. Fl. Ceyl. v. 3, p. 218; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171; Watt, Dict. Econ. Prod. v. 4, p. 491.—Flowers: Sept.—Oct. VERN. *Undirkáni.*

Common in places where water has lodged. KONKAN: *Law!, Stocks!, Dalzell & Gibson.* DECCAN: *Dalzell & Gibson, Woodrow;* Poona, *Woodrow;* Miraj, *Cooke!* S. M. COUNTRY: Belgaum, *Ritchie,* 1132!—DISTRIB. India (W. Peninsula); Ceylon, S.E. Africa, Tropical Africa.

2. **Merremia umbellata,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552 & v. 18, p. 114. Perennial; stems very long, scandent (only slightly twining), somewhat angular, slightly pubescent. Leaves variable, 1½—2½ by ½—2 in., oblong or elliptic or hastate, obtuse or acute, apiculate, nearly glabrous above, base rounded or cordate; nerves prominent beneath with reticulate veins between; petioles ¼—¾ in. long, pubescent. Flowers white or cream-colored, in axillary compound umbellate cymes; peduncles ¼—1½ in. long; pedicels ⅛—1 in. long; bracts caducous. Sepals ¼—⅓ in. long, broadly elliptic, concave, glabrous or nearly so, obtuse, aristate. Corolla tubular-infundibuliform, 1—1½ in. long, with badly defined interspaces between the bands, the bands rather faintly lineate; limb slightly lobed; buds pubescent at the tip. Stamens included. Capsules ⅛ in. in diam., globose, glabrous. Seeds ¼ in. long, densely clothed with long soft spreading hairs. *Convolvulus umbellatus,* Wall. Cat. (1828) 2329. *Ipomœa cymosa,* Rœm. & Schultz, Syst. Veg. v. 4 (1819) p. 241; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 211; Trim. Fl. Ceyl. v. 3, p. 219; Talb. Trees, Bomb. ed. 2, p. 251; Woodr. in

Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 484.—Flowers : Jan.—Feb.

Hallier f. includes this species in the section *Xanthips* (Engl. Bot. Jahrb. v. 18, p. 133), in which the bands of the corolla are said to be never lineate. I have not found the bands destitute of lines in any of the specimens I have examined.

KONKAN : *Law* ! ; Ambeghât, *Kanitkar* ! S. M. COUNTRY : hills S. of Belgaum, *Ritchie*, 1128 ! KANARA : *Bhiva* ! ; common in the forests of the Supa subdivision, *Talbot*.—DISTRIB. Throughout India (except the N.W. dry area) ; Ceylon, Java, Timor, China, S. America, W. Indies, Australia, Tropical Africa.

3. **Merremia tridentata,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. Perennial with a small woody rootstock ; stems elongate, prostrate, not twining, slender, angular, glabrous. Leaves ½—1 by $\frac{1}{16}$—¼ in., linear-hastate or oblong-obovate, the linear leaves usually acute, the obovate ones obtuse, often deeply emarginate and 3-toothed at the apex, all glabrous and dilated at the base into toothed auricles ; petioles very short, filiform, or the leaves sessile. Flowers axillary ; peduncles ⅛—⅞ in. long, filiform, solitary, with minute alternate lanceolate bracts beneath the pedicels ; pedicels 1—3, stout, somewhat clavate, ⅛ in. long. Sepals ⅛—¼ in. long, elliptic, subobtuse, strongly mucronate (especially the inner ones), glabrous, the outer rather shorter than the inner. Corolla pale-yellow, less than ½ in. long ; bands not very strongly lineate. Capsules ⅛ in. in diam., globose. Seeds trigonous, with a longitudinal ridge on the rounded back, glabrous. *Ipomœa tridentata,* Roth, in Rœm. Archiv. Bot. v. 1 (1798) part 3, p. 38 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 205 ; Grah. Cat. p. 131 ; Dalz. & Gibs. p. 165 ; Trim. Fl. Ceyl. v. 3, p. 218 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers : Aug.—Oct. VERN. *Morga.*

KONKAN : Shrivardhan, *Woodrow* ! ; near Bassein and Ghorabandar, *Dalzell & Gibson* ; S. Konkan, *Kanitkar* ! S. M. COUNTRY : Badami, *Woodrow* !, *Cooke* ! GUJARAT : Neriad, *Woodrow* !—DISTRIB. India (W. Peninsula, extending north to Chota Nagpore) ; Ceylon, Angola, Mauritius, Madagascar.

4. **Merremia hastata,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. A biennial diffuse twining herb ; stems very long, slender, angular, glabrous. Leaves subsessile, 1½—3 by ⅛—½ in., hastate-oblong, acute, cuspidate, glabrous, dilated and with coarsely dentate auricles at the base. Flowers in axillary 1—3-flowered cymes ; peduncles sometimes exceeding 3 in. long, slender ; bracts beneath the pedicels minute, lanceolate ; pedicels ¼—1¼ in. long, slightly clavate. Sepals ⅜ in. long, lanceolate, long-acuminate, very acute, with recurved points. Corolla ¾ in. long, pale-creamy-yellow or white, red at the base of the tube inside ; limb shallowly lobed. Capsules ¼ in. in diam., depressed-globose, surrounded by the slightly enlarged sepals. Seeds glabrous. Prain, Beng. Pl. p. 730. *Convolvulus hastatus,* Desr. in Lamk. Encyc. Méthod. v. 3 (1789) p. 542 (*not* of Sieb. nor Thunb.). *C. denticulatus,* Spreng. Syst. v. 1, p. 603. *Ipomœa denticulata,* R. Br. Prodr. (1810) p. 485 ; *I. filicaulis,* Blume, Bijdr. p. 721 (*not* of Meyer) ; Grah. Cat. p. 131 ; Dalz. & Gibs. p. 165 ; Bot. Mag. v. 90, t. 5426. *I. angustifolia,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 205 (*not* of Jacq.) ; Trim. Fl. Ceyl. v. 3,

p. 217 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 476.—Flowers : Aug.—Dec.

Dalzell in Herb. Kew. without locality. KONKAN : *Stocks* !, *Law* !, *Graham, Dalzell & Gibson.* DECCAN : *Graham, Dalzell & Gibson.* S. M. COUNTRY : Londa, *Woodrow* ! KANARA : *Ritchie,* 1893 ! ; Karwar, *Woodrow.*—DISTRIB. India (Bengal, Khasia mountains, W. Peninsula) ; Ceylon, S.E. Asia, Malaya, Australia, Tropical Africa.

5. **Merremia chryseides,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. Stems twining, branched, glabrous but often rough with small prominences. Leaves 1—3 by ½—2½ in., ovate, acute, apiculate, sometimes 3-lobed, entire or coarsely toothed, glabrous, base deeply cordate with rounded lobes ; petioles 1—2 in. long, slender. Flowers small, numerous, in rather dense axillary racemose cymes ; peduncles ½—3 in. long ; bracts small, caducous ; pedicels short. Sepals ⅛—¼ in. long, oblong, truncate, apiculate or sometimes obscurely toothed, glabrous, becoming stiff and chartaceous and reflexed in fruit. Corolla yellow, ½ in. long, campanulate-infundibuliform ; limb with 5 distinct triangular lobes ; bands strongly lineate. Stamens slightly exserted. Capsules ¼ in. long, broadly ovoid, somewhat 4-angled, glabrous, transversely wrinkled. Seeds with velvety fulvous pubescence, trigonous, rounded on the back. *Ipomœa chryseides,* Ker-Gawl. in Bot. Reg. (1818) t. 270 ; Dalz. & Gibs. p. 166 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 206 ; Trim. Fl. Ceyl. v. 3, p. 219 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers : Oct.—Nov.

Not very common. KONKAN : Muneri in the Wari Country, *Dalzell & Gibson.* DECCAN : Gokak, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1131 ! GUJARAT : Nausari, *Cooke* ! ; Dakor, *Kanitkar* !—DISTRIB. Throughout India ; Ceylon, Malaya, China, Australia, Tropical Africa.

6. **Merremia rhyncorhiza,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. Root an ovoid compressed beaked tuber ; stems filiform, twining, glabrous. Leaves 1½—2 in. in diam., palmately cut almost to the base into 5—7 segments, the middle the longest, sparsely hairy above and on the nerves beneath with fulvous hairs ; segments oblong, acute, unequally lobed or pinnatifid ; petioles filiform, 1—1½ in. long. Peduncles 1—2-flowered, filiform, glabrous, 2—4 in. long ; bracts ⅛—⅓ in. long, lanceolate, acute ; pedicels ⅓—⅜ in. long. Sepals unequal, glabrous, oblong-lanceolate, acute, the 2 outer ⅜ in. long, shorter than the inner, the 3 inner ½ in. long. Corolla yellow, 1—1¼ in. long by 2 in. in diam. at the mouth. Anthers ⅛ in. long, twisted, narrowly sagittate. Fruit not seen. *Ipomœa rhyncorhiza,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 179. Fl. B. I. v. 4, p. 214 ; Dalz. & Gibs. p. 167 ; Talb. Trees, Bomb. ed. 2, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.—Flowers : July—Sept.

A rare plant. KONKAN : Sahyadri mountains, *Dalzell* ! KANARA : near the coast at Belikeri, *Talbot ;* Hatigheri (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula).

The tubers are eaten and greedily sought for by the natives, which accounts for the rarity of the plant. The leaves are also used as a vegetable.

7. **Merremia vitifolia,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. A perennial twiner ; stems long, stout, much-branched,

the young ones clothed with spreading deciduous hairs. Leaves 2—6 in. in diam., the young ones bronze-colored, all palmately cut about ⅓ the way down or a little more, into 5 or sometimes 7 triangular acuminate lobes, more or less hairy above and on the nerves beneath, margins coarsely serrate-dentate, base cordate ; petioles ½—2 in. long, patently hairy. Flowers 1—7 in pedunculate cymes ; peduncles ¼—½ in. long, patently hairy ; buds pointed ; bracts linear, caducous. Calyx more or less densely clothed outside with long spreading hairs ; sepals rather more than ½ in. long, enlarged in fruit, broadly elliptic, obtuse, the outer slightly shorter, apiculate. Corolla yellow, 1—2 in. long, subcampanulate ; bands distinct, strongly lineate. Capsules ½ in. in diam., subglobose. Seeds glabrous. *Ipomœa vitifolia*, Sweet, Hort. Brit. ed. 2 (1830) p. 372 ; Grah. Cat. p. 132 ; Dalz. & Gibs. p. 165 ; Fl. B. I. v. 4, p. 213 ; Trim. Fl. Ceyl. v. 3, p. 224 ; Talb. Trees, Bomb. ed. 2, p. 251 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 172 ; Watt, Dict. Econ. Prod. v. 4, p. 496.—Flowers : Oct.—Dec. VERN. *Navli.*

KONKAN : *Stocks* !, *Law* ! ; Vingorla, *Kanitkar* ! ; hills about Bassein, *Graham* ; Malabar Hill (Bombay), *Graham* ; hilly parts of the Konkan generally, *Dalzell & Gibson*. S. M. COUNTRY : Castlerock, *Cooke* ! KANARA : Kála naddi, *Ritchie*, 1133 !—DISTRIB. Throughout India (except the N.W. dry area) ; Ceylon, Malay Islands.

8. **Merremia pentaphylla,** *Hallier f. in Engl. Bot. Jahrb.* v. 16 (1893) p. 552. A twining annual ; stems clothed with long scattered hairs from glandular bases. Leaves digitate ; leaflets 5, broadly lanceolate, acuminate, subsessile, 2—4 by ¾—1¾ in., thinly hirsute with long hairs (in cultivation often glabrous), base acute ; petioles 1—4 in. long, hairy. Flowers white, in few-flowered lax fulvous-hairy racemose cymes ; peduncles 1—4 in. long ; bracts ¼—⅓ in. long, linear ; pedicels ½—2 in. long. Sepals enlarged in fruit, thin, the 3 outer densely fulvous-hairy, the 2 outermost of these ⅔ by ¼ in., elliptic-oblong, subacute, the third smaller, ½ in. long, ovate, acute, the 2 inner sepals still smaller, glabrous or with a few scattered hairs on the back, membranous. Corolla 1 in. long, infundibuliform. Capsules ⅓—½ in. long, ovoid, papery, quite glabrous. Seeds glabrous, shining. *Ipomœ pentaphylla*, Jacq. Coll. v. 2 (1788) p. 297 ; Icon. Rar. t. 319 ; Fl. B. I. v. 4, p. 202 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 171. *Ipomœa ægyptia*, Linn. Sp. Pl. (1753) p. 162. *Batatas pentaphylla*, Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 436 ; Grah. Cat. p. 129 ; Dalz. & Gibs. p. 167 ; Aitch. Pb. & Sind Pl. p. 100.—Flowers : Sept.—Oct.

The plant varies much in hairiness ; in cultivation the leaves and calyces often become nearly glabrous. To be consistent, Hallier should have adopted the oldest specific name, *ægyptia* which is due to Linnæus and dates from 1753.

Dalzell in Herb. Kew. without locality ! KONKAN : Malabar Hill (Bombay), *Graham*. GUJARAT : Pál jungles, *Woodrow* ; Deesa, *Stocks* ! ; Baroda, *Woodrow* ; Domas near Surat, *Cooke* !—DISTRIB. India (W. Peninsula) ; Africa, Tropical America, Polynesia ; often cultivated.

Merremia dissecta, Hallier f. in Engl. Bot. Jahrb. v. 16 (1893) p. 552. A native of Tropical America and the W. Indian islands introduced into the Bombay Presidency by Nimmo (*fide Graham*) and now becoming naturalized. It has twining usually hirsute stems, palmately 7-partite usually glabrous leaves with lanceolate acute lobes which are again lobulate, subpinnatifid or toothed. The corolla is campanulate, white or pinkish-white, with a purple throat and strongly lineate bands. *Ipomœa dissecta*, Pers. in L. Syst. ed. 15 (1797) p. 207 *in note* (*not* of Willd.). *Ipomœa sinuata*, Ortega, Decad. vii. p. 84 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 214 ; Choisy, in DC. Prodr. v. 9, p. 362 ; Grah. Cat. p. 132 ; Dalz. & Gibs. Suppl. p. 59 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.—Flowers : Nov.

13. **OPERCULINA**, Silva Manso.

Large climbing herbs ; stems winged. Leaves entire or lobed. Flowers large, axillary, solitary or in few-flowered cymes. Sepals 5, large, glabrous, increasing and thickening in fruit, at length splitting irregularly from the tip. Corolla infundibuliform, rarely campanulate ; tube with 5 vertical smooth bands. Stamens 5 ; filaments filiform ; anthers large, at length contorted ; pollen not echinulate. Ovary 2-celled, glabrous ; ovules 4 ; style filiform ; stigma 2-globose. Capsule valveless, the epicarp circumscissile above the middle, the cap carrying away the style ; endocarp at length irregularly rupturing. Seeds often solitary, black, glabrous.—DISTRIB. Most tropical regions ; species about 10.

1. **Operculina Turpethum**, *Silva Manso, Enum. Subst. Braz.* (1836) pp. 16 & 49 (*turpetum*). Perennial with milky juice ; root long, slender, fleshy, much-branched ; stems very long, twining and much twisted together, angled and winged, pubescent, tough and brown when old. Leaves 2—4 by ½—2¾ in., ovate or oblong, rarely slightly lobulate, subacute, mucronate, more or less pubescent on both sides especially when young, minutely reticulately veined, base cordate or truncate ; petioles ¾—2 in. long, pubescent. Cymes few-flowered ; peduncles stout, 1—2 in. long ; bracts large, lanceolate, pubescent, reaching 1 in. long, caducous, often pinkish ; pedicels ¼—1 in. long, stout, pubescent, slightly thickened upwards. Outer sepals up to ⅝ in. long in flower, much enlarged in fruit, broadly ovate or suborbicular, obtuse, mucronate, concave, pubescent ; the 3 inner sepals smaller, scarcely ¾ in. long, very thinly membranous, glabrous, apiculate. Corolla white, 1½—2 in. long, subcampanulate. Anthers nearly ⅛ in. long, narrowly oblong, cordate. Capsules ½—⅝ in. in diam., globose, enclosed in the enlarged brittle very imbricate sepals, glabrous or faintly pubescent. *Ipomœa Turpethum*, R. Br. Prodr. (1810) p. 485 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 212 ; Grah. Cat. p. 131 ; Dalz. & Gibs. p. 165 ; Trim. Fl. Ceyl. v. 3, p. 222 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 493.—Flowers : Oct.—Jan. VERN. *Nisottar* ; *Dudhkalmi*.

KONKAN : Mumbra near Thana, *Cooke* !; Revadanda, *Woodrow, Kanitkar* !; Salsette, *Graham.* DECCAN : *Dalzell & Gibson.* GUJARAT : *Dalzell & Gibson, Woodrow,* 10 !; very common in the southern parts especially about Dharanpur, *Graham.*—DISTRIB. Throughout India, sometimes cultivated; Ceylon, Malay Islands, Tropical America, Mauritius, Philippines, Tropical Africa.

The root of the plant has long been used in medicine as a purgative and is known as *Turpeth-root* or *Indian Jalap.* See Watt, Dict. Econ. Prod. l. c.

14. IPOMŒA, Linn.

Herbs (rarely shrubs) twining or prostrate, rarely erect or suberect. Leaves alternate, usually entire. Flowers usually large, in axillary (rarely paniculate) cymes which are often reduced to a single flower. Sepals 5, equal or unequal, imbricate, often enlarged in fruit. Corolla campanulate or infundibuliform ; limb plicate, slightly lobed ; bands usually defined by 2 prominent lines. Stamens 5, usually included ; filaments filiform or dilated below, often unequal ; anthers straight or contorted ; pollen echinulate. Ovary 2 (rarely 3 or 4) -celled ; ovules 4 (rarely 6) ; style filiform ; stigma capitate, entire or 2—3-globose (rarely stigmas 2-linear). Capsule 4—6-valved, rarely indehiscent. Seeds usually 4 or 6 (rarely solitary), glabrous, bearded, or uniformly velvety or woolly.—DISTRIB. Tropical and warmer regions of the globe ; species about 400.

Leaves entire (occasionally 3-lobed in *I. pilosa*).	
Outer sepals sagittate or cordate at the base	1. *I. calycina.*
Outer sepals not cordate at the base.	
Sepals much enlarged in fruit.....	2. *I. barlerioides.*
Sepals not or slightly enlarged in fruit.	
Flowers in sessile or nearly sessile heads.	
Leaves ovate, acute; capsule hairy; seeds glabrous, minutely foveolate	3. *I. eriocarpa.*
Leaves elliptic or rhomboid, subacute; capsule glabrous; seeds furred, their margins villous.....	4. *I. Stocksii.*
Leaves oblong-hastate, acute ; capsule glabrous ; seeds velvety.....	5. *I. sindica.*
Flowers in pedunculate cymes or panicles.	
Sepals hispid.	
Stems prostrate; leaves as broad as long, very obtuse	6. *I. rumicifolia.*
Stems twining.	
Leaves as broad as long, white-woolly beneath.	
Outer bracts several; corolla less than 1 in. long	7. *I. pilosa.*
Leaves longer than broad, not white-woolly beneath.	
Heads enclosed in a large solitary boat-shaped outer bract	8. *I. involucrata.*
Bracts minute, not enclosing the flowers; corolla 1½ in. long.....	9. *I. Clarkei.*
Sepals glabrous (sometimes finely pubescent in *I. campanulata*).	
Seeds shaggy on the angles.	
Stems often muricate; corolla hypocrateriform, reaching 4½ in. long.....	10. *I. longiflora.*

Seeds not shaggy on the angles.
An aquatic plant.
Stems hollow, trailing in mud or floating ..... 11. *I. aquatica.*
Terrestrial plants.
Sepals obtuse.
Flowers in subumbellate cymes; outer sepals shorter than the inner; corolla less than 2 in. long. 12. *I. sepiaria.*
Flowers in lax panicles; sepals equal; corolla ¾—1 in long..... 13. *I. staphylina.*
Flowers in corymbosely-branched cymes; sepals subequal; corolla 3 in. long ..... 14. *I. campanulata.*
Sepals acute.
Flowers 1—3 together; corolla ⅞ in. long ..... 15. *I. obscura.*
Leaves lobed (occasionally entire in *I. pes-tigridis*).
Prostrate (rarely twining) herbs.
Leaves deeply 2-lobed or sometimes only emarginate; corolla rose-purple, exceeding 1 in. long. 16. *I. biloba.*
Leaves digitately or the upper sometimes pedately 3—7-partite; corolla white, less than 1 in. long. 17. *I. dissecta.*
Twining herbs (sometimes creeping in *I. laciniata*).
Leaves palmately or digitately 3—9-lobed.
Sepals glabrous.
Flowers in paniculate cymes.
Corolla purple, exceeding 1 in. long..... 18. *I. digitata.*
Peduncles 1—3-flowered
Sepals ribbed and wrinkled on the back; corolla white, exceeding 2 in. long..... 19. *I. laciniata.*
Sepals not ribbed on the back, dotted with white specks inside; corolla 1¼—2 in. long, violet with a purple tube..... 20. *I. palmata.*
Sepals hairy.
Flowers in many-flowered, pedunculate heads; corolla 1 in. long, pale-pink..... 21. *I. pes-tigridis.*

1. **Ipomœa calycina,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 201. Stem twining, sparingly clothed with long spreading hairs. Leaves 2—3 by 1½—2 in., ovate, acutely acuminate, entire, sparsely hairy or nearly glabrous, cordate at the base with a wide sinus; petioles ½—1½ in. long, slender, clothed with long spreading hairs. Flowers 1—3; peduncles hairy; pedicels hairy, about as long as the peduncles; bracts ¼ in. long, ovate, acute. Sepals in flower ⅛ in. long, unequal, ciliate, the outer in fruit ½ by ¼ in., lanceolate-sagittate with obtuse auricles, the inner linear-lanceolate. Corolla white, tubular, scarcely 1 in. long. Capsules ⅓ in. long, ovoid, pointed, glabrous. Seeds ⅓ in. long, villous all over, fringed on the margin with soft white hairs which are nearly ¼ in. long. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171. *Aniseia calycina,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 482; Wight, Icon. t. 833; Grah. Cat. p. 250; Dalz. & Gibs. p. 163.—Flowers: Oct.

KONKAN: *Stock!, Law!* DECCAN: road from Poona to Sattara near 25th mile-stone, *Woodrow.* GUJARAT: Surat, *Graham, Dalzell!, Woodrow*; Broach, *Dalzell!*

2. **Ipomœa barlerioides,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1876) p. 872. Twining, hirsute, perennial ; stems numerous. Leaves 1—2 by ½—1 in., ovate-oblong, subacute, often mucronulate, hairy on both sides, base usually cordate ; petioles ⅛—¾ in. long, densely hairy. Flowers axillary, solitary ; peduncles variable in length, sometimes reaching 3 in. or more, densely hairy, with 2 lanceolate bracts ¼—½ in. long at the top from which the short pedicel issues. Sepals much widened in fruit, densely villous, the exterior larger and broader, lanceolate, acute ⅜—¾ in. long, the 2 interior sepals linear, acute. Corolla 2—3 in. long, purple, infundibuliform, attenuated into a long tube which is very narrow at its base, pubescent outside ; limb subentire, plicate. Capsules ½ in. long, ovoid, glabrous. Seeds ⅓ in. long, oblong, villous or pubescent, the margins with short hairs. Fl. B. I. v. 4, p. 201 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers : Sept.—Oct.

Not common. KONKAN : *Dalzell* ! S. M. COUNTRY : Párva Ghát, *Ritchie*, 1897 ! KANARA : *Law* ! ; Sirsi, *Woodrow*.—DISTRIB. India (N.W. Provinces, Oude, W. Peninsula).

3. **Ipomœa eriocarpa,** *R. Br. Prodr.* (1810) p. 484. Stems twining, slender, terete, clothed with appressed or spreading hairs. Leaves 1¾—3 by ¾—1½ in., ovate or ovate-oblong, acute, often apiculate, more or less hairy on both surfaces and with hairy margins, base cordate with rounded lobes ; petioles 1 in. long, densely hairy with deflexed hairs. Flowers 1—3 (rarely more in a head) ; peduncles very short, under ¼ in. long ; bracts ⅛—¼ in. long, linear, hairy ; pedicels very short or 0. Sepals not or scarcely enlarged in fruit, very hairy, rather less than ½ in. long, with a long linear acumen from an ovate base, the outer sepals broader than the inner. Corolla ½ in. long, campanulate, pink, pubescent in the upper part and with small tufts of hairs at the apices of the small acute lobes. Ovary densely hairy. Capsules ¼—⅓ in. in diameter, globose, hairy. Seeds glabrous, minutely foveolate. Fl. B. I. v. 4, p. 204 ; Trim. F. Ceyl. v. 3, p. 217 ; Jackson, in Index Kewen. v. 1, p. 1224 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prodr. v. 4, p. 485. *Ipomœa sessiliflora* Roth, Nov. Pl. Sp. (1821) p. 116 ; Dalz & Gibs. p. 166 ; Wight, Icon. t. 169. *I. hispida*, Rœm. & Schult. v. 4 (1819) p. 238. *Convolvulus hispidus*, Vahl, Symb. v. 3 (1794) p. 29.—Flowers : Sept.—Oct.

KONKAN : *Law* !, *Stocks* ! ; Malwán, *Nairne* ; Bandra, *Nairne*. DECCAN : widely, *Woodrow* ; Poona, *Cooke* ! ; Dongergaon near Ahmednagar, *Cooke* ! S. M. COUNTRY : Dharwar, *Law* ! KANARA : *Law* ! Kála naddi, *Ritchie*, 479 ! GUJARAT : Ankleshvar, *Kanitkar* !—DISTRIB. Throughout India ; Ceylon, Afghanistan, Tropics of the Old World.

4. **Ipomœa Stocksii,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 204. Stems prostrate, twining, patently hairy. Leaves 2 in. long, elliptic or rhomboid, subacute, base obtuse or subcordate ; petioles ¼—1¼ in. long. Flowers in sessile heads ; bracts ¼ in. long, lanceolate, hispid. Sepals ⅓—½ in. long, elliptic-lanceolate, patently hispidulous. Capsules ¼—⅓ in. long, ovoid, glabrous, 2-celled, 4-seeded. Seeds furred, margins villous. The above description is that of Mr. C. B. Clarke (*l. c.*).

This species differs from *I. eriocarpa*, R. Br., in the leaves, the seeds, and the capsules, which latter are hairy in *I. eriocarpa* and glabrous in *I. Stocksii*, while it differs from *I. sindica*, Stapf, in the leaves and seeds.

I have seen no specimens authenticated as having been collected in the Bombay Presidency. There is in all 1 sheet in Herb. Kew. carrying a *printed* Herbarium label of Herb. Hook. f. & Thoms. on which appears *"Malabar, Konkan* &c. Coll. *Stocks Law* &c." On the corner of the sheet is a small ticket on which is written *"Herb. Stocks,"* above which is a word apparently *"Sind."*

5. **Ipomœa sindica,** *Stapf, in Kew Bull.* (1894) p. 346. Annual; stems reaching 2 ft. long, many from the root, slender, prostrate, hispid. Leaves ¾—2½ by ¼—1¼ in., oblong-hastate or deltoid-hastate, much longer than broad, acute or acuminate, more or less hairy on both surfaces and with ciliate margins, base cordate with diverging lobes; petioles ¼—1½ in. long, hairy. Flowers in axillary few-flowered cymes often reduced to single flowers; peduncles scarcely any; bracts linear, 1/10—⅛ in. long, hairy; pedicels very short. Sepals during flowering ⅛—¼ in. long, hispid, lanceolate, dilated at the base, slightly enlarged in fruit. Corolla infundibuliform, ⅓ in. long, slightly 5-lobed with a small tuft of hairs at the tip of each lobe. Capsules ⅓—½ in. long, globose or ovoid, glabrous. Seeds black, thinly grey-velvety. Very close to *Ipomœa eriocarpa*, Br., from which it may be distinguished by its glabrous capsules and velvety seeds. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers: Oct.

SIND: near Karachi, *Woodrow*!, *Cooke*!; Jemadar ka Landa near Karachi, *Stocks*, 41!—DISTRIB. North Western India.

6. **Ipomœa rumicifolia,** *Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv.* v. 6 (1834) p. 447. Annual; stems usually prostrate, sparsely hirsute. Leaves 1—1½ in. long, nearly as broad as long, ovate, hastate or subreniform, very obtuse, usually apiculate, sometimes emarginate, entire, or sometimes irregularly angular or lobulate, glabrous, base cordate, usually with a wide sinus and rounded lobes; petioles reaching 2 in. long. Peduncles short, 0—½ in. long, laxly few-flowered; bracts ⅓ in. long, linear, hairy, subpersistent; pedicels ¼—½ in. long, slightly thickened in fruit. Sepals ¼ in. long, ovate, acute, clothed with spreading hairs from bulbous bases, ciliate. Corolla tubular-campanulate, ⅓—½ in. long, glabrous. Capsules ⅛—⅕ in. long, ovoid, apiculate, glabrous, veined. Seeds usually 4, densely velvety. Fl. B. I. v. 4, p. 207; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers: Dec.

Rare. SIND: Karachi, *Woodrow*!—DISTRIB. India (W. Peninsula); Tropical Africa.

7. **Ipomœa pilosa,** *Sweet, Hort. Brit.* ed. 2 (1830) p. 372. Annual, twining; stems clothed with long hairs from glandular bases. Leaves 2—5 in. long and about as broad as long, broadly ovate, acute or acuminate, entire or sometimes more or less deeply 3-lobed, hairy above, white-woolly beneath, base cordate; petioles 2—4 in. long, hairy. Flowers in lax racemose bracteate cymes; peduncles 1—3 in. long; bracts ⅛—⅜ in. long, lanceolate, acute,

hairy, persistent; pedicels ¼—¾ in. long. Sepals ½ in. long and upwards, oblong-lanceolate, acuminate, densely hairy and with strongly ciliate margins. Corolla tubular-infundibuliform, ¾—⅞ in. long; limb with scattered hairs outside, acutely lobed. Capsules ¼—⅓ in. in diam., subglobose, slightly pubescent towards the top. Seeds clothed with velvety pubescence and long cottony hairs as well. Fl. B. I. v. 4, p. 213; Dalz. & Gibs. p. 166; Wight, Icon. t. 837; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172—Flowers: Dec.

GUJARAT: Baroda, *Woodrow*!; Godra, *Cooke*!; Ahmedabad, *Woodrow*. SIND: Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (W. Himalaya, Panjáb, Bengal); Tropical Africa.

8. **Ipomœa involucrata,** *Beauv. Fl. d'Owar. & Bén.* v. 2 (1810) p. 52, t. 89. Annual, twining; stems appressedly or patently hairy. Leaves 2—3 by 1½—2½ in., rather longer than broad, broadly ovate, acuminate, obtuse, apiculate, entire, hairy on both surfaces, green beneath, base deeply cordate with rounded lobes; petioles 1—3 in. long, hairy. Flowers sessile, in few-flowered heads enclosed in a large boat-shaped bract which reaches ¾ in. long and occasionally as much as 2½ in. broad, hairy inside and outside, strongly veined; peduncles 1—4 in. long with deflexed hairs; inner bracts as long as the sepals, obovate, hairy. Calyx densely hirsute outside, especially in the lower part; 3 outer sepals ½ in. long or a little longer, oblong, obtuse, very hairy in the lower part, strongly ciliate, veined; the 2 inner sepals smaller, narrowly linear, densely hairy along the back and with membranous margins. Corolla bright-pink, 1¼ in. long; tube ¾ in. long, narrow, cylindric; limb exceeding 1 in. in diam., suddenly widened at the mouth. Capsules ¼ in. in diam., subglobose or obovoid, somewhat depressed, papery, glabrous. Seeds glabrous, with a very narrow fringe of short hairs on the margins. Hallier f. Monogr. Convolv. in Herb. Boiss. v. 5, p. 375; Prain, Beng. Pl. p. 734. *Ipomœa pileata*, Roxb. Fl. Ind. ed. Carey, v. 2 (1824) p. 94; Wight, Icon. t. 1363; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 203; Trim. Fl. Ceyl. v. 3, p. 215; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers: Oct.—Nov.

KONKAN: *Stocks*!, *Law*!; jungles in S. Konkan, rare, *Dalzell & Gibson*; Savantvádi hills, *Kanitkar*!, *Woodrow*.—DISTRIB. India (Assam, Bengal, W. Peninsula); Ceylon, Tropical Africa.

9. **Ipomœa Clarkei,** *Hook. f. Fl. B. I.* v. 4 (1883) p. 734 (under additions and corrections). Annual; stems twining, slender, glabrous. Leaves 2—3½ by 1½—2½ in., broadly ovate, finely acuminate, more or less hairy on both surfaces, base deeply cordate with rounded lobes; petioles 1—2½ in. long. Peduncles 1—3-flowered, ¾—1½ in. long, slender; bracts minute, lanceolate, acute; pedicels ¼—1¼ in. long. Sepals ⅓ in. long, linear-lanceolate, acute, sparsely hairy and ciliate. Corolla 1½ in. long, infundibuliform. Capsules ½ in. long, ovoid, glabrous. Seeds puberulous, dark-brown. *Ipomœa Stocksii* in error for *Ipomœa Clarkei*, in Hook. f. Fl. B. I. v. 4, p. 207 (correction made in p. 734); Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers: Sept.

Rare. KONKAN: *Law*!, *Stocks*! DECCAN: Tulja hill near Junnar (Poona districts), *Kanitkar*!—DISTRIB. India (W. Peninsula).

10. **Ipomœa longiflora,** *R. Br. Prodr.* (1810) p. 484. An extensive climber ; stems long, cylindric, glabrous, often subspinous with short retroflexed tubercles. Leaves 3—6 by 2¾—5½ in., broadly ovate, shortly acuminte, entire, glabrous, base deeply cordate ; main nerves conspicuous beneath ; petioles 2—5 in. long. Peduncles usually solitary, variable in length, 1—3-flowered ; bracts small, caducous ; pedicels ½—¾ in. long, thickened in fruit. Sepals ¾—⅞ in. long, broadly elliptic obtuse, mucronate, glabrous, the 2 outer rather smaller than the inner, all enlarged and becoming orbicular in fruit. Corolla white, reaching as much as 4½ in. long ; tube reaching 3 in. long. Filaments exceeding 1 in. long, equal, hairy at the base. Capsules about 1 in. in diam., surrounded by the greatly enlarged sepals, glabrous. Seeds brown-velvety with a denser fringe on the margins. Prain, Beng. Pl. (1903) p. 733. *Ipomœa grandiflora,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 198 in part (*not* of Lamk. nor Roxb.) ; Talb. Trees, Bomb. ed. 2, p. 250 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.—Flowers : Sept.—Nov.

Rare ; near the sea-coast, but often cultivated. KONKAN : *Law* !, *Stocks* ! KANARA : in moist forests and along the banks of nálas, very rare, *Talbot* ; below the fall on the Kála naddi, *Ritchie* !—DISTRIB. India (W. Peninsula) ; most Tropical shores of the Old World, Australia.

11. **Ipomœa aquatica,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 44. Annual or biennial ; stems long, prostrate, trailing on mud or floating, thick, hollow, rooting at the nodes, glabrous. Leaves 2—5 by 1¼—3 in. (occasionally narrower), elliptic-oblong or subdeltoid, acute, glabrous, base usually dilated, cordate or hastate with rounded or acute lobes, less commonly truncate ; petioles 1½—5 in. long. Peduncles ½—4 in. long, usually 1—5-flowered ; bracts small, linear-lanceolate ; pedicels 1—2 in. long. Sepals ¼—⅓ in. long, subequal, oblong-lanceolate, subacute, membranous, glabrous. Corolla 1¾—2 in. long, infundibuliform, the limb very pale-purple (nearly white), the throat and tube dull-purple ; lobes obscure. Filaments very unequal, hairy at the base. Ovary glabrous. Capsules ⅓ in. long, ovoid. Seeds 4 or 2, minutely pubescent. Fl. B. I. v. 4, p. 210 ; Jackson, in Index Kewen, v. 1 (1893) p. 1223 ; Trim. Fl. Ceyl. v. 3, p. 221 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 476. *Ipomœa reptans,* Poir. Ency. Suppl. v. 3 (1813) p. 460 in Obs. ; Grah. Cat. p. 130 ; Dalz. & Gibs. p. 164. *Convolvulus reptans,* Linn. Sp. Pl. (1753) p. 158.—Flowers : Nov.—Apr. VERN. *Nalichi-bhági.*

Margins of tanks and other moist places throughout the Presidency, very common in Gujarat.—DISTRIB. Throughout India, common ; Ceylon, Tropical Asia, Africa, and Australia.

The young shoots, leaves and roots are eaten as a vegetable. The plant is largely cultivated in the Madras Presidency. See Watt, Dict. Econ. Prod. l. c.

12. **Ipomœa sepiaria,** *Kœnig, in Roxb. Hort. Beng.* (1814) p. 14. Perennial ; stems twining, slender, glabrous or more or less hairy. Leaves 1—3 by ⅝—2¼ in., ovate, acute, entire, usually glabrous, cordate at the base with a wide sinus and rounded lobes ; petioles 1—1¾ in. long, slender, glabrous. Flowers in pedunculate

subumbellate cymes; peduncles 1—6 in. long, glabrous; bracts small, lanceolate, caducous; pedicels ½—½ in. long, clavate in fruit. Sepals broadly elliptic, slightly apiculate, glabrous and with membranous margins, the 2 outer shorter than the inner, rugose on the back, scarcely ¼ in. long, the 3 inner a little more than ¼ in. long. Corolla tubular-infundibuliform, pale-purple or whitish, 1½ in. or more long, the mouth suddenly widened; tube nearly 1 in. long, purple within; lobes of the limb acute, shortly apiculate. Filaments hairy at the very base. Capsules ⅓ in. long, ovoid, glabrous, 4- or 2-seeded. Seeds grey with silky pubescence. Fl. B. I. v. 4, p. 209; Grah. Cat. p. 131; Dalz. & Gibs. p. 166; Wight, Icon. t. 838; Trim. Fl. Ceyl. v. 3, p. 220; Talb. Trees, Bomb. ed. 2, p. 251; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171; Watt, Dict. Econ. Prod. v. 4, p. 491.—Flowers: Aug.—Oct. VERN. *Amti-vel.*

Common in hedges throughout the Presidency. KONKAN: *Law*! DECCAN: Gokak, *Woodrow*. KANARA: *Thomson*!; hedges near the sea-coast of N. Kanara, *Talbot*. GUJARAT: Surat, Baroda, *Cooke*!; Godra, *Cooke*!; Porbandar (Kathiawar), *Woodrow*.—DISTRIB. Throughout India; Ceylon, Malaya.

VAR. *stipulacea*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 209. Leaves usually smaller, narrower, apiculate, angled or sagittate at the base with acute lobes; petioles often with stipule-like leaves in the axils; flowers rather smaller. *Ipomœa stipulacea* (sp.), Sweet, Hort. Brit. ed. 2, p. 372 (*not* of Jacq.); Grah. Cat. p. 131.

KONKAN: Mumbra near Thana, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 488! GUJARAT: Baroda, *Cooke*!

13. **Ipomœa staphylina,** *Rœm. & Schult, Syst. Veg.* v. 4 (1819) p. 249. Perennial, woody below; stems short, subscandent, straggling, glabrous. Leaves 2—5 by 1¼—3 in., ovate, subacute, glabrous, subcordate at the base; main nerves 8—10 pairs, conspicuous beneath and with reticulate veins between; petioles 1—3 in. long, slender. Flowers numerous, in lax panicles which are usually longer than the leaves; bracts small, caducous; pedicels ⅛—⅜ in. long, slender. Sepals equal, ⅓ in. long, orbicular-oblong, glabrous, chartaceous, concave, much imbricate. Corolla ¾—1 in. long, tubular-campanulate, nearly white at the mouth, purple in the tube. Filaments hairy at the very base. Ovary ovoid, acute, glabrous. Capsules ⅓ in. long, ovoid, subacute, glabrous. Seeds 4, clothed with long silky hairs. Fl. B. I. v. 4, p. 210; Trim. Fl. Ceyl. v. 3, p. 219; Talb. Trees, Bomb. ed. 2, p. 251; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171. *Ipomœa racemosa*, Roth, Nov. Pl. Sp. (1821) p. 115 (*not* of Poir); Wight, Ill. t. 168.—Flowers: Dec.—Jan.

Rare. DECCAN: Kolhapur, *Col. Hobson*!; Byadgi, *Woodrow*. S. M. COUNTRY: on the banks of nálas in the southern parts of the Dharwar districts, *Talbot*.—DISTRIB. India (W. Peninsula, Assam); Penang.

14. **Ipomœa campanulata,** *Linn. Sp. Pl.* (1753) p. 160. A large climber; stems twining, suffruticose, terete, striate, much-branched, the older glabrous, the younger finely pubescent. Leaves 3—6 by 2½—5½ in., broadly ovate or suborbicular, acuminate, apiculate, thick, glabrous or finely pubescent on both sides; main nerves 12—14 pairs, conspicuous beneath; petioles 1½—3 in. long,

softly velvety. Flowers in corymbosely branched, usually many-flowered cymes; peduncles 1-4 in. long, stout; bracts quickly deciduous; pedicels 1 in. long and more, thickened in fruit. Sepals subequal, nearly ½ in. long, orbicular-oblong, obtuse, glabrous or finely pubescent, somewhat succulent, a little enlarged in fruit. Corolla tubular-campanulate, 3 in. long, pale-violet, dark-purple within the tube; lobes of the limb usually conspicuous. Capsules ½ in. in diam., globose, glabrous, enclosed in the enlarged sepals. Seeds with silky hairs which often exceed ½ in. long. Fl. B. I. v. 4, p. 211; Grah. Cat. p. 131; Dalz. & Gibs. p. 165; Trim. Fl. Ceyl. v. 3, p. 221; Talb. Trees, Bomb. ed. 2, p. 251; Woodr. in Journ. Bombay. Nat. v. 12 (1898) p. 171.—Flowers: Oct.—Mar. VERN. *Tambarvel*; *Tugelmi*.

KONKAN: *Law*!; hilly parts, *Graham*; Wari jungles, *Dalzell & Gibson*. DECCAN: Mâwal (Poona districts), *Woodrow*; Fitzgerald Ghât, below Mahableshwar, *Cooke*! S. M. COUNTRY: Dharwar, *Woodrow*; Belgaum, *Ritchie*, 473! KANARA: Halihal (N. Kanara), *Talbot*!—DISTRIB. India (W. Peninsula); Ceylon, Malaya.

15. **Ipomœa obscura,** *Ker-Gawl. in Bot. Reg.* (1817) t. 239. Annual; stems very long and slender, often purplish, twining, glabrous or with a few spreading hairs. Leaves 1—2½ by ¾—2 in., broadly ovate, acuminate, subacute, entire, glabrous or more or less pubescent, thin; petioles 1—3 in. long, slender, glabrous or pubescent. Flowers rather small, 1 or 2 (rarely 3) together; peduncles 1—2½ in. long; bracts minute, linear-lanceolate; pedicels ¼—1¼ in. long. Sepals ⅛ in. long, subequal, oblong, subacute, shortly apiculate, minutely verrucose, veined. Corolla infundibuliform, ⅛ in. long, yellow, or white with the plaits yellowish, with a small purple eye; mouth of limb wide, 1 in. in diam. with shallow apiculate lobes. Capsules ⅛ in. long, ovoid, subacute, glabrous. Seeds dark-brown, velvety. Fl. B. I. v. 4, p. 207; Grah. Cat. p. 131; Dalz. & Gibs. p. 166; Trim. Fl. Ceyl. v. 3, p. 220; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171; Watt, Dict. Econ. Prod. v. 4, p. 488.—Flowers during the greater part of the year. VERN. *Pungali*.

KONKAN: common about Bombay, *Graham, Dalzell & Gibson*. DECCAN: *Dalzell & Gibson, Dr. Lush* ex *Graham*; Poona, *Cooke*!, *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 485!; Badami, *Woodrow*; Dharwar, *Cooke*! GUJARAT: *Woodrow*.—DISTRIB. Throughout India; Ceylon, Malaya, Mascarene Islands, Africa.

16. **Ipomœa biloba,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 44. Root large, long, with a thick brown bark; stems numerous, very long, prostrate, weak, rarely twining, cylindric, glabrous. Leaves 1½—2¼ by 2—3 in., usually broader than long, usually deeply 2-lobed (the division often extending half-way down, though sometimes the leaf is merely emarginate), fleshy, conspicuously parallel-veined, glabrous, cuneate or truncate at the base; petioles 1—3½ in. long, glabrous. Flowers large, usually solitary (sometimes 2—3); peduncles erect, 1—4½ in. long; bracts beneath the pedicels lanceolate, caducous; pedicels ⅝—1¾ in. long, stout. Calyx glabrous, the 2 outer sepals smaller than the inner, ⅛ by ¼ in., oblong, obtuse, apiculate, the 3 inner ½ by ⅜ in., elliptic-oblong, obtuse or emarginate, apiculate.

Corolla 1½—2 in. long, tubular-infundibuliform, brilliant rose-purple with a deeper color in the tube, glabrous; lobes shallow, acute, apiculate. Filaments dilated and hairy at the base. Ovary glabrous. Capsules ½—⅝ in. long, ovoid, glabrous. Seeds villous. Fl. B. I. v. 4, p. 212; Jackson, in Index Kewen. v. 1 (1893) p. 1223; Trim. Fl. Ceyl. v. 3, p. 224; Talb. Trees, Bomb. ed. 2, p. 252; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171; Watt, Dict. Econ. Prod. v. 4, p. 482. *Ipomœa Pes-caprœ*, Sweet, Hort. Suburb. (1818) p. 35; Roth, Nov. Pl. Sp. (1821) p. 109; Grah. Cat. p. 130; Dalz. & Gibs. p. 164; Aitch. Pb. & Sind Pl. p. 99. *Convolvulus Pes-caprœ*, Linn. Sp. Pl. (1753) p. 159.—Flowers more or less throughout the year. VERN. *Maryádvel*; *Samudraphen*.

Common throughout the Presidency on sandy shores and sandy river-banks, where it serves to bind the sand.—DISTRIB. Sea-shores of both hemispheres throughout the Tropics.

The leaves of the plant are employed as an external application in rheumatism. See Watt, Dict. Econ. Prod. l. c.

17. **Ipomœa dissecta,** *Willd. Phytogr.* (1794) p. 5, t. 2, fig. 3. Annual, glabrous, with a short stout stem and numerous prostrate slender angular branches 6—24 in. long, not or rarely twining. Leaves very variable, digitate, or the upper sometimes pedate; lobes 3—7, linear-lanceolate, irregularly and acutely serrate; petioles ½—½ in. long, with axillary stipule-like leaves at their base. Flowers usually solitary; peduncles ½—1½ in. long; bracts near the flower minute, lanceolate, acute, or flowers subsessile among leaf-like pectinate bracts. Sepals ¼ in. long, oblong-lanceolate, glabrous but rough outside with prominences, cuspidate, recurved at the apex. Corolla white, tubular, ⅓—½ in. long, glabrous, acutely 5-lobed. Ovary 3-celled. Capsules ⅛—¼ in. in diam., subglobose, glabrous, 3- or 6-valved. Seeds usually 3, pubescent. Fl. B. I. v. 4, p. 200; Jackson, in Index Kewen. v. 1, p. 1224; Trim. Fl. Ceyl. v. 3, p. 213. *Ipomœa coptica*, Roth, Nov. Pl. Sp. (1821) p. 110; Grah. Cat. p. 132; Dalz. & Gibs. p. 166. *Convolvulus copticus*, Linn. Mant. 559.

I have seen no authentic specimen of this plant from the Bombay Presidency, the specimens supposed to be *I. dissecta* being all referable to *I. laciniata*, Dalz. Graham (Cat. l. c.), whom Dalzell and Gibson follow (Bo. Fl. l. c.), gives it as occurring in open glades at Khandala, a locality which has been so thoroughly examined that the plant could scarcely have escaped notice. *Ipomœa laciniata*, Clarke, occurs at Khandala, and I think Graham has mistaken this for *I. dissecta* and been followed in his error. The corolla of *I. dissecta* is much smaller than that of *I. laciniata*, which latter has a long narrow corolla-tube.—DISTRIB. W. India (not common); Ceylon, Tropical Africa, Australia.

18. **Ipomœa digitata,** *Linn. Syst. Nat.* ed. x. (1759) p. 924 (*not* of Parodi). Perennial, with large ovoid or elongated tuberous roots; stems long, thick, twining, tough, glabrous. Leaves 4—6 in. long, often broader than long, deeply palmately divided; lobes 5—7, ovate-lanceolate, acute or acuminate, glabrous, entire, pale and with prominent nerves beneath; petioles 2—5 in. long, glabrous. Flowers in many-flowered corymbosely paniculate cymes; peduncles solitary, axillary, sometimes exceeding 6 in. long, stout; bracts minute, deciduous; pedicels ¼—¾ in. long. Sepals ½—⅔ in. long, orbicular-

oblong, subobtuse, concave, glabrous. Corolla purple, 1½—2½ in. long, campanulate-infundibuliform ; lobes of the limb emarginate. Ovary 4-celled, glabrous. Capsules ovoid, ⅓—½ in. long, 4-celled, 4-valved, surrounded by the enlarged rather fleshy sepals. Seeds clothed with brownish cottony readily detachable hairs, nearly ¼ in. long. Fl. B. I. v. 4, p. 202 ; Jackson, in Index Kewen. v. 1 (1893) p. 1224 ; Trim. Fl. Ceyl. v. 3, p. 212 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 484. *Ipomœa paniculata,* R. Br. Prodr. (1810) p. 486. *Convolvulus paniculatus,* Linn. Sp. Pl. (1753) p. 156. *Batatas paniculata,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6, p. 436 ; Grah. Cat. p. 129 ; Dalz. & Gibs. p. 167.—Flowers : July—Sept.

Doubtfully indigenous. KONKAN : *Law* ! ; Malabar Hill (Bombay), *Graham* ; Mahim woods, *Graham* ; Cross Island abundant, *Graham* ; Kalyan, *Woodrow*.—DISTRIB. Throughout tropical India in moist regions ; Ceylon, Tropical Asia, Africa, America, Australia in moist climates.

19. **Ipomœa laciniata,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 200. Stem slender, creeping or twining, angled and twisted, glabrous. Leaves 1—2 in. in diam., subdigitate, 5—7-partite ; segments elliptic or linear, serrate or pinnatifid, the teeth unequal, mucronate ; petioles ½—1 in. long with stipule-like axillary leaves. Flowers 1—3 (usually 1) on axillary peduncles ; peduncles solitary, variable in length, ½—1½ in. long, thickened upwards in fruit ; bracts ⅛ in. long, linear-lanceolate, acute. Sepals ¼—⅓ in. long, subequal, elliptic, mucronate, fleshy, ribbed and wrinkled on the back, glabrous. Corolla white ; tube narrow, cylindric, reaching 2 in. long by ⅛ in. in diam. ; limb flat, spreading, 1—1½ in. in diam. Anthers scarcely exserted. Ovary 3-celled. Capsules ⅓ in. in diam., subglobose, 3-celled. Seeds normally 6, shortly silky. Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 171. *Ipomœa dissecta,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 (*not* of Willd.). *Pharbitis laciniata,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 178 ; Dalz. & Gibs. p. 167.—Flowers : Oct.

Flowers open at sunset (*Dalzell*).

KONKAN : *Stocks* ! ; Malwán, *Dalzell* ! ; Savantvádi, *Woodrow*. DECCAN : Mahableshwar, *Cooke* ! ; Khandala, *Cooke* ! ; Panchgani, *Cooke* !, *Woodrow* ! S. M. COUNTRY : near Belgaum, *Ritchie*, 1888 !—DISTRIB. India (W. Peninsula).

20. **Ipomœa palmata,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 43. Perennial, glabrous ; stems numerous, twining, the older semi-woody and often rough with lenticels. Leaves 1—2 in. long and as broad as long, palmately cut almost to the base into 3—7 (usually 5) oblanceolate obtuse mucronate glabrous segments ; petioles ½—2 in. long. Peduncles short, usually 1—3-flowered, curved downwards ; bracts minute ; pedicels ¼—½ in. long, erect and thickened in fruit. Sepals ¼ in. long, elliptic-oblong, obtuse, chartaceous, glabrous outside, dotted with whitish specks inside and with membranous margins. Corolla 1¼—2 in. long, dull-violet with a purple tube, widely infundibuliform. Capsules ⅜ in. in diam., subglobose, glabrous, 2-celled. Seeds pubescent with a marginal fringe of long white silky hairs. Fl. B. I. v. 4, p. 214 ; Trim. Fl. Ceyl. v. 3, p. 225 ; Talb. Trees, Bomb. ed. 2, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898)

p. 172. *Ipomœa pulchella,* Roth, Nov. Pl. Sp. (1821) p. 115 ; Wight, Icon. t. 156.—In flower most of the year.

KONKAN : *Stocks* ! S. M. COUNTRY : Badami, *Woodrow* !, *Cooke* ! KANARA : *Law* ! ; N. Kanara near the sea-coast, *Talbot.* GUJARAT : Baroda, *Woodrow* ! Often cultivated in gardens.—DISTRIB. India (W. Peninsula) ; Ceylon, Tropics generally.

21. **Ipomœa pes-tigridis,** *Linn. Sp. Pl.* (1753) p. 162. Stems twining, clothed with long spreading hairs. Leaves 1½—4 in. in diam., rotundate in outline, usually more or less deeply palmately 5—9-lobed, sometimes 3-lobed or occasionally entire ; lobes ovate, acute or acuminate, narrowed at the base, hirsute on both surfaces ; petioles 1½—3 in. long, hairy. Flowers sessile, 3 or more in a head ; peduncles 1—3 in. long, very hairy ; outer bracts nearly 1 in. long, the inner about ⅜ in. long, all ovate-oblong, subobtuse, very hair. Sepals ⅓—½ in. long, densely hairy and ciliate with long stiff hairs, the 2 outer sepals broader than the inner, ovate-lanceolate, the 3 inner linear-oblong, acute. Corolla about 1 in. long, tubular-campanulate, white or pale pink. Capsules ¼ in. in diam., globose, glabrous, papery, concealed in the calyx. Seeds grey-pubescent. Fl. B. I. v. 4, p. 204 ; Grah. Cat. p. 132 ; Dalz. & Gibs. p. 165 ; Wight, Icon. t. 836 ; Trim. Fl. Ceyl. v. 3, p. 216 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 488.—Flowers : Sept.—Nov.

Common in hedges, *Dalzell & Gibson.* KONKAN : *Law* !, *Stocks* ! ; Marmagão, *Cooke* ! ; Shrivardhan, *Woodrow* ! DECCAN : Junnar, *Kanitkar* ! S. M. COUNTRY : Padshapur, *Ritchie,* 1894 ! GUJARAT : Godra, *Cooke* ! ; Chandod, *Kanitkar* !—DISTRIB. More or less throughout India ; Ceylon, Malaya, China, Polynesia, Tropical Africa.

VAR. *hepaticifolia,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 204, cannot stand as a variety, inasmuch as 3-lobed and even entire leaves may sometimes be found on the same plant together with the 7-lobed ones.

Many plants of the genus are cultivated in the Presidency either as useful or ornamental plants, of which the principal are the following :—

Ipomœa Batatas, Poir, Encyc. Méthod. v. 6 (1804) p. 14. The well-known *Sweet potato,* originally a native of Tropical America, cultivated as a vegetable throughout India. There are 2 forms, one with white and the other with red flowers and tubers. Fl. B. I. v. 4, p. 202 ; Woodr. in Journ. Bomb. Nat. v. 11 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 478. *Batatas edulis,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 435 ; Grah. Cat. p. 129.—VERN. *Ratálu* ; *Kanangi.*

Ipomœa tuberosa, Linn. Sp. Pl. (1753) p. 160. A climber of rapid growth often called *The Spanish Arbor-vine,* grown as an ornamental plant in gardens. It has large dark-green digitate leaves and a profusion of golden-yellow flowers which appear in the cold season. It is easily propagated by seed, but does not flower the first season after sowing. Woodr. Gard. in Ind. ed. 5, p. 394.

Ipomœa carnea, Jacq. Enum. Pl. Carib. (1760) p. 13. A shrub, not twining, suberect and supporting itself to 5 or 6 ft. high ; in the woods of S. America, of which it is a native, climbing to a height of 20 ft. Corolla showy, pale rose-colored with a long tube. Introduced into many gardens in the Bombay Presidency. Woodr. Gard. in Ind. ed. 5, p. 391.

Ipomœa Leari, Paxt. Mag. Bot. v. 6 (1839) p. 267. A handsome twiner, a native of Tropical America, a favorite ornament of verandahs and trellises. It has large dark-blue flowers which become reddish as they fade. Woodr. Gard. in Ind. ed. 5, p. 392. *Pharbitis Learii,* Dalz. & Gibs. Suppl. p. 58.

Ipomœa hederacea, Jacq. Collect. v. 1 (1786) p. 124. A twiner with hairy stems, common in gardens and sometimes found as an escape. Probably an American plant, naturalized in the Old World (*Clarke*). It has ovate, cordate, 3-lobed leaves and a light-blue corolla. Fl. B. I. v. 4, p. 199 ; Trim. Fl. Ceyl. v. 3, p. 212 ; Jackson, in Index Kewen. v. 1, p. 1225 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171. *Convolvulus hederaceus,* Linn. Sp. Pl. (1753) p. 154. *C. Nil,* Linn. Sp. Pl. ed. 2 (1762) p. 219.

Ipomœa Horsfalliæ, Hook. Bot. Mag. (1834) t. 3315. A glabrous twiner a native of the West Indies with deeply-divided palmate leaves and a corolla of a deep rich rose-color. It is occasionally grown in gardens but is not easy of propagation. Woodr. Gard. in Ind. ed. 5, p. 392.

Ipomœa dasysperma, Jacq. Eclog. v. 1 (1811—1816) p. 132, t. 89. A glabrous twiner with pedately-divided leaves and sulphur-yellow flowers with a purple tube, cultivated in gardens, sometimes found as an escape. Fl. B. I. v. 4, p. 215 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172.

Ipomœa purpurea, Roth, Bot. Abhand. (1787) p. 27. A very showy plant, probably introduced from Tropical America, often grown to ornament trellises &c. Its flowers are of every shade from nearly white to dark-purple. Fl. B. I. v. 4, p. 200 ; Woodr. Gard. in Ind. ed. 5, p. 393.

Ipomœa rubro-cœrulea, Hook. Bot. Mag. (1834) t. 3297. A handsome species with large blue or white flowers, a native of Mexico, often cultivated in gardens. Woodr. Gard. in Ind. ed. 5, p. 393.

15. **CALONYCTION,** Choisy.

Large herbaceous climbers ; stems usually muricate. Leaves large, cordate, entire or angled. Flowers 1—5 in axillary cymes ; bracts caducous. Sepals 5, herbaceous, smooth, usually aristate, subequal or the outer smaller. Corolla large, glabrous, white or rose-purple, hypocrateriform ; tube long, narrow, many times longer than the sepals ; limb plicate. Stamens 5, exserted. Ovary 2-celled ; ovules 4 ; style filiform ; stigma 2-globose. Capsule 4-valved. Seeds 4, glabrous.—DISTRIB. Tropical Asia, Africa and America ; species 4.

Corolla pure white; seeds yellow..... 1. *C. speciosum.*
Corolla rose-purple; seeds black..... 2. *C. muricatum.*

1. **Calonyction speciosum,** *Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv.* v. 6 (1834) p. 441. A large glabrous twiner climbing to a great height; stems often muricate (sometimes almost prickly). Leaves large, 3—7 in. long, broadly ovate, acuminate, entire, glabrous, thin, base deeply cordate with broad rounded basal lobes; petioles about as long as the leaves. Peduncles 2—6 in. long, glabrous, 1—5-flowered; bracts caducous; pedicels usually short, stout. Sepals subequal in length, ½ in. long, ovate, strongly mucronate, the 2 inner broader than the 3 outer. Corolla pure white, the bands sometimes greenish; tube 3—3½ in. long, narrow; limb 3—5 in. in diam. Anthers shortly exserted. Capsules ovoid-oblong, about 1 in. long, narrowed upwards. Seeds irregularly trigonous, ½ in. long, glabrous, polished, yellow. Dalz. & Gibs. p. 164; Wight, Icon. t. 1361. *Calonyction Bona-nox,* Boj. Hort. Maur. (1837) p. 227. *C. Roxburghii,* G. Don. Gen. Syst. v. 4 (1837) p. 263; Grah. Cat. p. 130. *Ipomœa Bona-nox,* Linn. Sp. Pl. ed. 2 (1762) p. 228; Trim. Fl. Ceyl. v. 3, p. 213; Talb. Trees, Bomb. ed. 2, p. 252; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171; Watt, Dict. Econ. Prod. v. 4, p. 483. *I. Bona-nox,* var. *grandiflora,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 197. *I. grandiflora* (sp.), Roxb. Hort. Beng. (1814) p. 14.—Flowers: Oct.—Nov. VERN. *Gulchándni.*

Doubtfully wild, frequently found near villages and houses. Cultivated for its large white fragrant flowers, which open in the evening and wither before noon next day. Called *Moon-flower* by Anglo-Indians.—DISTRIB More or less throughout India; Ceylon, Tropical Africa, E. Asia.

2. **Calonyction muricatum,** *G. Don, Gen. Syst.* v. 4 (1837) p. 264. A large twiner; stems often muricate. Leaves 3—6 by 2½—5 in., broadly ovate, acuminate, glabrous, entire, base deeply cordate with rounded lobes; petioles 3—6 in. long. Peduncles 1—5-flowered, variable in length; bracts caducous; pedicels usually much thickened upwards in fruit. Sepals ½—⅝ in. long, elliptic-oblong, aristate, subequal in length, the 3 outer much broader than the 2 inner. Corolla 2—3 in. long, rose-purple; tube 1—2 in. long, hairy within. Anthers not twisted. Capsules ½—⅔ in. in diam., globose, apiculate. Seeds ⅜ in. long, smooth polished, black. Grah. Cat. p. 130. *Ipomœa muricata,* Jacq. Hort. Schœnb. v. 3 (1798) p. 40, t. 323 (*not* of Cav.); C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 197; Trim. Fl. Ceyl. v. 3, p. 214; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171; Watt, Dict. Econ. Prod. v. 4, p. 487.—Flowers: Sept.—Nov. VERN. *Gariya.*

Rarely if ever truly wild, often cultivated for the sake of the thickened pedicels which are eaten KONKAN: on rubbish and in waste places about Bombay, *Graham.* DECCAN: Kartriz Ghát, *Woodrow.* S. M. COUNTRY: Belgaum, *Ritchie,* 1889!—DISTRIB. India (Himalayas extending from Kangra to Sikkim, Deccan hills); Ceylon, Japan.

16. **RIVEA,** Choisy.

Climbing shrubs. Leaves cordate, usually silky beneath (at least when young); petiole long. Peduncles axillary, 1—3 (sometimes 7)-

flowered ; bracts 2—3, narrow. Sepals 5, ovate or lanceolate-oblong, subqual. Corolla large, hypocrateriform ; tube narrow, cylindric ; lobes of the limb broad, rounded, plicate. Disk annular. Stamens 5, included ; anthers narrow, oblong, not finally twisting. Ovary 4-celled ; ovules 4 ; style filiform ; stigmas 2, linear-oblong. Fruit a subglobose dry woody berry, or an irregularly opening capsule often 1-celled from the absorption of the septa. Seeds 1—4, glabrous, surrounded by mealy pulp.—DISTRIB. East Indies and S. America ; species about 10.

Sepals ovate, obtuse; peduncles usually 1-flowered; leaves rarely broader than long..... 1. *R. hypocrateriformis.*
Sepals lanceolate, acute; peduncles usually 7-flowered; leaves usually broader than long..... 2. *R. ornata.*

1. **Rivea hypocrateriformis,** *Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv.* v. 6 (1834) p. 408. A large climber ; stems terete, more or less silky-pubescent. Leaves 1½—2½ by 1¼—2¼ in., sometimes as broad as, but rarely broader than long, orbicular, obtuse, rarely mucronulate, glabrous or nearly so above, appressedly silky-hairy beneath, base usually cordate ; petioles ½—2 in. long, silky. Peduncles very short, usually 1-flowered ; bracts 2 at the apex of the peduncle ; pedicels short, articulated to the peduncle. Sepals ⅓ in. long, ovate-elliptic, obtuse or subobtuse, silky-hairy. Corolla fragrant, 2½—3 in. long ; tube very long ; limb reaching 2 in. in diam., glabrous or with a few scattered hairs outside. Anthers ¼ in. long, linear-oblong. Stigmas ⅛ in. long, linear-oblong. Fruit ½ in. in diam., globose, mucronate by the style-base, chestnut-brown, glabrous, polished. Fl. B. I. v. 4, p. 184 ; Grah. Cat. p. 127 ; Dalz. & Gibs. p. 168 ; Aitch. Pb. & Sind Pl. p. 100 ; Talb. Trees, Bomb. ed. 2, p. 247 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 557. *Rivea fragrans,* Nimmo, in Grah. Cat. p. 127. *R. Bona-nox,* Choisy, Convolv. Orient. (*l. c.*) p. 409 ; Dalz. & Gibs. p. 168.—Flowers : Aug.—Oct. VERN. *Phánji.*

KONKAN : *Law* !, *Graham.* DECCAN : Máwal (Poona districts), *Woodrow* ! ; Bowdhan near Poona, *Cooke* ! ; Ganesh Khind, *Woodrow* ! SIND : common in the hills, *Stocks,* 486 ! ; Jemadar ka Landa near Karachi, *Stocks,* 486 ;—DISTRIB. India (W. Peninsula, Assam). The leaves and young shoots are eaten as a vegetable. See Watt, Dict. Econ. Prod. l. c.

2. **Rivea ornata,** *Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv.* v. 6 (1834) p. 409. Climbing ; stems stout, terete, finely silky-pubescent (especially when young) with white appressed hairs. Leaves 1½—4 in. long, usually broader than long, orbicular or reniform, obtuse, often apiculate or very shortly acuminate, glabrous above, more or less densely white-silky beneath, base cordate ; petioles 1—3 in. long, densely silky. Peduncles stout, stiff, 1—3 in. long, white-silky, 1—7-flowered ; bracts oblong, acute, fleshy, caducous ; buds pointed, silky at the tip ; pedicels short, stout, silky, articulated to the peduncle. Sepals ⅝—¾ in. long, ovate-lanceolate, acute or subacute, fleshy, silky-pubescent outside, persistent. Corolla at first white, afterwards becoming cream-colored, drying yellow (*Trimen*), sweetly fragrant ; tube 1½—2 in. long ; limb 2—2½ in. in diam ; lobes shallow, emarginate. Fruit subglobose, less than 1 in. in diam.,

mucronate by the style-base, glabrous, polished, brown. Fl. B. I. v. 4, p. 183 ; Grah. Cat. p. 128 ; Dalz. & Gibs. p. 168 ; Wight, in Calc. Journ. Nat. Hist. v. 8 (1847) p. 179, t. 5, fig. 1 ; Trim. Fl. Ceyl. v. 3, p. 205 ; Talb. Trees, Bomb. ed. 2, p. 247 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 558.—Flowers : July—Sept.

Throughout the Presidency in deciduous forests, not common. KONKAN : Worli hill (Bombay), *Graham* ; Salsette, *Graham*. DECCAN : Máwal (Poona districts), *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon.

17. **ARGYREIA,** Lour.

Climbing rarely suberect shrubs. Leaves ovate-cordate to narrow-lanceolate, usually pubescent or silky beneath. Flowers showy, purple or rose (rarely white), usually in many-flowered cymes, often capitate ; bracts often conspicuous. Sepals 5, herbaceous, leathery and but little enlarged in fruit, often red within. Corolla infundibuliform or somewhat tubular ; limb plicate, more or less hirsute externally, shortly lobed. Stamens 5, included ; anthers oblong, straight. Disk annular. Ovary 4-celled ; ovules 4 ; style filiform ; stigma 2-globose. Fruit a dry hard berry. Seeds 4 or fewer, embedded in mealy pulp.—DISTRIB. Tropical Asia and the Malayan Archipelago ; species about 25.

Climbing or twining shrubs.	
Leaves glabrous above.	
Leaves broadly ovate-cordate, 5—10 in. broad.	
Leaves white-tomentose beneath	1. *A. speciosa.*
Leaves glabrous or nearly so beneath, not white-tomentose	2. *A. Hookeri.*
Leaves elongate-ovate with rounded base, less than 4 in. broad, sparsely hairy beneath	3. *A. involucrata.*
Leaves strigose or pubescent above.	
Bracts with parallel nerves.	
Bracts large, ovate-oblong, silky	4. *A. sericea.*
Bracts not parallel-nerved.	
Bracts linear.	
Bracts ⅜—1¼ in. long, strigose with bulbous-based hairs	5. *A. pilosa.*
Bracts ½—⅔ in. long, softly pubescent	6. *A. Lawii.*
Bracts suborbicular, ½ in. in diam.	7. *A. cymosa.*
An erect shrub with obovate cuneate leaves	8. *A. cuneata.*

1. **Argyreia speciosa,** *Sweet, Hort. Brit.* ed. 1 (1827) p. 289. A very large climber ; stems stout, white-tomentose. Leaves 3—12 by 2½—10 in. (sometimes even larger), ovate, acute, glabrous above, persistently white-tomentose beneath, base cordate ; petioles 2—6 in. long, white-tomentose. Flowers in subcapitate cymes ; peduncles 3—6 in. long, stout, white-tomentose ; bracts large, ovate-lanceolate with a long acumen, thin, veined, pubescent outside, glabrous inside, deciduous, the outer sometimes 2 in. long ; pedicels very short, often almost 0, white-tomentose. Calyx white-tomentose outside ; sepals nearly ⅜ in. long, oblong-elliptic, obtuse. Corolla 2—2½ in. long, tubular-infundibuliform, the bands silky-pubescent outside ; tube somewhat inflated, white-pubescent outside, rose-purple and glabrous inside. Ovary glabrous. Fruit ¾ in. in diam., globose,

apiculate. Fl. B. I. v. 4, p. 185 ; Grah. Cat. p. 128 ; Dalz. & Gibs. p. 168 ; Trim. Fl. Ceyl. v. 3, p. 207 ; Talb. Trees, Bomb. ed. 2, p. 248 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 ; Watt, Dict. Econ. Prod. v. 1, p. 310.—Flowers : Aug.—Sept. VERN. *Samudrashok.*

The *Elephant Creeper* of Anglo-Indians. A doubtful native in the Bombay Presidency, where it is found chiefly near villages. It is considered to be native in Bengal. It is cultivated for its large handsome leaves and beautiful rose-purple flowers.

KONKAN : *Graham, Stocks* !, *Law* ! DECCAN : *Dalzell & Gibson.* S. M. COUNTRY : Belgaum, *Ritchie,* 1886 !—DISTRIB. Throughout India, often cultivated ; Java.

2. **Argyreia Hookeri,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 185. A large climbing shrub ; stems grooved, glabrous or slightly pubescent. Leaves 6—8 by 5—6 in., broadly ovate, acute or acuminate, glabrous, base cordate with rounded lobes ; main nerves 10—12 pairs, conspicuous beneath, not very oblique ; petioles 4—5 in. long, grooved, glabrous or nearly so. Flowers in long-pedunculate few-flowered cymes ; peduncles 6—8 in. long, grooved, more or less hairy ; bracts ¾—1½ by ⅛—⅓ in., linear-oblong, obtuse or subacute, often apiculate, glabrous or pubescent ; pedicels ¼—⅓ in. long. Sepals ovate-lanceolate, sparsely hairy on the back and with membranous margins, the outer rather more than ½ in. long, slightly narrower and longer than the inner. Corolla rose-colored, 2—2½ in. long, tubular-campanulate ; tube 1 in. long, glabrous ; limb 2—2½ in. wide at the mouth, with 5 acute lobes, the bands sparsely hairy with appressed hairs. Filaments hairy at the base ; anthers ¼ in. long, oblong, obtuse. Berry ¾ in. in diam., globose. *Argyreia malabarica,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 (*not* of Choisy).—Flowers : Aug.—Sept.

The bracts of the Bombay specimens are rather longer than those from the Himalayas and Assam and the sepals somewhat more unequal.

DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ; road between Mahableshwar and Panchgani, *Cooke* !—DISTRIB. Assam, Sikkim-Himalaya, Bhotan, W. Peninsula.

3. **Argyreia involucrata,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 187. A large twiner ; stems clothed with appressed hairs. Leaves 4—7 by 1½—3½ in., ovate, acute or acuminate, glabrous or nearly so above, sparsely hairy beneath, base rounded or shallowly cordate (rarely subrhomboid) ; main nerves 8—10 pairs, conspicuous beneath ; petioles 1—2½ in. long, usually hairy. Flowers in subcapitate cymes ; peduncles ¾—3 in. long, hairy ; bracts very variable, usually ¾—1¼ in. long (in an extreme case 2½ by 1 in.), oblong-lanceolate, acute, veined, thin, flat, sparsely hairy, the inner narrower than the outer. Sepals in flower unequal, the 2 outer exceeding ½ in. long, ovate-lanceolate, acuminate, hairy and with ciliate margins, the 3 inner ⅜ in. long ; rather broader than the outer, ovate, acute, hairy on the back and with glabrous membranous margins. Corolla 2 in. long, tubular-infundibuliform ; the bands hairy ; tube glabrous within the calyx, sparsely hairy with long hairs beyond it ; lobes of

limb short, acute, with penicillate tips. Filaments hairy at the base. Fruit ½ in. in diam., globose. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170 ; var. *inæqualis*, C. B. Clarke, in Hook. f. Fl. B. I. (*l. c.*) ; Talb. Trees, Bomb. ed. 2, p. 248.—Flowers : Oct.

In the 'Flora of British India' (*l. c.*) the sepals are said to be subequal, but I have found them very distinctly unequal, even in the specimens in Herb. Kew. which have been named *A. involucrata* by Mr. Clarke. The outer bracts vary much in size, being especially large in some of the specimens collected near the coast. In a specimen collected by me near Marmagão the outer bracts is 2½ by 1 in. These monstrous bracts are, however, by no means a constant character and vary on the same plant. The VAR. *inæqualis*, C. B. Clarke, cannot be maintained.

KONKAN : *Stocks* ! ; Collem (in Portuguese territory below Castlerock Ghát), *Woodrow* ! ; road from Vingorla to Wadi, *Woodrow* ! ; Marmagão, *Cooke* !, *Woodrow* ! DECCAN : Wadi, below Mahableshwar, *Cooke* ! KANARA : *Talbot*.—DISTRIB India (W. Peninsula).

4. **Arygreia sericea,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 169. A large silky twiner. Leaves 3—6 by 2—5½ in., broadly ovate, acuminate, hispid or strigose with appressed hairs above, densely silky, silvery-white beneath, base usually cordate with rounded lobes ; main nerves 8—10 pairs, slender, usually conspicuous beneath ; petioles 1—2 in. long, densely silky. Flowers 6—8, in capitate or subcapitate cymes ; peduncles 1—4 in. long, silky ; bracts large, foliaceous, with subparallel nerves, ovate-oblong, silky, the outer sometimes reaching 1¾ in. long ; pedicels almost 0. Sepals densely hairy and ciliate, the 2 outer rather more than ½ in. long, linear-oblong, obtuse, the 3 inner about ⅓ in. long, elliptic-oblong, subacute. Corolla pink, 2½ in. long, tubular-infundibuliform ; tube and bands hairy. Filaments hairy at the base ; anthers sagittate. Berry ½ in. in diam., orange-colored. Fl. B. I. v. 4, p. 188 ; Talb. Trees, Bomb. ed. 2, p. 248 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170. *Ipomœa bracteata*, Grah. Cat. p. 131 (*not* of Don).—Flowers : Sept.—Oct. VERN. *Gável.*

Very close to *A. argentea*, Choisy.

KONKAN : *Stocks* !, *Law* ! ; S. Konkan, common, *Dalzell & Gibson* ; Matheran, *Cooke* ! ; hills near Matheran, *Kanitkar* ! ; Dasgaon, *Woodrow* ! ; Chowk, *Graham*. DECCAN : Kartriz hills, *Kanitkar* ! ; high hills west of Junnar, *Dalzell & Gibson*. S. M. COUNTRY : hills south of Belgaum, *Ritchie*, 472 !—DISTRIB. India (W. Peninsula).

5. **Argyreia pilosa,** *Wight & Arn. in Arn. Pugill. in Nov. Act. Nat. Cur.* v. 18, part 1 (1836) p. 356 c. A large patently hirsute twiner. Leaves 3—7½ by 2—6 in., ovate, acute, densely hirsute on both sides with hairs arising from bulbous bases, base rounded or cordate ; petioles ¾—3 in. long. Flowers capitate, 2—6 in a head ; peduncles variable in length, ½—4 in. long, hirsute ; bracts ⅝—1¼ in. long, linear, subacute, hairy on both sides, the hairs usually from bulbous bases. Sepals nearly ½ in. long, subequal, lanceolate, acute, hairy on the back. Corolla dark-red or purple, 2 in. long, tubular-infundibuliform, hirsute on the bands, sparingly so on the tube ; lobes of the limb short, acute, penicillate at the tip. Filaments long, fili-

form, hairy at the very base ; anthers oblong, obtuse. Fruit ½—⅔ in. in diam. Fl. B. I. v. 4, p. 189 ; Talb. Trees, Bomb. ed. 2, p. 248 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers : Sept.—Oct.

KONKAN : *Stocks* ! S. M. COUNTRY : Belgaum (common), *Ritchie*, 473 ! KANARA : *Law* ! ; very common in the forests near Yellapur in moist shady places, *Talbot* ; Yellapur, *Woodrow*.—DISTRIB. India (W. Peninsula).

6. **Argyreia Lawii,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1883) p. 190. Scandent ; stems softly silky. Leaves 3—5 by 1¾—2¾ in., ovate, acute or acuminate, softly hairy on both surfaces with appressed hairs which are often silvery-white beneath, base rounded or rhomboid ; petioles ¾—1¾ in. long. Flowers 3—9, in small, dense, dichotomous cymes with 1 flower in the fork ; peduncles 2—5 in. long, slender, silky-white ; bracts ⅓—⅔ in. long, linear, acute, pubescent, ciliate ; pedicels very short. Sepals ¼ in. long, subequal, elliptic, subacute, hairy. Corolla 2 in. long, tubular-campanulate, hairy on the bands outside. Filaments short, dilated and densely hairy at the base. Fruit not seen. Talb. Trees, Bomb. ed. 2, 249.

Except a sheet in Herb. Kew. marked "North and South Konkan, Law," I have seen no specimen from the Bombay Presidency. Talbot has apparently not found the plant, as he gives no definite locality for it, while Woodrow does not include it in his list.

7. **Argyreia cymosa,** *Sweet, Hort. Brit.* ed. 1 (1827) p. 289. Scandent ; stems terete, pubescent. Leaves 2—4 by 1¾—3 in., broadly ovate, shortly acuminate, pubescent on both sides, base cordate with rounded lobes ; petioles 1½—2½ in. long, hairy. Flowers in branched corymbose cymes sometimes reduced to simple heads ; peduncles 1—4 in. long, hairy ; bracts ½ in. in diam., suborbicular, persistent, softly pubescent. Calyx large ; 3 outer sepals very broad, ½—⅔ in. long and sometimes nearly ½ in. wide, broadly obovate, oblong or suborbicular, obtuse or subacute, pubescent on both sides, veined ; the 2 inner sepals almost as long as the outer but much narrower (⅓—¼ in. wide), oblong-lanceolate, subacute, softly pubescent on both sides. Corolla 2—2½ in. long, tubular-infundibuliform, densely hairy on the bands outside. Stamens not exserted. Fruit ¾ in. in diam. Fl. B. I. v. 4, p. 190 ; Wight, Icon. t. 839 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.

Rare in the Bombay Presidency. KONKAN : North and South Konkan, *Law* ! ; Western Ghâts, *Woodrow*.—DISTRIB. India (W. Peninsula) ; Philippines.

8. **Argyreia cuneata,** *Ker-Gawl. in Bot. Reg.* v. 8 (1822) t. 661. A shrub, usually erect but with a tendency to climb when near support ; stems softly silky pubescent. Leaves 1½—4 by ⅜—1¾ in., obovate-oblong, obtuse, sometimes emarginate, usually shortly apiculate, glabrous or nearly so above, silky-hairy beneath, base cuneate ; petioles ¼—⅓ in. long. Flowers in few-flowered (usually 3-flowered) cymes ; peduncles 0—1½ in. long ; bracts ¼—⅓ in. long, linear-lanceolate, acute, hairy. Sepals ⅓—¼ in. long, orbicular-ovate, obtuse, thick, pubescent outside. Corolla bright-purple, 2 in. long, tubular-infundibuliform, the bands hairy. Filaments short, dilated and hairy at the base. Fruit ½ in. long, ellipsoid, pointed, shining, yellowish-

brown, nearly dry. Fl. B. I. v. 4, p. 191 ; Grah. Cat. p. 128 ; Dalz. & Gibs. p. 169 ; Talb. Trees, Bomb. ed. 2, p. 249 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 170.—Flowers: July—Sept. VERN. *Mahálungi.*

Tolerably common in the dry districts of the Presidency. DECCAN: hills near Poona, *Woodrow*!; Máwal districts common, *Dalzell & Gibson;* Bowdhan (Poona districts), *Cooke*!, *Kanitkar*! S. M. COUNTRY: *Ritchie,* 476!—DISTRIB. India (W. Peninsula).

IMPERFECTLY KNOWN SPECIES.

ARGYREIA MALABARICA, Choisy, convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 420. This plant, of which, according to Mr. C. B. Clarke (Hook. f. Fl. B. I. v. 4, p. 189), no authentic example has been seen by any author, I have not been able to find in the Bombay Presidency. There are 2 sheets in Herb. Kew. from Wight's herbarium which Wight has named *A. Leschenaultii,* but which Mr. Clarke considers to be the plant figured by Rheede (Hort. Mal. v. 11, t. 51) and to be *A. malabarica,* Choisy. The specimens on these sheets are destitute of flowers and were not collected in the Bombay Presidency. I cannot agree that they accord with Rheede's drawing. The leaves of Wight's n. 2353 do not resemble the leaves in Rheede's figure, the former having a truncate or cuneate base, the latter being deeply cordate. The young leaves in Wight's n. 2356 (distributed from Kew as *Argyreia Leschenaultii,* Wight, and numbered 1962) are very densely silky-pubescent; the older leaves in both of Wight's specimens (n. 2353 and n. 2356) are appressedly hairy with long bulbous-based hairs on the lower side. Graham (Cat. Bo. Pl. p. 128) describes the flowers as large and showy, cream-colored, with a deep purple bottom. I know of no *Argyreia* on the Bombay Ghâts (where Graham says it is pretty common) which fits in with this description. Dalzell & Gibson (Bo. Fl. p. 169) follow Graham and say that the plant is common on the Ghâts, but there are no specimens in Dalzell's herbarium at Kew. Dalzell & Gibson further describe the peduncles as many-flowered at the apex, whereas Rheede's figure shows them to be 3-flowered. Talbot does not include the plant in his list of trees, shrubs, and woody climbers, while the plant, of which Woodrow (Journ. Bomb. Nat. v. 12 (1898) p. 170) gives Mahableshwar as the habitat and names *A. malabarica,* is *A. Hookeri,* Clarke. Trimen (Fl. Ceyl. v. 3, p. 228) says that Rheede's plant has been referred by Moon to *Breweria cordata.*

18. LETTSOMIA, Roxb.

Scandent more or less hairy shrubs. Leaves alternate, base rounded, rhomboid or cordate. Flowers in axillary pedunculate corymbose or capitate cymes ; bracts usually conspicuous. Sepals 5, orbicular, elliptic or oblong, often thickened and somewhat enlarged in fruit. Corolla usually pink, tubular-infundibuliform ; limb plicate ; lobes small. Stamens 5, included or exserted ; anthers oblong or linear, not finally twisted. Disk annular or cup-shaped. Ovary 2-celled ; ovules 4 ; style filiform ; stigma 2-globose. Fruit a dry berry. Seeds 4 or fewer, embedded in mealy pulp.—DISTRIB. East Asia and Tropical Africa ; species 13.

Stamens exserted	1. *L. aggregata.*
Stamens included.	
Corolla glabrous or nearly so; fruit orange	2. *L. elliptica.*
Corolla densely strigose; fruit red	3. *L. setosa.*

1. **Lettsomia aggregata,** *Roxb. Hort. Beng.* (1814) p. 13. A climbing white- or yellowish-tomentose shrub (sometimes procumbent

or diffuse, *Wight*) ; stems softly tomentose. Leaves 2—4½ by 1¾—4 in., ovate, usually obtuse, glabrous above, white- or yellowish-tomentose or woolly beneath, base shallowly cordate ; main nerves prominent beneath ; petioles 1—2 in. long, tomentose, grooved. Flowers in dense capitate cymes ; peduncles shorter than the leaves, 0—2½ in. long, grooved, tomentose ; bracts large, broad, orbicular-ovate, ⅓—½ in. long, densely silky-tomentose outside, glabrous inside, subpersistent ; pedicels short or 0. Sepals oblong-obtuse, ⅜ in. long, densely silky-tomentose. Corolla pink, rather more than ½ in. long, tubular-campanulate ; tube glabrous, ¼ in. long ; limb 5/16 in. long, deeply divided below the middle into 5 oblong emarginate lobes, each lobe furnished at the back with a densely hairy band, the margins of the lobes beyond the bands tender. Stamens and style much exserted. Filaments densely hairy at the base, with short stout hairs. Fruit ¼—⅓ in. in diam., smooth, red, surrounded by the enlarged, spreading, rather thick, concave sepals, which are hairy outside, glabrous, red and smooth within. Seeds greyish-black, smooth. Fl. B. I. v. 4, p. 191 ; Wight, Icon. t. 1359 ; Trim. Fl. Ceyl. v. 3, p. 209 ; Talb. Trees, Bomb. ed. 2, p. 249 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171. *Argyreia aggregata,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 427 ; Grah. Cat. p. 128 ; Dalz. & Gibs. p. 169.—Flowers : Sept.—Dec.

KONKAN : *Stocks* !, *Law* ! S. M. COUNTRY : *Law* ex *Graham, Dalzell & Gibson;* Belgaum, *Ritchie,* 471 ! ; Dharwar, *Talbot, Cooke* !, *Woodrow* ! KANARA : drier parts of N. Kanara, *Talbot* ; Kumpta, *Woodrow* !—DISTRIB. India (W. Peninsula) ; Ceylon.

2. **Lettsomia elliptica,** *Wight, Icon.* v. 4, part 2 (1850) p. 12. A large climber ; young parts more or less pubescent ; stems slender, woody below. Leaves 2½—4 by 1¼—2¾ in., often closely placed on numerous short branches, elliptic-lanceolate, acute, nearly glabrous above, more or less hairy and pale beneath, base acute or rounded ; main nerves slender, very oblique, curving towards the apex of the leaf-blade ; petioles 1—2 in. long, pubescent. Flowers in lax corymbose or paniculate cymes ; peduncles 1—3 in. long ; pedicels ¼—¾ in. long ; bracts small, caducous. Sepals ⅛—¼ in. long, the 3 outer elliptic, obtuse, hairy, ⅛ in. broad, the 2 inner orbicular, as broad as long or nearly so, pubescent on the back and with membranous glabrous margins. Corolla tubular-infundibuliform, 1—1½ in. long, rose-colored with a deep purple bottom, the bands slightly hairy, sometimes almost glabrous ; tube glabrous ; limb very slightly lobed. Stamens included ; filaments dilated and hairy at the base. Fruit ¼—⅓ in. in diam., depressed-globose, orange, surrounded by the slightly enlarged sepals. Fl. B. I. v. 4, p. 192 ; Trim. Fl. Ceyl. v. 3, p. 209 ; Talb. Trees, Bomb. ed. 2, p. 249 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 ; Watt, Dict. Econ. Prod. v. 4, p. 632. *Argyreia elliptica,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 417 ; Grah. Cat. p. 128 ; Dalz. & Gibs. p. 169.—Flowers : Sept.—Oct. VERN. *Bondvel.*

A very variable plant in the size of the flowers and their number in a cyme.

KONKAN: *Stocks, Law*! DECCAN: Khandala, *Cooke*!; Western Ghâts, *Kanitkar*!; Fitzgerald Ghât below Mahableshwar, *H. M. Birdwood;* Koina valley below Mahableshwar, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 475!; Castlerock, *Cooke*!; KANARA: common in the Supa Ghât jungles, *Talbot.*—DISTRIB. India (W. Peninsula); Ceylon.

3. **Lettsomia setosa,** *Roxb. Hort. Beng.* (1814) p. 13. A large climber; stems terete, thick, the older glabrous with a rough bark, the younger as well as the young branchlets appressedly strigose-hairy. Leaves 3—6 by 2—5 in., ovate, acute or acuminate, sparsely hairy on both surfaces, nearly glabrous when old, base usually cordate with rounded lobes; petioles 1—3 in. long. Flowers in dense hairy corymbose cymes; peduncles 2—8 in. long, stout, strigose with appressed hairs; bracts ¼ in. long, broadly ovate, obtuse, appressedly strigose; pedicels variable in length, strigose. Sepals subequal, ⅛ in. long, thick, subfleshy, orbicular, densely appressedly strigose, the 2 inner with membranous margins. Corolla rose-colored, ¾—1¼ in. long; tube contracted within the calyx and there glabrous, the upper portion beyond the calyx somewhat swollen and as well as the bands densely strigose; limb with short acute lobes. Stamens included; filaments much dilated and densely hairy at the base. Fruit ⅜ in. long, ovoid, red. Fl. B. I. v. 4, p. 194; Wight, Icon. t. 1360; Talb. Trees, Bomb. ed. 2, p. 250; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171. *Argyreia setosa,* Choisy, Convolv. Orient. in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 425; Dalz. & Gibs. p. 168.—Flowers: Sept.—Dec. VERN. *Dudh-vel*; *Sámbhar-yel.*

KONKAN: *Stocks*!, *Law*!; Narel below Matheran, *Woodrow*; Matheran, *H. M. Birdwood.* S. M. COUNTRY: Belgaum, south of Cheeta hill, *Ritchie*, 1129! KANARA: *Talbot.*—DISTRIB. More or less throughout India; Ceylon.

VAR. *minor,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1883) p. 194. Leaves 1—2 in. long; flowers capitate; peduncles 1—1½ in. long; corolla 1 in. long.

KONKAN: *Law*!, *Stocks*!

The following, not belonging to any of the genera described above, are grown in gardens as ornamental plants:—

Legendrea mollissima, Webb & Berthelot, Hist. Nat. Canar. v. 3, part 2, sect. 3, p. 27, t. 137. A strong climber, a native of the Canary Islands. It lives several years and develops a thick stem of a pale ash-color marked by deep furrows. The leaves are cordate, smooth, about 4 by 3 in., and the flowers are produced in great profusion in October. Woodr. Gard. in Ind. ed. 5, p. 395.

Quamoclit coccinea, Mœnch. Méthod. (1795) p. 453. A subscandent shrub with weak stems, a native of Tropical America. It has ovate cordate acute leaves and lax cymes of crimson flowers. *Quamoclit phœnicea,* Choisy, in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 433; Dalz. & Gibs. Suppl. p. 59. *Ipomœa coccinea,* Linn. Sp. Pl. (1753) p. 160; Bot. Mag. (1794) t. 221; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 199; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171.

Quamoclit vulgaris, Choisy, in Mém. Soc. Phys. Genèv. v. 6 (1834) p. 434. A handsome twining glabrous annual, a native of Tropical America, very common in gardens throughout the Presidency and indeed throughout India. It has pinnate leaves with numerous filiform segments and bright red or sometimes white flowers 1 in. in diam. when expanded. Dalz. & Gibs. Suppl. p. 59. *Quamoclit pinnata*, Boj. Hort. Maurit. (1837) p. 224. *Ipomœa Quamoclit*, Linn. Sp. Pl. (1753) p. 159 ; Bot. Mag. (1794) t. 244 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 199 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 171 & Gard. in Ind. ed. 5, p. 397.—VERN. *Kámalatá ; Ganesh-pushpa.*

ORDER LXXXIX. **SOLANACEÆ.**

Herbs or shrubs, erect, trailing or scandent (rarely trees). Leaves alternate, often in unequal pairs, rarely clustered, never truly opposite, entire, lobed or pinnate ; stipules 0. Flowers regular, hermaphrodite (very rarely dicœcious), in lateral terminal axillary or extra-axillary cymes, or on solitary or clustered pedicels ; bracts and bracteoles 0. Calyx inferior ; limb usually 5 (rarely 3—10) -lobed or -toothed, usually persistent, often accrescent in fruit. Corolla infundibuliform, campanulate or rotate, often plicate ; lobes 5 (rarely 10) or limb subentire. Stamens 5, on the corolla-tube ; anthers ovate or oblong, dehiscing by apical pores or longitudinally. Ovary 2-celled or imperfectly 1- or 4-celled (rarely 3—5-celled) ; ovules many, on prominent peltate placentas ; style linear ; stigma capitate or very shortly lobed. Fruit a berry or a circumscissile or valved capsule, usually 2-celled, many-seeded. Seeds compressed, discoid, or subreniform, with peripheric embryo, or seeds scarcely compressed with a straight embryo—DISTRIB. Warmer regions of the whole world ; genera about 70 ; species about 1250.

Fruit a berry.		
Corolla plaited or the lobes valvate.		
Anthers opening by apical pores	1.	SOLANUM.
Anthers dehiscing longitudinally.		
Calyx in fruit much enlarged, overtopping the berry.		
Pedicels solitary	2.	PHYSALIS.
Flowers clustered, sessile or nearly so.	3.	WITHANIA.
Corolla-lobes more or less imbricate.		
Calyx and corolla small	4.	LYCIUM
Fruit capsular.		
Capsule 4-celled, 4-valved or subindehiscent.		
Calyx in fruit circumscissile above the base	5.	DATURA.
Capsule circumscissile near the apex	6.	HYOSCYAMUS.

1. **SOLANUM,** Linn.

Herbs or shrubs sometimes subscandent (rarely small trees), unarmed or prickly. Leaves alternate or subopposite, entire, lobed or pinnatisect, solitary or twin. Flowers in dichotomous or racemose lateral or terminal cymes. Calyx 5—10-lobed (rarely 4-lobed or sub-

entire), unaltered or enlarged in fruit. Corolla rotate, rarely campanulate; tube short; limb plicate, usually 5-lobed. Stamens 5 (rarely 4—6) in the corolla-throat; filaments short; anthers oblong, often narrowed upwards, connivent in a short cone, opening by terminal pores or short slits. Ovary 2-celled, rarely (in cultivated forms) 3—4-celled; style columnar; stigma small. Berry small or large, globose or elongate. Seeds numerous, usually discoid; embryo peripheric.—DISTRIB. Warmer regions of the globe, most abundant in America; species more than 700.

Unarmed.

An annual herb; flowers in umbellate cymes	1. *S. nigrum.*
Shrubs, undershrubs, or small trees.	
Shrub or small tree 6—20 ft. high; flowers white in corymbose cymes	2. *S. verbascifolium.*
Shrubs 3—6 ft. high; flowers purple.	
Flowers in racemose cymes	3. *S. pubescens.*
Flowers in lateral fascicles.	
Calyx entire or obscurely 5-toothed	4. *S. bigeminatum.*
Calyx with 5—8 conspicuous teeth	5. *S. denticulatum.*

Armed with prickles.

Herbs.	
Leaves 6 in. or more long; berry ¾—1¼ in. in diam., densely clothed with long hairs	6. *S. ferox.*
Leaves not exceeding 4 in. long; berry ½—¾ in. in diam., yellow, or white with green veins, glabrous.	7. *S. xanthocarpum.*
Shrubs or undershrubs.	
Leaves entire, not prickly on the midrib.	
A tall hoary-tomentose shrub reaching 12 ft. high; leaves 5—9 in. long	8. *S. giganteum.*
Leaves exceeding 2 in. long, more or less sinuately or pinnately lobed, prickly on the midrib.	
Flowers hermaphrodite.	
Berry ⅓ in. in diam., yellow	9. *S. indicum.*
Male flowers in a raceme; female flowers solitary.	
Berry ¾—1 in. in diam., yellow	10. *S. incanum.*
Leaves not exceeding 2 in. long.	
Petioles and pedicels prickly.	
Berry ¼—½ in. in diam., scarlet	11. *S. trilobatum.*
Petioles and pedicels not prickly.	
Flowers in racemose cymes; pedicels ¼—½ in. long; calyx-teeth triangular; berry yellow	12. *S. albicaule.*
Flowers in fascicles; pedicels ¾—1½ in. long, filiform; calyx-teeth linear; berry yellow	13. *S. gracilipes.*

1. **Solanum nigrum,** *Linn. Sp. Pl.* (1753) p. 186. A variable annual; stem erect, glabrous or more or less pubescent, much divaricately branched. Leaves numerous, 1—3½ by ¾—2 in., ovate-lanceolate, subacute or acuminate, glabrous, thin, entire or sinuate-toothed, tapering into the petiole; petioles ¾ in. long. Flowers small, in extra-axillary subumbellate 3—8-flowered cymes; peduncles ¼—¾ in. long, slender; pedicels ¼—⅜ in. long, very slender. Calyx ⅛ in. long, glabrous or nearly so; lobes 5, oblong, obtuse, 1/20 in. long, not enlarged in fruit. Corolla ⅛—⅓ in. long, divided more than ½-way down into 5 oblong subacute lobes. Filaments short, flattened, hairy at the base; anthers 1/10 in. long, yellow, oblong, obtuse, notched at

the apex. Ovary globose, glabrous ; style cylindric, hairy. Berry ¼ in. in diam., globose, usually purplish-black, but sometimes red or yellow, smooth, shining. Seeds discoid, $\frac{1}{16}$ in. in diam., minutely pitted, yellow. Fl. B. I. v. 4, p. 229 ; Trim. Fl. Ceyl. v. 3, p. 231 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 172 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 263. *Solanum rubrum,* Mill Gard. Dict. ed. 8, n. 4 ; Wight, Icon. t. 344. *S. incertum,* Dunal, Hist. Solan. p. 155 ; Grah. Cat. p. 137.—Flowers : Sept.—Jan. VERN. *Kángani.*

A weed, often occurring in cultivated ground.

KONKAN : Bombay, *Woodrow.* DECCAN : Poona, *Cooke* !, *Woodrow* ! ; Mahableshwar in cultivated ground, *Cooke* ! S. M. COUNTRY : Rámghát, *Ritchie,* 508 ! SIND : *Stocks* ! ; Hydrabad, *Woodrow.*—DISTRIB. Throughout India common ; Ceylon ; all temperate and tropical regions of the world.

2. **Solanum verbascifolium,** *Linn. Sp. Pl.* (1753) p. 184. A shrub or small unarmed tree 6—20 ft. high, covered almost all over with a dense yellowish or grey tomentum of scurfy stellate hairs. Leaves 4—8 by 2—6 in., elliptic-lanceolate, acuminate, entire, velvety-pubescent above, densely woolly beneath, base acute or subrhomboid (rarely rounded) ; main nerves about 8 pairs ; petioles ¾—1½ in. long. Flowers numerous, in woolly dichotomous corymbose cymes which are at first apparently terminal, afterwards becoming lateral ; peduncles stout, 1—4 in. long ; pedicels ⅛—⅜ in. long, stout. Calyx ¼ in. long, cup-shaped, densely stellately woolly ; teeth at flowering-time $\frac{1}{10}$ in. long, broadly deltoid, acute, enlarged in fruit but not overtopping the berry. Corolla white, nearly ½ in. long, deeply divided ; lobes ⅓ in. long, elliptic-lanceolate, acute, stellately hairy outside. Filaments flat, glabrous ; anthers ⅛ in. long, oblong, obtuse. Ovary hairy ; style glabrous. Berry ⅓ in. in diam., globose, yellow, covered with small stellate hairs. Seeds $\frac{1}{16}$ in. in diam., slightly rugose. Fl. B. I. v. 4, p. 230 ; Grah. Cat. p. 138 ; Dalz. & Gibs. p. 175 ; Trim. Fl. Ceyl. v. 3, p. 232 ; Talb. Trees, Bomb. ed. 2, p. 253 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Wight, Icon. t. 1398 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 273.—Flowers : July—Nov. VERN. *Kutri.*

DECCAN : Poona, *Kanitkar* ! ; Wai, *Cooke* ! S. M. COUNTRY : about Dharwar, *Dr. Lush* ex *Graham.* KANARA : Supa subdivision of N. Kanara in deciduous forests, common, *Talbot.*—DISTRIB. Throughout India in the tropical and sub-tropical zone ; Ceylon, Malaya, N. Australia, Tropical America.

3. **Solanum pubescens,** *Willd. Phytogr.* (1794) p. 5. A shrub 3—4 ft. high ; young branches densely stellately pubescent, the older glabrous. Leaves 1½—4 by 1—2½ in., ovate, subacute, entire or more or less sinuately lobed, the young leaves stellately woolly, the older becoming almost glabrous above, acutely decurrent into the petiole from a rounded or subcordate base ; petioles 1—1¾ in. long, stellately pubescent. Flowers in woolly racemose cymes, apparently terminal at first but becoming leaf-opposed ; peduncles ½—¾ in. long ; pedicels ½—1 in. long, thickened and elongating in fruit. Calyx ¼ in. long at flowering-time, stellately pubescent, divided about ½-way down ; lobes lanceolate-oblong, acuminate. Corolla purple, ⅝ in. long, deeply divided ; tube $\frac{1}{10}$ in. long ; lobes ovate-lanceolate, acute, slightly stellately pubescent outside, veined. Filaments very short, thick,

glabrous ; anthers ¼ in. long, oblong, obtuse, 1 of them longer than the other 4. Ovary glabrous ; style longer than the stamens, curved, glabrous. Berry ⅓ in. in diam., glabrous, red. Seeds discoid, reaching ⅛ in. in diam., slightly muriculate. Fl. B. I. v. 4, p. 230 ; Wight, Icon. t. 1402 ; Trim. Fl. Ceyl. v. 3, p. 232 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173.—Flowers : Aug.—Nov.

A rare plant in the Bombay Presidency. S. M. COUNTRY : Badami, *Bhiva* !, *Cooke* !, *Woodrow* ; Banicopa, *Bhiva* !—DISTRIB. India (W. Peninsula) ; Ceylon.

4. **Solanum bigeminatum,** *Nees, in Trans. Linn. Soc.* v. 17 (1837) p. 42. Suffruticose ; branches quadrangular. Leaves 5—7 by 1¾—2¾ in., the lower solitary, the upper twin, membranous, elliptic-lanceolate, acuminate, entire, more or less scabrid above with short setæ, glabrous beneath, margins minutely ciliate, base very acute, decurrent on the petiole ; main nerves 8—9 pairs, conspicuous beneath ; petioles ½—2 in. long, glabrous. Flowers solitary or 2—6, in lateral fascicles (reduced umbels); pedicels ½—¾ in. long, slender, glabrous. Calyx 1/10 in. long, cup-shaped, entire or obscurely toothed, saucer-shaped in fruit, glabrous. Corolla pale-purple, ¼ in. long, deeply divided ; tube 1/16 in. long ; lobes ovate-oblong, acute, glabrous. Filaments filiform, 1/16 in. long, glabrous ; anthers ⅛ in. long. Ovary glabrous ; style glabrous or nearly so. Berry ⅓ in. in diam., red. Seeds 1/10—⅛ in. long, somewhat angular (not discoid), reticulately pitted, yellow. Fl. B. I. v. 4, p. 231 ; Trim. Fl. Ceyl. v. 3, p. 232 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173. *Solanum Neesianum,* Dalz. & Gibs. Bo. Fl. p. 175 (*not* of Wall.).—Flowers : Oct.

A rare plant. KONKAN : *Gibson* ! DECCAN : Phunda Ghát, *Dalzell & Gibson;* Mahableshwar, *Woodrow.* S. M. COUNTRY : Rámghát, *Ritchie,* 1301 ! ; Londa, *Cooke* !—DISTRIB. India (W. Peninsula).

5. **Solanum denticulatum,** *Blume, Bijdr.* (1825) p. 697. A shrub 3—6 ft. high, unarmed, much-branched ; branches ash-colored, smooth, except for a few lenticels. Leaves 2—4½ by 1—2 in., the lower solitary, the upper often twin, one of the pair being smaller than the other, elliptic-lanceolate, acute or acuminate, the upper side sparsely clothed with short glandular setæ, the lower side subglabrous when mature, base acute, decurrent into the petiole ; main nerves 6—8 pairs, conspicuous below, with reticulate venation between ; petioles ¼—1 in. long, slender. Flowers in lateral fascicles (reduced umbels); pedicels ½ in. long, 1—4 together. Calyx sparsely pubescent ; teeth 5—8 (when 5 at regular, when more than 5 often at irregular intervals), about 1/16 in. long, lanceolate-subulate, reaching nearly ½-way up the corolla. Corolla bluish-purple, ¼—⅓ in. long, deeply divided ; tube 1/16—1/10 in. long ; lobes ovate-oblong, acute. Berry ¼—⅓ in. in diam., red when ripe. Seeds 1/10—⅛ in. long, somewhat angular (not discoid), reticulately pitted, yellow. Fl. B. I. v. 4, p. 231 ; Wight, Icon. t. 1397 ; Trim. Fl. Ceyl. v. 3, p. 232 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173.—Flowers : in flower and fruit throughout most of the year.

DECCAN : Mahableshwar, very common, *Cooke* !, *Woodrow.*—DISTRIB. India (mountains of the Western Peninsula) ; Ceylon, Malay Islands.

6. **Solanum ferox,** *Linn. Sp. Pl.* ed. 2 (1762) p. 267. Stem herbaceous, stout, 2—4 ft. high, densely clothed with long coarse, often stalked, usually fulvous stellate hairs, and copiously armed with straight slender prickles. Leaves usually 2 at a node and unequal, 6—11 by 4—8 in., broadly elliptic in outline, sinuately or pinnately cut into few short triangular lobes, softly stellately fulvous-hairy on both sides (very densely so beneath), armed with long erect yellow slender prickles on the nerves on both sides, base cordate, truncate, or more or less acute, often unequal-sided ; main nerves 6—8 pairs ; petioles 1½—2½ in. long, prickly and densely fulvous-hairy. Flowers solitary or in 2—6-flowered leaf-opposed densely hairy cymes ; peduncles very short ; pedicels ¼—½ in. long, densely stellately fulvous-hairy and usually with a few prickles. Calyx campanulate, ⅜ in. long, divided about ½-way down, densely stellately fulvous-hairy, slightly enlarged in fruit ; teeth deltoid, acute. Corolla ¾ in. long, 5-partite ; tube very short, 1/16 in. long ; lobes ovate-lanceolate, acute, densely hairy outside. Anthers sessile or nearly so, linear-lanceolate, ⅓ in. long, opening by small pores. Ovary densely hairy with long hairs ; style glabrous. Berry globose, ¾—1¼ in. in diam., densely covered with long fulvous hairs. Seeds 1/16 in. in diam., faintly rugose with concentric rings. Fl. B. I. v. 4, p. 233 ; Grah. Cat. p. 139 ; Wight, Icon. t. 1399 ; Trim. Fl. Ceyl. v. 3, p. 233 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 257.

Rare. KONKAN! S. Konkan, *Nimmo* ex *Graham*. S. M. COUNTRY : 40 miles west of Belgaum, *Woodrow*.—DISTRIB. India (Assam, Birma, W. Peninsula) ; Ceylon, China.

7. **Solanum xanthocarpum,** *Schrad. & Wendl. Sert.* v. 1 (1795) p. 8, t. 2. A very prickly diffuse bright-green perennial herb, somewhat woody at the base ; stem somewhat zigzag ; branches numerous, the younger ones clothed with dense stellate tomentum ; prickles compressed, straight, yellow, glabrous and shining, often exceeding ½ in. long. Leaves 2—4 by 1—2¼ in., ovate or elliptic, sinuate or subpinnatifid, obtuse or subacute, stellately hairy on both sides (especially so beneath), sometimes becoming nearly glabrous in age, armed on the midrib and often on the nerves with long yellow sharp prickles, base usually rounded and unequal-sided ; petioles ½—1 in. long, stellately hairy and prickly. Flowers in extra-axillary few-flowered cymes sometimes reduced to a single flower ; peduncles short ; pedicels short, curved, stellately hairy. Calyx nearly ½ in. long, densely hairy and prickly ; tube short, globose ; lobes 7/16 in. long, linear-lanceolate, acute, prickly outside. Corolla purple, ¾ in. long ; lobes deltoid, acute, hairy outside. Filaments 1/16 in. long, glabrous ; anthers ⅓ in. long, oblong-lanceolate, opening by small pores. Ovary ovoid, glabrous ; style glabrous. Berry ½—¾ in. in diam., yellow, or white with green veins, surrounded by the enlarged calyx. Seeds 1/16 in. in diam., glabrous. Fl. B. I. v. 4, p. 236 ; Trim. Fl. Ceyl. v. 3, p. 235; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 6, part 3, p. 273.—Flowers : June. VERN. *Bhuiringani ; Káteringani.*

KONKAN : *Law* !; Elephanta, *Graham*. DECCAN : common; Poona, *Cooke* !, *Woodrow* ! SIND : *Woodrow*.—DISTRIB. Throughout India; Ceylon, S. E. Asia, Malaya, Tropical Australia, and Polynesia.

The root is much used in Hindu medicine. The fruit is sometimes eaten. See Watt, Dict. Econ. Prod. l. c.

8. **Solanum giganteum,** *Jacq. Collect.* v. 4 (1790) p. 125. A shrub sometimes reaching a height of 12 ft., armed with broadly triangular prickles which are yellow towards the point and usually tomentose at the base ; young branches, inflorescence, and underside of leaves clothed with dense close white stellate tomentum. Leaves 5—9 by 1¼—2 in., oblong-lanceolate, acute, entire, glabrous above when mature, base tapering into the petiole, often unequal-sided ; main nerves about 12, impressed on the upper surface ; petioles 1—1½ in. long. Flowers in dense lateral (often apparently terminal) paniculately corymbose cymes ; peduncles stout, ¼—1 in. long ; pedicels ¼—⅓ in. long. Calyx ⅕ in. long, densely floccosely tomentose ; teeth thick, triangular, $\frac{1}{16}$—$\frac{1}{10}$ in. long. Corolla bluish-purple, ⅓ in. long, deeply divided ; tube $\frac{1}{12}$ in. long ; lobes oblong-lanceolate, subacute, tomentose outside, glabrous inside. Filaments very short. Ovary glabrous ; style glabrous. Berry ⅓ in. in diam., supported on the slightly enlarged calyx, red when ripe. Seeds ⅛ in. in diam., minutely muriculate. Fl. B. I. v. 4, p. 233 ; Grah. Cat. p. 138 ; Dalz. & Gibs. p. 175 ; Wight, Icon. t. 893 ; Trim. Fl. Ceyl. v. 3, p. 233 ; Talb. Trees, Bomb. ed. 2, p. 253 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173.—Flowers : Jan.—Mar. VERN. *Kutri* ; *Chunna*.

Higher hills of the Presidency. DECCAN : hills about Pár, *Graham*; Harishchandragad, *Gibson* ex *Graham*; Mahableshwar, very common, *Cooke* !, *Woodrow*; hills 4000 ft., *Law* ! S. M. COUNTRY : Castlerock, *Bhiva* !; Belgaum, *Ritchie*, 1302 !—DISTRIB. India (W. Peninsula); Ceylon.

9. **Solanum indicum,** *Linn. Sp. Pl.* (1753) p. 187. A much-branched undershrub 1—5 ft. high, very prickly ; prickles large, with a long compressed base, sharp, often slightly recurved ; stem stout, often purple ; branches covered with minute stellate hairs. Leaves 2—6 by 1—3 in., ovate in outline, acute, subentire or with a few large triangular-ovate subacute lobes, sparsely prickly on both sides, clothed above with simple hairs from bulbous bases intermixed with small stellate ones, covered below with small stellate hairs ; base cordate, cuneate or truncate, often unequal-sided ; petioles ½—1 in. long, prickly. Flowers in racemose extra-axillary cymes ; peduncles short ; pedicels ¼—½ in. long, stellately hairy and prickly. Calyx ⅛ in. long, stellately hairy ; teeth triangular, $\frac{1}{16}$ in. long. Corolla ⅓ in. long, pale-purple, clothed outside with darker purple stellate hairs ; lobes ⅓ in. long, deltoid-ovate, acute. Filaments very short, almost 0 ; anthers oblong-lanceolate, opening by small pores. Ovary often hairy at the top ; style stellately hairy, curved at the apex. Berry ⅓ in. in diam., globose, dark-yellow when ripe, glabrous or sometimes with a few stellate hairs at the apex. Seeds ⅛ in. in diam., minutely pitted. Fl. B. I. v. 4, p. 234 ; Grah. Cat. p. 138 ; Dalz. & Gibs. p. 174 ; Wight, Icon. t. 346 ; Aitch. Pb. & Sind Pl. p. 102 ; Trim. Fl. Ceyl. v. 3, p. 234 ; Woodr.

in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 258.—Flowers : Aug.—Oct. VERN. *Dorli* ; *Mothiringani* ; *Chinchurdi*.

Common in the Deccan and Konkan hills. DECCAN : Khandala, *Graham, Cooke* !, *Woodrow* ! ; Mahableshwar, *Cooke* !, *Woodrow*.—DISTRIB. Throughout Tropical India ; Ceylon, Malaya, China, Philippines.

10. **Solanum incanum,** *Linn. Sp. Pl.* (1753) p. 188. A branched prickly shrub, densely clothed with soft stellate pale-fulvous hairs ; prickles stout, very sharp, recurved, yellow, shining above, usually tomentose at the broad base. Leaves 3—4½ by 1¾—3 in., ovate-elliptic, subacute, sinuately lobed, velvety above with stellate fuscous hairs, densely fuscous-woolly below, sparsely prickly along the midnerve on both sides, rarely so on the lateral nerves, base subcordate or truncate, rarely cuneate ; main nerves about 6 pairs ; petioles ¾—1½ in. long, prickly. Peduncles lateral, usually paired, one bearing a solitary fertile flower, the other bearing a racemose cyme of male flowers. Calyx cup-shaped, densely stellately woolly, prickly in the fertile, usually not prickly in the sterile flowers, ⅛ in. long, divided less than ½-way down ; lobes triangular, acute. Corolla pale-purple, nearly ¾ in. long ; lobes ⅛ in. long, ovate, acute, stellately hairy on both sides, densely so on the outside, the interspaces between the hairy bands tender, glabrous. Filaments $\frac{1}{20}$ in. long, flattened, glabrous ; anthers ⅛ in. long, narrowly oblong, opening by small pores. Ovary globose, hairy at the apex ; style hairy below. Berry ¾—1 in. long, ovoid or subglobose, yellow. Seeds $\frac{1}{10}$ in. in diam., minutely pitted. Forsk. Fl. Ægypt.-Arab. (1775) p. 46. *Solanum sanctum*, Linn. Sp. Pl. ed. 2 (1762) p. 269 ; Aitch. Pb. & Sind Pl. p. 103. *S. coagulans*, Forsk. Fl. Ægypt.-Arab. p. 47 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 236 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 256.—Flowers : Jan.—May.

SIND : *Dalzell* ! ; near Karachi, *Bhola* !, *Woodrow*.—DISTRIB. India (Panjáb, W. Peninsula) ; S. W. Asia, Arabia, Egypt.

11. **Solanum trilobatum,** *Linn. Sp. Pl.* (1753) p. 188. An undershrub 6—12 ft. long, trailing or subscandent by its numerous hooked prickles ; stems slender ; branches long, divaricate, the young ones sometimes with a few stellate hairs, the older glabrous ; prickles from a broad triangular base, very sharp, compressed, hooked, decurved. Leaves 1—2 by ¾—1½ in., ovate or rotund-ovate, obtuse, irregularly sinuate or 3—5-lobed, sparsely stellately hairy or glabrous, with or without 2 or 3 prickles on the midrib, base not cordate ; petioles ½—1½ in. long, prickly. Flowers large and showy, violet-purple, in extra-axillary racemose cymes ; peduncles very short, almost 0 ; pedicels ½—1 in. long, often prickly. Calyx cyathiform, ⅛—¼ in. long, stellately hairy ; teeth $\frac{1}{20}$ in. long, triangular, acute. Corolla exceeding ½ in. long ; tube $\frac{1}{12}$ in. long ; lobes oblong-lanceolate, acute, stellately hairy outside, usually reflexed. Filaments $\frac{1}{20}$ in. long ; anthers ⅛ in. long, narrowly oblong, opening by small pores. Ovary ovoid or subglobose, glabrous ; style glabrous. Berry ¼—⅜ in. in diam., scarlet when ripe. Seeds ⅛ in. in diam.,

slightly pitted. Fl. B. I. v. 4, p. 236 ; Grah. Cat. p. 138 ; Dalz. & Gibs. p. 175 ; Wight, Icon. t. 854 ; Trim. Fl. Ceyl. v. 3, p. 236 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 264.—Flowers : Dec.—Jan.

DECCAN : Bijapur, *Cooke* !; Ahmednagar, *Cooke* ! S. M. COUNTRY : Badami, *Kanitkar* !, *Woodrow*; Dharwar, *Woodrow*. GUJARAT : *Gibson* ex *Graham*, *Woodrow*; common in hedges, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula); Ceylon, Malay Peninsula.

12. **Solanum albicaule,** *Kotschy, ex Dunal, in DC. Prodr.* v. 13, part 1 (1852) p. 204. A very prickly undershrub ; stem woody, 1 ft. and more high ; branches elongate, terete, and, as well as the leaves beneath, petioles, peduncles, pedicels, calyx and corolla (outside) hoary with stellate tomentum ; prickles numerous, compressed or sometimes conical, very sharp and recurved at the apex from a broad base, usually tomentose in the basal part. Leaves solitary or the upper twin, one of the pair shorter than the other, ¾—1½ by ⅝—1 in., variable in shape, ovate-oblong or subpanduriform, acute or obtuse, entire or slightly lobate, softly hairy above, white with dense stellate tomentum beneath, base subcordate ; main nerves 2—4 pairs ; petioles ¼—¾ in. long, rarely prickly. Flowers in racemose cymes ; peduncles short ; pedicels ¼—½ in. long, usually unarmed. Calyx densely woolly-tomentose, ⅛—⅕ in. long, cyathiform ; lobes equalling the tube, triangular, acute. Corolla purple, stellately pubescent outside ; tube very short, 1/16 in. long ; lobes nearly ½ in. long, lanceolate-oblong, acute, with a strong mid-nerve. Filaments very short, almost 0 ; anthers narrowly oblong-lanceolate, ¼ in. long, opening by small pores. Ovary glabrous ; style glabrous, curved at the top. Berry ⅛—¼ in. in diam., globose, glabrous, yellow. Seeds ⅛ in. in diam., subreniform, slightly tuberculate. *Solanum sindicum*, Prain, in Journ. Asiat. Soc. Beng. v. 65 (1896) p. 542.

Rare in the Bombay Presidency, occurring only in Sind. There is but one sheet in Herb. Kew., the specimens on which were collected by me near Karachi, in 1891.—DISTRIB. Arabia, Tropical Africa.

13. **Solanum gracilipes,** *Dcne. in Jacquem. Voy. Bot.* (1844) p. 113, t. 119. An undershrub with slender branches ; stems stellately ashy-tomentose ; branches terete, sparingly prickly ; prickles small, sharp, straight or recurved, not compressed, tomentose at the base. Leaves small, rotund-ovate, obtuse, ¾—1½ in. long and nearly as broad as long, minutely stellately hairy on both sides, sometimes subglabrous, base subcordate, truncate, or cuneate ; main nerves 3—4 pairs ; petioles slender, ¾—1¼ in. long, stellately tomentose, not prickly. Flowers in extra-axillary or subaxillary few-flowered fascicles sometimes reduced to a single flower ; pedicels filiform, ¾—1½ in. long, stellately tomentose, not prickly. Calyx ⅕ in. long, stellately pubescent ; lobes as long as the tube, linear from a triangular base and with a broad sinus between, elongating in fruit. Corolla ⅜ in. long ; lobes ¼ in. long, triangular-ovate, acute, stellately pubescent outside, reticulately veined. Filaments very short, almost 0 ; anthers ¼ in. long, linear-oblong, opening by small pores. Ovary globose-ovoid, glabrous or with a few stellate hairs at its apex ; style glabrous. Berry ½ in. in diam., globose, glabrous.

Seeds ⅛ in. in diam., minutely tuberculate. Fl. B. I. v. 4, p. 237; Aitch. Pb. & Sind Pl. p. 102; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 6, part 3, p. 257.—Flowers: Dec.—Jan.

In the Bombay Presidency apparently confined to Sind. SIND: *Dalzell*, 77!, *Stocks*, 252!; near Karachi, *Bhola Puran*!, *Cooke*!, *Woodrow*; hills at the Hub, *Bhola Puran*, 119!; Mulir, *Woodrow*.—DISTRIB. India (Panjáb); Beluchistan.

Solanum torvum, Swartz, Prod. Descr. Veg. (1788) p. 47. A shrub 8—12 ft. high with a prickly stem and ovate sinuate or lobed leaves, stellately tomentose beneath without prickles. Though indigenous in some parts of India, being very common in Bengal, the plant is not indigenous and is rarely cultivated in the Bombay Presidency. Dalzell and Gibson (Bo. Fl. p. 175) mention its occurrence in the S. M. Country, but add that the plants were probably an escape from cultivation. Fl. B. I. v. 4, p. 234; Dalz. & Gibs. p. 175; Watt, Dict. Econ. Prod. v. 6, part 3, p. 264.—Flowers: July.

Solanum macrophyllum, Hort. ex Dunal, Hist. Solan. (1813) p. 199, t. 17. A large shrub, of short life, a native of Mexico, with large leaves more or less armed with prickles. The flowers when fresh are purple, changing to white, and much resemble the flowers of the potato. The plant is effective in gardens owing to its bold foliage and large flowers. Dalz. & Gibs. Suppl. p. 61.

Solanum tuberosum, Linn. Sp. Pl. (1753) p. 185. *The Potato*, introduced into Europe from America in the sixteenth century, is widely cultivated throughout India. The potatoes grown at Mahableshwar (4500 ft.) are noted for their excellence. An exhaustive account of the modes of cultivation adopted in different provinces of India will be found in Watt's 'Dictionary of Economic Products,' vol. 6, part 3, pp. 265—272. Fl. B. I. v. 4, p. 229; Grah. Cat. p. 137; Dalz. & Gibs. Suppl. p. 60; Woodr. Gard. in Ind. ed. 5, p. 397.—VERN. *Batátá*.

Solanum Melongena, Linn. Sp. Pl. (1753) p. 186. *The Brinjal* or *Egg-plant*, widely cultivated throughout India for its fruit. Its native country is uncertain, but it does not seem to have been found truly wild anywhere in India, though, as an escape, it is not uncommon. A full description of the plant and its varieties, mode of culture, &c. will be found in Watt's 'Dictionary of Economic Products,' v. 6, part 3, pp. 258—262. Fl. B. I. v. 4, p. 235; Grah. Cat. p. 138; Dalz. & Gibs. Suppl. p. 61; Woodr. Gard. in Ind. ed. 5, p. 399.—VERN. *Vángi*.

2. **PHYSALIS**, Linn.

Annual or perennial herbs. Leaves alternate, entire, sinuate or rarely pinnatifid. Flowers usually small, axillary, solitary, pedicellate. Calyx campanulate, 5-fid, much accrescent in fruit, then inflated, membranous, loosely enclosing the berry; teeth small,

connivent. Corolla campanulate, greenish or lurid-yellow, sometimes with purple spots below. Stamens 5, attached near the base of the corolla; anthers usually shorter than the filaments, dehiscing longitudinally. Ovary 2-celled; ovules numerous; style filiform; stigma obscurely 2-lobed. Berry globose, enevloped in the bladder-like calyx. Seeds many or few, smooth or faintly tuberculate, compressed; embryo peripheric.—DISTRIB. Mostly American, several introduced in the Old World; species about 30.

1. **Physalis minima,** *Linn. Sp. Pl.* (1753) p. 183. Annual, herbaceous; stem erect, 6—12 in. high, striate, more or less (often viscidly) pubescent. Leaves 1—2½ by ½—1½ in., ovate, acute, shallowly toothed or lobed, more or less pubescent, thin, base cuneate; petioles ½—1¼ in. long, slender, more or less pubescent. Flowers solitary; pedicels filiform, nodding, ⅛—⅓ in. long. Calyx ⅛—⅓ in. long at flowering-time, not angular, base truncate; teeth triangular, acute, nearly equalling the tube, ciliate. Corolla clear-yellow, sometimes spotted at the base within; lobes of limb very short. Filaments $\frac{1}{16}$ in. long, glabrous; anthers $\frac{1}{12}$ in. long, oblong, obtuse. Ovary ovoid, seated on a large disk; style glabrous. Berry ⅓ in. in diam., entirely enveloped in the enlarged calyx, which is ovoid or subglobose, ½—1 in. long, membranous, 5- or sometimes 10-ribbed, reticulately veined, tipped by the connivent pubescent calyx-teeth. Seeds discoid or subreniform, $\frac{1}{12}$ in. in diam., finely muriculate, orange-yellow. Fl. B. I. v. 4, p. 238; Grah. Cat. p. 140; Trim. Fl. Ceyl. v. 3, p. 236; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 6, part 1, p. 224.—Flowers: Aug. VERN. *Chirboti*; *Rán-popati*.

A weed, tolerably common in the Deccan. DECCAN: Poona, *Cooke!*, *Woodrow!* S. M. COUNTRY: Belgaum, *Ritchie*, 1305!—DISTRIB. More or less throughout India; Ceylon, Tropical Africa, and Australia.

Physalis peruviana Linn. Sp. Pl. ed. 2 (1763) p. 1670. A small shrub a native of Tropical America has been long grown in gardens and is known to Anglo-Indians as the *Cape Gooseberry*. The yellow berries are eaten, made into jam or used in tarts, and have a pleasant subacid flavor. It is sometimes found as an escape and used to be tolerably abundant below the Table Rock at Panchgani. Fl. B. I. v. 4, p. 238; Grah. Cat. p. 140; Dalz. & Gibs. Suppl. p. 61; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 & Gard. in Ind. ed. 5, p. 400; Watt, Dict. Econ. Prod. v. 6, part 1, p. 225.—VERN. *Popati*.

3. WITHANIA, Pauq.

Unarmed shrubs, often hoary-tomentose. Leaves entire. Flowers usually fascicled, subsessile or shortly pedicellate, sometimes dicœcious. Calyx campanulate, 5—6-toothed, accrescent in fruit. Corolla campanulate; lobes 3—6, short, valvate in bud. Stamens 5, attached near the base of the corolla; anthers dehiscing longitudinally. Ovary 2-celled; ovules numerous; style linear;

stigma shortly 2-fid. Berry globose, enclosed in the enlarged calyx. Seeds many, discoid; embryo peripheric.—DISTRIB. Southern Europe, Western Asia in warm regions, North Africa, Canary Islands; species 4.

Flowers hemaphrodite; berry loosely enclosed in the accrescent calyx ..... 1. *W. somnifera.*
Flowers dicœcious; berry tightly girt by the accrescent calyx ..... 2. *W. coagulans.*

1. **Withania somnifera,** *Dunal, in DC. Prod.* v. 13, part 1 (1852) p. 453. A branched erect undershrub 1—5 ft. high; branches terete, usually clothed with mealy stellate hoary tomentum. Leaves 2—4 by 1—2 in., ovate, subacute, entire, more or less minutely stellately pubescent, base acute; main nerves about 6 pairs, stout, conspicuous; petioles ¼—½ in. long, stellately tomentose. Flowers greenish or lurid-yellow, usually about 5 together in a sessile or nearly sessile umbellate cyme; pedicels 0—⅛ in. long. Calyx ⅛ in. long in flower, stellately tomentose; teeth $\frac{1}{10}$ in. long, linear, acute, from a deltoid base. Corolla ⅛ in. long, divided rather more than ½-way down; lobes lanceolate, acute, pubescent outside. Filaments ⅛ in. long, slender, glabrous; anthers broadly elliptic (almost orbicular), $\frac{1}{20}$ in. long. Ovary glabrous; style glabrous. Berry red, smooth, ¼ in. in diam., enclosed in the inflated calyx which reaches more than 1 in. in diam., and is globose, slightly 5-angled, pointed with the connivent calyx-teeth and scurfy-pubescent outside. Seeds $\frac{1}{10}$ in. in diam., yellow, somewhat scurfy. Fl. B. I. v. 4, p. 239; Aitch. Pb. & Sind Pl. p. 104; Trim. Fl. Ceyl. v. 3, p. 237; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 6, part 4 p. 311. *Physalis somnifera,* Linn. Sp. Pl. (1753) p. 182; Grah. Cat. p. 139; Dalz. & Gibs. p. 175; Wight, Icon. t. 853.—Flowers: Sept. VERN. *Ghodá; Askand.*

Not common except in Sind, where it is tolerably plentiful. KONKAN: *Graham.* DECCAN: Junnar, *Woodrow*; Poona, *Woodrow.* GUJARAT: *Graham.* SIND: *Stocks!, Cooke!*; Karachi, *Cooke!, Woodrow.*—DISTRIB. India in the drier regions; Ceylon, Mediterranean regions, Canaries, Cape of Good Hope.

2. **Withania coagulans,** *Dunal, in DC. Prodr.* v. 13, part 1 (1852) p. 685. A rigid grey-tomentose undershrub 1—3 ft. high; branches terete, clothed with dense grey or yellowish-white tomentum. Leaves 1—2¼ by ⅜—⅞ in., lanceolate-oblong, obtuse, entire, clothed with a persistent not easily-detachable greyish tomentum, of a uniform color on both sides, thick, more or less rugose, base acute, running down into an often obscure petiole; petioles ¼ in. long but often indistinct. Flowers dicœcious, in axillary clusters; pedicels 0—¼ in. long, deflexed, slender. Calyx ¼ in. long, campanulate, clothed with fine stellate grey tomentum; teeth triangular, $\frac{1}{10}$ in. long. Corolla ⅛ in. long, stellately mealy outside, divided about ⅓ the way down; lobes ovate-oblong, subacute. MALE FLOWERS: Stamens about level with the top of the corolla-tube; filaments $\frac{1}{12}$ in. long, glabrous; anthers ⅛—⅙ in. long. Ovary ovoid, without style or stigma. FEMALE FLOWERS: Stamens scarcely reaching ½-way up the corolla-tube; filaments about $\frac{1}{30}$ in. long; anthers smaller than in the male flowers, sterile. Ovary ovoid,

glabrous; style glabrous; stigma mushroom-shaped, 2-lamellate. Berry ¼—⅓ in. in diam., globose, smooth, closely girt by the enlarged membranous calyx which is scurfy-pubescent outside. Seeds ⅒—⅛ in. in diam., somewhat ear-shaped, glabrous. Fl. B. I. v. 4, p. 240; Aitch. Pb. & Sind Pl. p. 104; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 6, part 6, p. 309. *Puneeria coagulans*, Stocks, in Journ. As. Soc. Bomb. v. 3 (1849) pp. 54—57; Wight, Icon. t. 1616; Hook. Icon. Pl. (1852) t. 801.—Flowers: Dec. VERN. *Panirband*; *Kaknaj*.

SIND: *Vivary*!, *Stocks*, 413!, *Dalzell*, 78!, *Woodrow*; Quetta Ghát, near Dirgi, *Cooke*!—DISTRIB. India (Panjáb, Sutlej Valley); Afghanistan, Beluchistan.

The fruit is commonly employed in Sind, N.W. India, Afghanistan, and Beluchistan as a substitute for rennet to coagulate milk. The seeds, which appear to contain the active ferment, have been the subject of important experiments by Mr. Lea, of which a full account will be found in Watt's Dict. Econ. Prod. l. c.

4. **LYCIUM**, Linn.

Spinous usually glabrous shrubs. Leaves small, alternate or often fascicled, linear, terete or flat. Pedicels usually solitary (rarely fascicled at the nodes); flowers small. Calyx campanulate, at first 5-merous, then irregularly 3—5-lobed or 2-lipped, in fruit not or scarcely enlarged. Corolla tubular-infundibuliform; lobes 5 (rarely 4), imbricate in bud, spreading in flower. Stamens 5 (rarely 4) on the corolla-tube; anthers exserted or included, dehiscing longitudinally. Ovary 2-celled; ovules few or many; style filiform; stigma subcapitate. Berry small, globose or oblong. Seeds many, few, or solitary, compressed, scrobiculate; embryo peripheric.—DISTRIB. Temperate and subtropical regions of the world, especially S. Africa and S. America; species 40.

1. **Lycium barbarum**. *Linn. Sp. Pl.* (1753) p. 192. A spinous shrub reaching 10 ft. high; branches white or grey, armed with sharp conical spines which sometimes elongate and bear leaves and flowers. Leaves very variable, sometimes solitary, oblong-lanceolate, reaching 1¾ by ¼ in., more commonly in fascicles and oblong-spathulate or linear, obtuse, attenuated into a short petiole, glabrous or nearly so. Flowers solitary or in fascicles of 2—5; pedicels filiform, ¼—½ in. long. Calyx in flower glabrous, somewhat rugose outside, ⅛ in. long, cyathiform, often becoming irregularly lobed and sometimes 2-lipped in fruit; teeth 4—6, oblong, obtuse, about 1/10 in. long, with membranous margins. Corolla ⅜—½ in. long, glabrous; lobes ⅒—⅛ in. long, oblong, obtuse. Stamens exserted beyond the corolla-tube; filaments flat, glabrous at the base; anthers ⅒ in. long, orbicular. Ovary ovoid-oblong, glabrous, seated in a large membranous cup-shaped disk; style glabrous, exserted beyond the corolla-tube; stigma mushroom-headed, 2-lamellate. Berry bright-red, ¼ in. in diam., seated on the slightly enlarged and often deformed calyx. Seeds ⅒ in. in diam., discoid or subreniform, embedded in a soft glutinous viscid pulp, very minutely pitted, orange-yellow. Fl. B. I. v. 4, p. 241; Bois. Fl. Orient. v. 4, p. 289; Talb.

Trees, Bomb. ed. 2, p. 254 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173. *Lycium foliosum & L. depressum*, Stocks, in Kew Journ. Bot. v. 4 (1852) p. 179.—Flowers : Nov.

A variable plant as regards arrangement, size, and shape of leaves, length of corolla, and relative lengths of corolla-tube and lobes. It seems to be hardly separable from *Lycium europœum*, Linn.

GUJARAT : Porbandar (Kathiawar), *Cooke* ! SIND : *Stocks* ; Landhi, near Karachi, *Cooke* !—DISTRIB. India (Panjáb) ; Beluchistan, Afghanistan, Persia.

5. **DATURA**, Linn.

Herbs or shrubs glabrous or minutely pubescent. Leaves large, entire or coarsely sinuate-dentate. Pedicels solitary. Flowers large, purple or white, erect or pendulous. Calyx long-tubular, harbaceous, 5-toothed ; in fruit circumscissile above the base, the upper part deciduous. Corolla long, tubular-infundibuliform, mouth wide ; limb plicate, entire or shortly 5—10-lobed, the lobes often accuminate. Stamens attached near the base of the tube, included ; filaments filiform ; anthers linear, longitudinally dehiscent. Ovary 2- or spuriously 4-celled ; ovules numerous ; style filiform ; stigma 2-lobed. Capsule ellipsoid, 4-celled, usually spinous, 4-valved or irregularly breaking up near the apex. Seeds very many, compressed ; embryo peripheric.—DISTRIB. Temperate and tropical regions ; species 10 or 12.

1. **Datura fastuosa,** *Linn. Syst. Nat.* ed. 10 (1759) p. 932. Annual ; stem stout, 1—2 ft. high, somewhat zigzag, rather succulent, softly pubescent, divaricately branched. Leaves 3—6 by 1½—3 in., ovate, acute, entire or with a few large teeth or lobes, usually covered with a fine mealy pubescence (sometimes nearly glabrous), glaucous-green above, paler beneath, usually rounded and very unequal at the base ; main nerves conspicuous, usually about 8 on one side of the midrib, 6 at the other ; petioles 1—2 in. long. Flowers purple outside, usually white inside, often double, solitary ; pedicels short, stout, pubescent. Calyx reaching sometimes 3½ in. long, finely pubescent ; teeth ½—¾ in. long, triangular, very acute. Corolla 7 in. long or even more, often 4—5 in. across at the mouth ; limb with 5 or 6 short acute deltoid lobes and a short tail in the middle of each intervening sinus. Stamens about equalling the corolla-tube ; filaments slender ; anthers ⅜ in. long, oblong, obtuse. Ovary clothed with soft prickles ; stigma 2-lobed. Capsules nodding, on curved pedicels 1¼ in. in diam., subglobose, supported on the reflexed base of the calyx, green, covered all over with numerous straight sharp prickles. Seeds numerous, closely packed, compressed, ⅛ in. in diam., nearly smooth, yellowish-brown. Fl. B. I. v. 4, p. 242 ; Grah. Cat. p. 141 ; Wight, Icon. t. 1396 ; Trim. Fl. Ceyl. v. 3, p. 238 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 473 ; Watt, Dict. Econ. Prod. v. 3, p. 32. *Datura Hummatu*, Bernh. in Tromms. N. Journ. Pharm. v. 26 (1833) p. 153 ; Dalz. & Gibs. p. 174.—Flowers : Sept.—Dec. VERN. *Kálá-dhatura*.

Very common on rubbish heaps throughout the Presidency.

VAR. *alba*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1883) p. 243. Flowers white or cream-colored, rather smaller than those of *D. fastuosa* proper, single, not double as is often the case in that plant. Watt, Dict. Econ. Prod. v. 3, p. 36. *Datura alba* (sp.), Nees, in Trans. Linn. Soc. v. 17 (1834) p. 73; Wight, Icon. t. 852; Grah. Cat. p. 141; Dalz. & Gibs. p. 174.—Flowers: Sept.—Dec. VERN. *Dhatura.*

Found in the same localities as the preceding, than which it is even more common. The seeds of both are highly poisonous, the natives being of opinion that those of purple-flowered plant (*kálá-dhatura*) are the more deadly of the two. They are used by roadside poisoners to stupify their victims and render the committal of theft easy. They are also used to render liquor more intoxicating and as a remedy for hydrophobia. For a full account see Watt, Dict. Econ. Prod. l. c.

Datura Metal, Linn. Sp. Pl. (1753) p. 179. A native (probably) of Tropical America has been occasionally found, no doubt as an escape. It has (*e.g.*) been found on a small island in the river at Poona. The limb of the corolla is 10-toothed and the capsules nodding, Fl. B. I. v. 4, p. 243; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 3, p. 39.

Datura arborea, Linn. Sp. Pl. (1753) p. 179. A large shrub with pure white flowers 7 or 8 inches long and about 4 inches wide at the mouth. It is easily propagated and thrives well at about 4000 ft. altitude. It is abundant at Mahableshwar, where it has been planted along many of the new roads, and its large trumpet-like flowers are conspicuous objects. It is a native of Peru. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 & Gard. in Ind. ed. 5, p. 401. *Brugmansia candida*, Pers. Syn. v. 1, p. 216; Grah. Cat. p. 141; Dalz. & Gibs. Suppl. p. 63.

6. **HYOSCYAMUS**, Linn.

Erect coarse herbs. Leaves sinuate-dentate or pinnatifid, rarely quite entire. Flowers usually unilateral, sessile or pedicellate, the lower axillary, solitary, the upper arranged in a spike or scorpioid raceme; upper floral leaves bract-like. Calyx tubular-campanulate or urceolate, shortly 5-fid, enlarged in fruit, including the capsule, strongly ribbed. Corolla infundibuliform; limb oblique, 5-fid; lobes more or less unequal, imbricate in bud. Stamens attached about the middle of the corolla-tube, usually exserted; anthers dehiscing longitudinally. Ovary 2-celled; ovules numerous; style filiform; stigma subcapitate. Capsule perfectly or almost perfectly 2-celled, circumscissile above the middle. Seeds more or less compressed, usually scrobiculate; embryo peripheric.—DISTRIB. Mediterranean region, Canary Islands and thence to Central Asia; species 8 or 9.

1. **Hyoscyamus muticus,** *Linn. Mant.* (1767) p. 45. Herbaceous, 1—3 ft. high; root creeping extensively (*Stocks*); stem branched, erect, firm, fistulose, leafy, obsoletely angular; branches clothed with soft clammy woolly hairs. Cauline leaves scattered,

4—8 by 2—5 in., the lower the largest, ovate-oblong or subrhomboid, acute, thick, entire or coarsely sinuate-dentate, pubescent or woolly, base acute ; petioles ½—3 in. long, very broad. Flowers unilateral in 10—30-flowered spicate racemes, scorpioid when young, much elongate (6—12 in.) in age ; pedicels of the lower flowers sometimes nearly as long as the calyx, those of the uppermost flowers scarcely $\frac{1}{10}$ in. long. Calyx strongly nerved, urceolate, ⅔—1 in. long in flower, enlarged in fruit ; teeth triangular-oblong, acute, not spreading, often unequal. Corolla infundibuliform, 1—1½ in. long ; tube gradually enlarged into the limb, about equalling the calyx, greenish ; limb pink outside, darker pink inside, veined, often with dark purple spots at the base ; lobes short, suborbicular, subequal. Stamens unequal, the 3 lower shorter, about equalling the corolla, the 2 upper longer than the corolla ; filaments pubescent at the base ; anthers ⅛ in. long, sagittate at the base. Ovary glabrous or faintly pubescent ; style longer than the stamens, glabrous. Capsules ⅝ by ¼ in., oblong, rounded at the apex, circumscissile near the top. Seeds very numerous, ¼ in. in diam., discoid, tuberculate, yellow. Fl. B. I. v. 4, p. 245 ; Jaub. & Spach, Ill. Pl. Or. v. 5, t. 415 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173. *Hyoscyamus insanus,* Stocks, in Kew. Journ. Bot. v. 4 (1852) p. 178.

Rare in the Presidency, found only on the Sind hills. SIND : Boogta hills, *Vicary* ! ; Sind hills, *Dalzell* ! ; Kirthar mountains, *Woodrow*.—Flowers : Mar.

Stocks in Kew Journ. l. c. gives an account of the effects of smoking the plant in small quantities, which are said to be the production of furious delirium.—DISTRIB India (Panjáb) ; Afghanistan, Beluchistan, Egypt.

Hyoscyamus niger, Linn. Sp. Pl. (1753) p. 179. *The Henbane,* a native of Europe and the temperate Himalaya, was for a long time successfully cultivated at Hewra by Dr. Gibson and at Dapuri near Poona by Dr. Lush for the supply of the extract to the Bombay Government Medical Stores. Its cultivation for this purpose has been discontinued. Very high manuring was necessary to produce leaves in quantity. Fl. B. I. v. 4, p. 244 ; Grah. Cat. p. 141 ; Dalz. & Gibs. Suppl. p. 62 ; Woodr. Gard. in Ind. ed. 5, p. 401 ; Watt, Dict. Econ. Prod. v. 4, p. 319.

The following species not belonging to any of the foregoing genera are more or less cultivated as economic or ornamental plants in the Bombay Presidency :—

Lycopersicum esculentum, Mill. Gard. Dict. ed. 8 (1768) n. 2. *The Tomato,* a native of Tropical America, cultivated extensively and sometimes found as an escape throughout India, too well known to need description. Fl. B. I. v. 4, p. 237 ; Grah. Cat. p. 139 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 & Gard. in Ind. ed. 5, p. 398 ; Watt, Dict. Econ. Prod. v. 5, p. 100.—VERN. *Vel-vángi.*

Cyphomandra betacea, Sendt. in Flora, v. 28 (1845) p. 172. A shrub cultivated in S. America for its fruit, which somewhat resembles a Tomato in general appearance. It was expected to thrive in the Deccan, but has hitherto been unable to resist the S.W. Monsoon (*Woodrow*). On the hills it has succeeded fairly well. The fruit is used in tarts. Woodr. Gard. in Ind. ed. 5, p. 401.

Nicandra physaloides, Gærtn. Fruct. v. 2 (1791) p. 237, t. 131, fig. 2. A much-branched glabrous annual with pretty bluish-purple bell-shaped flowers, a native of Peru, cultivated and sometimes found as an escape (especially about Dapuri near the site of the old Botanic Garden). Fl. B. I. v. 4, p. 240 ; Grah. Cat. p. 140 ; Dalz. & Gibs. Suppl. p. 62 ; Bot. Mag. (1824) t. 2458 ; Watt. Dict. Econ. Prod. v. 5, p. 350.—VERN. *Rán-popati.*

Cestrum elegans, Schlech. in Linnæa, v. 19 (1847) p. 261. A branched shrub 4—6 ft. high, with ovate-lanceolate leaves and dense cymes of purplish-red flowers at the ends of the branches. It flowers from September to December and is easily propagated by cuttings. Woodr. Gard. in Ind. ed. 5, p. 402.

Cestrum aurantiacum, Lindl. Bot. Reg. (1844) Misc. p. 71. A large shrub, a native of Guatemala, with smooth wavy light-green glossy leaves and spikes of glowing orange-colored, somewhat waxy flowers about 1 in. long, produced in profusion in December. Woodr. Gard. in Ind. ed. 5, p. 402.

Nicotiana Tabacum, Linn. Sp. Pl. (1753) p. 180. The well-known *Tobacco Plant,* grown more or less throughout India, and, in the Bombay Presidency, largely throughout the Deccan and Gujarat. Its native country is not known with absolute certainty, but it is generally supposed to be a native of S. America. It does not exhibit much tendency to spread as weed (*Clarke*). Fl. B. I. v. 4, p. 245 ; Grah. Cat. p. 140 ; Dalz. & Gibs. Suppl. p. 62 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Watt, Dict. Econ. Prod. v. 5, p. 353.

Browallia demissa, Linn. Syst. ed. 10 (1759) p. 1118. A pretty annual about 1½ ft. high, a native of S. America, with ovate acute leaves and numerous small blue flowers about ½ in. across when expanded. Dalz. & Gibs. Suppl. p. 63. *Browallia elata,* Linn. *l. c.* ; Woodr. Gard. in Ind. ed. 5, p. 404 A.

Brunsfelsia americana, Linn. Sp. Pl. (1753) p. 191. A free-flowering shrub, a native of Tropical America, with elliptic-ovate leaves and odorous flowers with a long corolla-tube. The flowers are at first yellow, afterwards turning white. Woodr. Gard. in. Ind. ed. 5, p. 402 ; Firminger, Man. Gard. ed. 3 (1874) p. 551.

Petunia. Varieties of *Petunia nyctaginiflora,* Juss. in Ann. Mus. Par. v. 2 (1803) p. 216, t. 47, fig. 2, and of *Petunia violacea,* Lindl. Bot. Reg. t. 1626, natives of the Argentine, are grown in gardens, where they make an imposing show with their variously striped and colored corollas. Dalz. & Gibs. Suppl. p. 63 ; Woodr. Gard. in Ind. ed. 5, pp. 402—403.

Capsicum.

There seems little doubt that the several varieties of this genus are natives of Tropical America, although they have been cultivated in India from a remote period. Numerous species (perhaps 50 or more) have been enumerated by various authors, but, at present, botanists have generally agreed to refer all the varieties to 2 species, and to consider the other so-called species to be varieties or sub-varieties of these. The two accepted species of the genus are *Capsicum annuum*, Linn., and *C. frutescens*, Linn.

Capsicum annuum, Linn. Hort. Cliff. (1737) p. 59. Herbaceous or suffrutescent, annual or biennial, usually 2—3 ft. (sometimes 4—5 ft., rarely only 1 ft.) high. Pedicels usually solitary. Corolla usually white (in var. *longum*, purple). This species furnishes the chief commercial varieties now in cultivation. Linn. Sp. Pl. (1753) p. 188; Fingerh. Monogr. Gen. Caps. (1832) p. 12, t. 2, fig. *a*; Irish, Revis. Gen. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 65; Watt, Dict. Econ. Prod. v. 2, p. 134.

VAR. *acuminata*, Fingerh. Monogr. Gen. Caps. (1832) p. 13, t. 2, fig. *c*. Plant 1½—2½ ft. high. Foliage dense. Leaves solitary, sometimes semi-fascicled, ovate, acuminate. Pedicels slender, enlarging towards the apex. Calyx embracing the base of the fruit. Corolla dull-white. Fruit tapering, much longer than broad, usually more or less curved, red, yellow or orange; flesh thin, pungent. Irish, Rev. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 69, t. 10. *Capsicum frutescens*, Roxb. Fl. Ind. v. 1, p. 574 (*not* of Linn.); Grah. Cat. p. 139; Dalz. & Gibs. Suppl. p. 61; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 239; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 2, p. 137. The common *Chilli* largely cultivated.—VERN. *Mirchi*; *Lál mirchi*.

VAR. *abbreviata*, Fingerh. Monogr. Gen. Caps. (1832) p. 14, t. 2, fig. *f*. Plant 1—2 ft. high; branches numerous, more or less angled. Leaves broadly ovate. Pedicels 1—1½ in. long, usually solitary. Berry seated on the calyx, not enclosed by it at the base. Corolla dull-white. Fruit not or but little longer than broad, circular in cross-section, usually subconical, ovoid or ellipsoid, more or less rugose, red or yellow when ripe, often variously blotched with brown before ripening; flesh thin, pungent. Irish, Revis. Gen. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 88, t. 28. *Capsicum annuum*, Roxb. Fl. Ind. v. 1, p. 573. Cultivated sparingly, chiefly in the gardens of Europeans.

VAR. *grossa*, Sendt. in Mart. Fl. Bras. v. 10 (1846—1856) p. 147. Plant herbaceous, 1½—2 ft. high; branches green, often warty, enlarged at the nodes which are often blotched with purple. Leaves thick, the lower ones very large, on stout petioles 2—3 in. long. Pedicels stout ¾—1 in. long. Calyx not embracing the base of the fruit. Corolla large,

spreading, dull-white. Fruit large, angular in cross-section, prismatic, quadrate, or oblate, more or less sulcate, usually with a basal depression ; flesh thick, scarcely at all pungent. Irish, Revis. Gen. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 80, tt. 15—24. *Capsicum grossum* (sp.), Linn. Mantiss. (1767) p. 47 ; Grah. Cat. p. 139 ; Dalz. & Gibs. Suppl. p. 61 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 239 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173 ; Watt, Dict. Econ. Prod. v. 2, p. 139. *C. ceratocarpum,* Fingerh. Monogr. Gen. Caps. (1832) p. 22, t. 6, fig. *c*. *Spanish* or *Monstrous Pepper,* grown sparingly, chiefly in the gardens of Europeans.—VERN. *Kafri-mirchi* ; *Bopala-mirchi.*

VAR. *cerasiformis,* Mill. Gard. Dict. ed. Martyn (1807) n. 1, *e*. Shrubby, 1—2 ft. high ; branches numerous, 4-angled, green or purplish, usually purple and much enlarged at the nodes. Leaves ovate or oblong, acuminate. Pedicels ⅜—½ in. long, usually solitary. Calyx not embracing the base of the fruit. Corolla large, dull-white. Fruit spherical, subcordate ½—1 in. in diam., often, when unripe, blotched with purple on the side next the sun ; flesh firm, thick, extremely pungent. Irish, Revis. Gen. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 92. *Capsicum cerasiforme* (sp.), Mill. Gard. Dict. ed. 6 (1752) n. 5 ; Fingerh. Monogr. Gen. Caps. (1832) p. 19, t. 5, fig. *b*. *C. grossum* var. *cerasiformis,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 239. *Cherry Pepper,* cultivated occasionally in the gardens of Europeans.

VAR. *longum,* Sendt. in Mart. Fl. Bras. v. 10 (1846—1856) p. 147. Branches few, large, erect, green, often streaked with purple and with purplish nodes. Leaves ovate, acuminate, with long petioles. Pedicels solitary, ⅞—1⅛ in. long, curved or straight. Calyx hardly embracing the base of the fruit. Corolla purple, or white blotched with purple. Fruit tapering, much longer than broad, nearly black at first, afterwards becoming orange-red ; flesh rather thick, usually mild in flavour. Irish, Revis. Gen. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 73, t. 12, fig. 2. *Capsicum purpureum,* Vahl, ex Hornem. Hort. Hafn. v. 1 (1813) p. 224 ; Roxb. Fl. Ind. v. 1, p. 573. *C. nigrum,* Willd. Enum. (1809) p. 242. *C. annuum* var. *nigra,* Prain, Beng. Pl. (1903) p. 749. *Purple Chilli,* occasionally cultivated in gardens.

Capsicum frutescens, Linn. Hort. Cliff. (1737) p. 60. Shrubby perennial plants 2½—6 ft. high ; branches angular. Leaves broadly ovate, acuminate, usually wrinkled, more or less pubescent. Pedicels slender, usually 2 or more together, 1—2 in. long. Calyx embracing the base of the fruit, usually cup-shaped. Corolla white or greenish-white, often with ochreous markings in the throat. Fruit red, ovoid, obtuse, or oblong, acuminate. Linn. Sp. Pl. (1753) p. 159 ; Fingerh. Monogr. Gen. Caps. (1832) p. 17, t. 4, fig. *c* ; Irish, Revis. Gen.

Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 97, t. 9, fig. 1, *Capsicum minimum*, Mill. Gard. Dict. ed. 6 (1752) n. 10; Roxb. Hort. Beng. (1814) p. 17; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 239; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173; Watt, Dict. Econ. Prod. v. 2, p. 139. The *Bird's-eye Chilli* of Europeans, cultivated, but not extensively, often found as an escape.—VERN. *Lovungi-mirchi*.

VAR. *baccata*, Irish, Revis. Gen. Caps. in Missouri Bot. Gard. Rep. 9 (1898) p. 99. A much-branched shrub. Leaves ovate, acuminate, narrowing abruptly into the petiole. Pedicels usually 2 together, slender, 1—1¼ in. long, extra-axillary, erect. Calyx short, not embracing the base of the fruit. Corolla small, greenish-white. Fruit globose or nearly so, about ¼ in. in diam., changing from green to blackish-spotted, finally ripening to a red or yellow. *Capsicum baccatum* (sp.), Linn. Mantiss. (1767) p. 47; Fingerh. Monogr. Gen. Caps. (1832) p. 18, t. 4, fig. *a*; Sendt. in Mart. Fl. Bras. v. 10 (1846—1856) p. 146. *C. minimum*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 239 in part. The *Brazil Pepper* or *Pimentas*, occasionally cultivated.

ORDER XC. SCROPHULARIACEÆ.

Herbs or shrubs (rarely trees), often semi-parasitic, rarely quite parasitic on root. Leaves all or the lower only opposite, rarely all alternate or whorled; stipules 0. Flowers hermaphrodite, usually irregular; inflorescence centripetal or composite. Calyx inferior, usually persistent, 5 (rarely 4) -merous. Corolla hypogynous, more or less 2-lipped or occasionally personate, 4—5-lobed. Stamens usually 4 with or without a rudimentary 5th (*staminode*), less commonly 2 or 5; anthers variously shaped, 1—2-celled, the cells distinct or more or less confluent. Disk annular, cupular, or glandular. Ovary superior, usually 2-celled; ovules many, rarely few or only 2 in each cell, anatropous or amphitropous; style simple; stigma capitate, or dilated, or 2-lobed, or 2-lamellate. Fruit capsular (rarely baccate); placentas on a free central axis or attached to the margins of the valves. Seeds small, or various shapes; hilum lateral or ventral; albumen fleshy (rarely 0); embryo straight or curved.—DISTRIB. Throughout the world; genera about 160; species about 2000.

Leaves all alternate.	
Corolla-tube elongate.	
Stamens 2. Viscid herbs	1. ANTICHARIS.
Corolla subrotate.	
Stamens 4, didynamous	2. CELSIA.
Leaves the lower at least if not all opposite.	
Corolla spurred or subsaccate at the base in front; capsule opening by pores.	
Corolla spurred; anther-cells distinct.....	3. LINARIA.
Corolla subsaccate; anther-cells confluent above.	4. SCHWEINFURTHIA.

Corolla not spurred nor subsaccate; capsule dehiscing by valves.
Corolla with upper lip or 2 upper lobes outermost, and lower lobes innermost in bud.
Corolla elongate; tube cylindric with more or less expanded throat; limb with subequal lobes or 2-lipped; stamens 4 or 2.
Stamens 4, inserted within the corolla-tube.
Corolla-lobes rounded, subequal.
Anther-cells divaricate, confluent; capsule septicidal..... 5. SUTERA.
Anther-cells contiguous though distinct, parallel; capsule septicidal and loculicidal..... 6. MONIERA.
Corolla distinctly 2-lipped.
Corolla with 2-gibbous throat; anther-cells confluent at the apex ..... 7. MIMULUS.
Corolla-throat not 2-gibbous; anther-cells distinct.
Placentas either separating in fruit or, if conjoined in a column, the column not winged; seeds terete. 8. STEMODIA.
Placentas always conjoined in a column which is winged by the remains of the septa; seeds angular, usually truncate ..... 9. LIMNOPHILA.
Stamens 2 perfect, the lower pair reduced to staminodes, all inserted in the corolla-tube ..... 10. DOPATRIUM.
Stamens if 4 the lower pair, if 2 the staminodes inserted in the corolla-throat, the upper or only perfect pair inserted in the corolla-tube; capsule septicidal.
Stamens 4 with perfect anthers.
Calyx-segments winged.
Calyx 3—5-toothed or 2-lipped ..... 11. TORENIA.
Calyx-segments not winged.
Long filaments with a broad appendage at the base; calyx 5-partite ..... 12. ARTANEMA.
Long filaments with a tooth-like or subulate appendage at the base; calyx 5-fid or 5-partite ..... 13. VANDELLIA.
Stamens 2 with perfect anthers, the 2 lower reduced to staminodes inserted on the corolla-throat.
Leaves with parallel nerves; staminodes unequally 2-lobed. 14. ILYSANTHES.
Leaves penni-nerved; staminodes entire ..... 15. BONNAYA.
Corolla small; tube very sort; stamens 2.
Prostrate or creeping herbs.
Calyx tubular, obtusely 5-toothed..... 16. PEPLIDIUM.
Calyx campanulate, 3—4-lobed ..... 17. GLOSSOSTIGMA.

Corolla-lobes all flat, the 2 lateral or one of them exterior in bud; stamens 2.
- Shrubs with alternate linear fleshy leaves... 18. CAMPYLANTHUS.
- Herbs; corolla subrotate; tube short..... 19. VERONICA.

Corolla with upper lip or 2 upper lobes innermost and lower lobes outermost in bud; stamens 4.
- Calyx tubular, 5-toothed or 5-fid.
  - Corolla-tube straight or nearly so; lobes subequal; lower leaves much larger than the upper ..... 20. BUCHNERA.
  - Corolla tube abruptly incurved at or above the middle; 2 upper lobes smaller than the others; lower leaves not much larger than the upper..... 21. STRIGA.
- Calyx campanulate, 5-fid or 5-lobed.
  - Anthers 1-celled; leaves sometimes pinnatisect; corolla-tube long, slender.... 22. RHAMPHICARPA.
  - Anthers 2-celled, one of the cells barren; leaves always pinnatisect; corolla-tube short with dilated throat. 23. SOPUBIA.
  - Anthers 2-celled, both cells fertile; leaves toothed, not pinnatisect..... 24. LINDENBERGIA.
- Calyx spathaceous, split down the front.
  - Corolla-lobes subequal, broad, spreading; anthers 2-celled, one cell often empty. 25. CENTRANTHERA.
  - Corolla strongly 2-lipped, the upper lip erect, hooded; anther-cells both fertile ..... 26. PEDICULARIS.

1. **ANTICHARIS,** Endl.

Small erect viscid-hairy herbs. Leaves alternate, quite entire. Flowers axillary, usually solitary, with 2 bracts on the pedicel. Calyx 5-partite; sepals narrow, subvalvate. Corolla-tube enlarged at the throat; lobes 5, subequal. Stamens 2 perfect; filaments filiform; anthers versatile, curved; staminodes 0. Style filiform; stigma obtuse or notched. Capsule ovoid or oblong, acuminate; loculicidally and septicidally dehiscent; valves with inflexed margins, separating from the axis, laying bare the placentiferous column. Seeds numerous, small, oblong or obovoid, striately ribbed; embryo straight; cotyledons ovate.—DISTRIB. Tropical and South Africa, Arabia, India; species about 9.

- Leaves ovate, not exceeding ¾ in. long; pedicels less than twice as long as the calyx..... 1. *A. glandulosa.*
- Leaves narrowly linear, exceeding 1 in. long; pedicels more than twice as long as the calyx..... 2. *A. linearis.*

1. **Anticharis glandulosa,** *Aschers. in Monatsb. Akad. Wiss. Berl.* (1866) p. 880. An erect branched leafy herb scarcely reaching 1 ft. high, clothed all over with viscid glandular hairs. Leaves ⅜—¾ in. long, ovate-oblong, subobtuse, densely glandular-hairy, entire, narrowed into a short flattened often obscure petiole. Pedicels axillary, solitary (very rarely 2 together), ⅛ in. long, slender, glandular-hairy; bracts 2 about the middle of the pedicel, reaching ¼ in. long, linear-spathulate, glandular-hairy. Calyx ¼ in. long, divided to the base; sepals oblanceolate, acute, glandular-hairy and ciliate. Corolla scarcely ½ in. long, rosy. Filaments short, filiform,

glabrous; anthers versatile, curved, the segments unequal. Ovary ovoid, glabrous, seated on a somewhat cup-shaped disk; style glabrous. Capsules $\frac{1}{3}$ in. long, narrowly ovoid, acuminate, pubescent. Seeds about $\frac{1}{25}$ in. long, oblong, truncate, longitudinally striately ribbed. Fl. B. I. v. 4, p. 249; Boiss. Fl. Orient. v. 4, p. 423; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 173. *Anticharis arabica*, Aitch. Pb. & Sind Pl. p. 106 (*not* of Endl.).

In the Bombay Presidency confined to Sind. SIND: *Stocks*!, *Vicary*!, *Bhola Puran*!, *Cooke*!, *Woodrow*.—DISTRIB. Upper Egypt.

2. **Anticharis linearis,** *Hochst. ex Aschers. in Monatsb. Akad. Wiss Berl.* (1866), p. 882. A much-branched herb rarely exceeding 1 ft. high, turning black in drying, more or less clothed with slender glandular hairs. Leaves linear, acute, 1—$1\frac{3}{4}$ by $\frac{1}{12}$—$\frac{1}{8}$ in., sessile, entire, glandular-hairy or nearly glabrous. Pedicels $\frac{1}{2}$—$\frac{3}{4}$ in. long, solitary, filiform, with 2 small linear bracts $\frac{1}{10}$—$\frac{1}{8}$ in. long at or near the middle. Calyx $\frac{1}{3}$ in. long, divided to the base; sepals linear-lanceolate, acute, glandular-hairy. Corolla pale-purple, veined, divided scarcely $\frac{1}{4}$—way down; lobes 5, oblong, obtuse. Anthers versatile, curved, the segments unequal. Style glabrous. Capsules $\frac{1}{3}$ in. long, ovoid, acuminate, pubescent, veined. Seeds $\frac{1}{50}$ in. long, oblong, truncate, longitudinally striately ribbed. Boiss. Fl. Orient. v. 4, p. 423; Woodr. in Journ. Bomb. Nat. v. 12 (1898), p. 173. *Doratanthera linearis*, Benth. in DC. Prodr. v. 10 (1846) p. 347; Aitch. Pb. & Sind Pl. p. 106.

In the Bombay Presidency confined to Sind. SIND: *Stocks*!, *Woodrow*, *Bhola Puran*!—DISTRIB. India (Panjáb); Arabia, Tropical Africa, Cape de Verde Islands.

2. CELSIA, Linn.

Annual or biennial erect herbs. Leaves alternate, crenate, sinuate-dentate or inciso-pinnatifid. Flowers in terminal simple or rarely branched spikes or racemes. Calyx deeply 5-fid or 5-partite; segments imbricate. Corolla rotate; tube scarcely any; lobes 5, broad, somewhat unequal, the upper outermost in bud. Stamens 4, didynamous or (in the single Bombay species) subequal; filaments bearded; anthers at the apex of the filament transverse or oblique, the cells confluent; staminodes 0. Ovary 2-celled; ovules many; style entire; stigma compressed, terminal. Capsule globose or ovoid, septicidally 2-valved, the valves each usually 2-fid. Seeds small, warted, not winged.—DISTRIB. S. Europe, N. Africa, Abyssinia, W. Asia, and East Indies; species about 30.

1. **Celsia coromandeliana,** *Vahl, Symb. Bot.* v. 3 (1794) p. 79. An annual herb; stem 2—3 ft. high, hairy, often branched near the top. Leaves: radical 2—4 by $\frac{3}{4}$—$1\frac{1}{2}$ in., on long petioles, lyrate, compound or pinnatisect, with several small leaflets or segments at the base and a large ovate-oblong subacute terminal lobe; lower cauline leaves similar but smaller, and with shorter petioles; upper cauline leaves gradually becoming smaller and sessile, passing into bracts, all coarsely dentate, more or less hairy on both sides. Flowers

yellow, in simple or branched terminal racemes 1—2 ft. long; rhachis glandular-pubescent; pedicels longer than the calyx, glandular-pubescent; bracts (or floral leaves) foliaceous, ovate, acute, sessile, gradually becoming smaller upwards. Calyx rather less than ¼ in. long, deeply divided, glandular-pubescent; lobes ⅛ in. long, linear-oblong, subacute. Corolla rotate, ½ in. in diam.; lobes 5, rounded. Filaments densely bearded with purple hairs. Ovary globose, glabrous; style glabrous. Capsules ¼—⅜ in. in diam., subglobose. Seeds $\frac{1}{10}$ in. long, oblong, truncate, warted. Fl. B. I. v. 4, p. 251; Dalz. & Gibs. p. 176; Wight, Icon. t. 1406; Aitch. Pb. & Sind Pl. p. 105; Trim. Fl. Ceyl. v. 3, p. 240; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174; Watt, Dict. Econ. Prod. v. 2, p. 241. *Celsia Arcturus*, Grah. Cat. p. 141 (*not* of Jacq.).—Flowers: Jan.—May. VERN. *Kutaki*.

KONKAN: *Law*! DECCAN: waste places, *Dalzell & Gibson*; Poona, *Cooke*!, *Woodrow*!; Raighar Fort, *Dalzell & Gibson*. GUJARAT: *Woodrow*. SIND: *Stocks*!—DISTRIB. Throughout India; Ceylon, Afghanistan, Ava, China.

The plant has some repute in native medicine. See Watt, Dict. Econ. Prod. l. c.

3. LINARIA, Juss.

Herbs. Leaves usually opposite or whorled below and alternate above. Flowers axillary, solitary, or the upper arranged in a terminal raceme or spike, the floral leaves reduced to bracts; pedicels slender; bracteoles 0. Calyx 5-partite; segments imbricate. Corolla personate, 2-lipped; tube spurred in front; upper lip erect, 2-lobed; lower lip spreading, 3-lobed; throat usually closed by the tumid palate. Stamens 4, didynamous, included, ascending; anthers with distinct parallel cells. Ovary 2-celled; ovules many; style filiform; stigma minute. Capsule ovoid or globose, 2-celled, both cells or the anterior only opening by an apical pore. Seeds angled, rugose or echinulate, wingless, or discoid and winged.—DISTRIB. Chiefly in the temperate regions of the world; species 130.

1. **Linaria ramosissima,** *Wall. Pl. As. Rar.* v. 2 (1831) p. 43, t. 153. A perennial herb often much-branched from the base; branches slender, terete, prostrate or suberect, 1—2½ ft. long, usually glabrous. Leaves alternate, very variable, ½—1¾ in. long, variable in breadth, glabrous or the lower sometimes pubescent, the lower 5—7-lobed, triangular-hastate, the upper usually lanceolate-sagittate; petioles ¼—½ in. long, filiform. Flowers yellow, usually axillary, solitary; pedicels capillary, ½—1½ in. long, ebracteate. Calyx ⅛ in. long, divided almost to the base, hairy, often becoming glabrous in fruit; segments linear-lanceolate, acute, from an ovate membranously-margined base. Corolla (including the spur) nearly ½ in. long, pubescent outside; spur ⅛ in. long; upper lip 2-lobed, the lobes $\frac{1}{16}$ in. long, oblong, obtuse; the lower lip 3-lobed, the lobes spreading, $\frac{1}{12}$ in. long, oblong, obtuse. Stamens didynamous; filaments more or less pubescent. Ovary subglobose; style stout, $\frac{1}{12}$ in. long, glabrous or nearly so. Capsules ovoid or subglobose, ⅛ in. in diam. Seeds small, echinulate. Fl. B. I. v. 4, p. 251; Dalz. & Gibs. p. 176;

Wight, Ill. t. 165; Aitch. Pb. & Sind Pl. p. 105; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174; Watt, Dict. Econ. Prod. v. 4, p. 642. *Linaria* (sp.), Grah. Cat. p. 142.—Flowers: Sept.

Throughout the Presidency, tolerably common. KONKAN: *Stocks*!; Bassein hills, *Dalzell & Gibson*. DECCAN: *Stocks*!, *Dalzell & Gibson*, *Cooke*!; Dongergaon, near Ahmednagar, *Cooke*!; Poona, *Cooke*!, *Woodrow*!; Ghât between Wai and Panchgani, plentiful, *Cooke*! S. M. COUNTRY: Belgaum, *Dalzell & Gibson*. GUJARAT: *Stocks*!; Ahmedabad, *Dalzell & Gibson*. SIND: *Stocks*!, *Dalzell & Gibson*.—DISTRIB. Throughout India, usually in rocky or stony places; Afghanistan, Ava.

EXCLUDED SPECIES.

LINARIA CABULICA (Benth. in DC. Prodr. v. 10 (1846) p. 270), which differs from *L. ramosissima*, Wall., in being softly hirsute and having smaller and more entire leaves and a larger corolla than that plant, with a spur which is usually longer than the corolla-tube, does not appear to occur in the Bombay Presidency. The specimens in Herb. Kew. from Stocks (1025!) and Lace (3479!) are from Beluchistan. *Linaria ramosissima*, var. *pubescens*, Hook. f. Fl. B. I. v. 4, p. 251, of which a solitary sheet occurs in Herb. Kew. (*Stocks*, 101!) to which no locality has been assigned, seems certainly to be *L. cabulica*. Stocks, in his MSS. note attached to the sheet in question, was of opinion that this might be the case. The length of the spur, the only character by which it would appear to differ, is not a very constant one, the spur in some authenticated specimens of *L. cabulica* not being longer than the corolla-tube. In fact Boissier (Fl. Orient. v. 4, p. 368) describes it as shorter.

4. SCHWEINFURTHIA, A. Braun.

Annual or perennial branched usually glabrous herbs. Leaves usually alternate, quite entire. Flowers small, axillary. Calyx 5-partite; segments imbricate, the upper the largest. Corolla-tube large, subsaccate at the base, not spurred; limb 2-lipped, the upper lip erect, 2-lobed, the lower 3-lobed, the mid-lobe narrower than the lateral; palate closing the throat. Stamens 4, fertile, didynamous (the 5th rudimentary); anthers 2-celled, the cells divaricate after flowering. Style filiform; stigma minute. Capsule subglobose, fragile, 2-celled, the upper cell small, 3—4-seeded or empty, the lower longer and broader, large, many-seeded, bursting irregularly. Seeds obconic, ribbed or winged, truncate at both ends.—DISTRIB. N.E. Africa, Arabia, Afghanistan, Beluchistan, Sind; species 3.

Leaves ovate or obovate; ribs of the seeds acute..... 1. *S. sphærocarpa*.
Leaves linear; ribs of the seeds obtuse..... 2. *S. pedicellata*.

1. **Schweinfurthia sphærocarpa,** *A. Braun, in Monatsb. Akad. Wiss. Berl.* (1866) p. 875. A subglabrous glaucous herb 6—12 in. high, from a perennial root; stems ascending, glabrous or puberulous. Leaves ill-smelling when bruised, somewhat succulent, variable, ½—1 by ¼—¾ in., elliptic or ovate, sometimes slightly obovate or so much attenuated at the base as to be subspathulate, acute, often apiculate, entire, sparsely clothed on both sides with very minute hairs or glabrous, base usually attenuated into a short petiole. Flowers axillary; pedicels equalling the petiole, deflexed in fruit. Calyx 5-partite, the upper segment very large, reaching ⅝ by ½ in. in fruit, broadly ovate, subcordate, acute, veined, the remaining segments in

fruit $\frac{1}{8}$ by $\frac{1}{8}$ in., lanceolate, acute. Corolla scarcely $\frac{1}{2}$ in. long, dingy-white with purple veins ; upper lip 2-lobed ; lobes oblong, obtuse, $\frac{1}{20}$ in. long ; lower lip 3-lobed, spreading, the lobes oblong, obtuse. Capsules $\frac{1}{4}$—$\frac{1}{3}$ in. in diam., obliquely globose, 2-celled, the lower cell many-seeded, the upper very small, 3—4-seeded. Seeds obconic, $\frac{1}{20}$ in. long, truncate at both ends, acutely winged, pale. Fl. B. I. v. 4, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 489. *Linaria sphærocarpa*, Benth. in DC. Prodr. v. 10, p. 287 ; Aitch. Pb. & Sind. Pl. p. 105. *Antirrhinum glaucum*, Stocks, ex Wight, Icon. t. 1459.—Flowers : Dec. VERN. *Sannipát.*

SIND : *Cooke* !, *Dalzell*, 79 !, *Woodrow*, *Stocks*, 521 ! ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. Beluchistan, Afghanistan.

The powdered fruit and leaves are sold as a drug which native practitioners prescribe in typhoid fever. The powder is used as snuff for bleeding at the nose. See Watt, Dict. Econ. Prod. l. c.

2. **Schweinfurthia pedicellata,** *Benth. & Hook. f. Gen. Pl.* v. 2 (1876) p. 934 (by error *pedicellaris*). Suffruticose, erect, branched ; stem and branches usually greyish, glabrous or rarely with a few scattered glandular hairs. Leaves $\frac{1}{2}$—$1\frac{1}{4}$ by $\frac{1}{16}$—$\frac{1}{12}$ in., sessile, linear, subacute. Flowers axillary, solitary ; pedicels $\frac{1}{4}$—$\frac{1}{2}$ in. long, capillary. Calyx $\frac{1}{8}$ in. long, 5-partite, glabrous ; segments $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, acute, the upper slightly longer and broader than the other 4. Corolla 2-lipped, $\frac{1}{3}$ in. long, parallel-veined and with 2 lines of hairs in the throat at the lower side ; upper lip erect, 2-lobed, the lobes $\frac{1}{12}$ in. long, oblong, rounded at the apex ; lower lip 3-lobed, the lobes oblong-rounded, the middle lobe longer and narrower than the lateral ones. Stamens 4 (with a rudimentary 5th), didynamous, the lower pair the longer ; filaments hairy at the base ; anthers divaricate. Ovary glabrous ; style glabrous. Capsules $\frac{1}{8}$—$\frac{1}{4}$ in. in diam., globose, fragile, 2-celled, the upper cell with few seeds or empty. Seeds $\frac{1}{20}$ in. long, obconic, truncate at both ends, strongly ribbed with longitudinal obtuse ribs. *Anarrhinum pedicellatum*, T. Anders. Flor. Aden. in Journ. Linn. Soc. v. 5, Suppl. 1 (1860) p. 26.

SIND : rare, *Cooke* !—DISTRIB. Arabia.

5. **SUTERA,** Roth.

Herbs or small shrubs, annual or perennial, glabrous, pubescent or hispid, sometimes viscid. Leaves mostly opposite (the upper sometimes alternate), subentire, pinnatifid, or more or less toothed. Flowers axillary or in terminal simple (rarely compound) spikes or racemes ; bracts not adhering along the pedicel. Calyx usually 5-partite ; segments sublinear or rarely ovate, more or less imbricate in bud. Corolla tubular, not spurred at the base, deciduous ; tube long or short, cylindric or infundibuliform, straight or more or less curved ; throat dilated or not ; limb regular or 2-lipped ; lobes entire, or shortly 2-fid or emarginate, equal or nearly so, imbricate in bud, the 2 upper exterior. Stamens 4, didynamous, exserted, or some or all included ; filaments filiform, inserted in the corolla-tube ; anthers reniform, perfect, 1-celled by confluence of the cells. Ovary 2-celled ;

ovules numerous ; style filiform, included or exserted, slightly dilated upwards. Capsule septicidal, 2-valved, the valves bifid. Seeds rugose.—DISTRIB. Species about 115, chiefly natives of S. Africa.

1. **Sutera glandulosa,** *Roth, Nov. Pl. Sp.* (1821) p. 291. Annual, diffuse, or sometimes suberect, viscidly-pubescent, branched from the base or near it ; branches 6—12 in. long, viscidly glandular-pubescent. Leaves ¼—¾ by ⅛—½ in., ovate in outline, pinnatifid, the segments toothed and cut, base tapering into a short petiole. Flowers axillary, solitary, or the uppermost racemose ; pedicels glandular-pubescent, rarely reaching ⅛ in. long, sometimes almost 0. Calyx ⅒—⅛ in. long, divided to the base or very nearly so, glandular-pubescent ; segments linear-oblong, subacute. Corolla white, ⅛—¼ in. long, divided about one-third the way down, glabrous ; lobes oblong, obtuse, subequal. Stamens 4, didynamous. Style short ; stigma notched. Capsules ⅛ in. long, ovoid-oblong, septicidal, with 2 bifid valves, viscidly pubescent or glabrous. Seeds minute, ⅒ in. long, yellowish, minutely pitted. Fl. B. I. v. 4, p. 258 ; Wight, Icon. t. 856 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Dec.—Feb. VERN. *Bhul.*

KONKAN : *Stocks* ! DECCAN : Nasik, *Vadekar* ! ; Diksal, *Bhiva* ! ; Karli, *Kanitkar* ! ; bank of Mutha river near Poona, *Woodrow* !—DISTRIB. India (Behar, Bengal, W. Peninsula) ; Arabia, Egypt, Nubia.

6. **MONIERA,** B. Juss. ex P. Browne, Hist. Jamaic. (1756) p. 269. *HERPESTIS,* Gærtn. Fruct. v. 3 (1805) p. 186, t. 214.

Glabrous herbs. Leaves often punctate, entire or toothed, or submerged and multifid. Flowers axillary, solitary or racemose ; bracteoles small or 0. Calyx 5-partite ; segments imbricate, the upper largest, the 2 lateral innermost, often very narrow. Corolla 2-lipped ; tube cylindric ; lips spreading, the upper outer in bud, notched or 2-lobed, the lower lip 3-lobed. Stamens didynamous, included ; anthers sometimes approximate in pairs, the cells contiguous, parallel, distinct. Ovary 2-celled ; ovules many in each cell ; style dilated at the top ; stigma entire or 2-lobed. Capsule globose or ovoid, 2-grooved ; valves 2 or 4, separating from an entire column. Seeds many, minute.—DISTRIB. Warmer regions of both hemispheres : species about 50.

The name *Moniera* was given to the genus in 1756, and is therefore prior to the name *Herpestis,* which was given to it 49 years later by Gærtner. Although a genus *Monnieria,* Linn., exists under the Order *Rutaceæ*, that too is of subsequent date (1759) to the genus *Moniera,* Juss.

Leaves obovate-oblong or spathulate; flowers pedicellate; capsule ovoid, acute	1. *M. cuneifolia.*
Leaves linear-lanceolate; capsule globose.	
Flowers sessile, solitary	2. *M. Hamiltoniana.*
Flowers pedicellate, 1—3 in an axil	3. *M. floribunda.*

1. **Moniera cuneifolia,** *Michaux, Fl. Bor. Amer.* v. 2 (1803) p. 22 (*Monniera*). A glabrous somewhat succulent creeping herb ; stems 4—12 in. long, rooting at the nodes ; branches numerous, ascending. Leaves sessile, decussate, ¼—1 by ⅒—⅜ in., obovate-

oblong or spathulate, rather fleshy, dotted with black specks, very obtuse, quite entire ; nerves obscure. Flowers axillary, solitary ; bracteoles ½ in. long, linear ; pedicels ¼—1½ in. long, slender. Calyx glabrous, divided to the base ; upper sepal ¼ by ⅛—⅓ in., ovate, acute ; the other 4 sepals slightly shorter than the upper ; the 2 inner lateral ones $\frac{1}{16}$ in. wide, lanceolate, acute. Corolla pale-blue or almost white, ⅓ in. long ; lobes nearly equal, rounded, spangled when fresh with shining dots. Anthers bluish-purple ; pollen white. Capsules ⅓ in. long, ovoid, acute, pointed with the stylebase, glabrous. Seeds about $\frac{1}{30}$ in. long, oblong, striate, pale. Hiern, in Dyer, Fl. Capen. v. 4, Sec. 2 (1904) p. 355. *Herpestis Monnieria*, H. B. & K. Nov. Gen. & Sp. Pl. v. 2 (1817) p. 366 ; Benth. in DC. Prodr. v. 10, p. 400 ; Trim. Fl. Ceyl. v. 3, p. 246. *Herpestis Monniera*, Benth. Scroph. Ind. p. 30 ; Hook. f. Fl. B. I. v. 4, p. 272 ; Grah. Cat. p. 144 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 ; Watt, Dict. Econ. Prod. v. 4, p. 225. *Herpestes Monnieria*, Dalz. & Gibs. p. 178. *Gratiola Monnieria*, Linn. Cent. Pl. ii. n. 120 in Amœn. Acad. v. 4 (1759) p. 306.—Flowers : Jan.—May. VERN. *Bám ; Nira-bráhmi.*

Throughout the Presidency in damp places. KONKAN : Marmagão, *Bhiva* ! DECCAN : *Woodrow* ; Lanoli, *Cooke* ! ; Dongergaon near Ahmednagar, *Cooke* ! ; Mahableshwar, *Cooke* ! ; Khandala, *Kanitkar* ! SIND : *Woodrow* ; Landhi, *Cooke* !—DISTRIB. Throughout India in wet places; Ceylon and all warm countries.

The stalks and leaves are used medicinally by the Hindus, who consider them diuretic and aperient. According to Roxburgh, the expressed juice mixed with petroleum is used as an external application in rheumatism. It is also taken internally as a nervine tonic. See Watt, Dict. Econ. Prod. l. c.

2. **Moniera Hamiltoniana,** *T. Cooke.* Erect or decumbent at the base, stout, 3—10 in. high, glabrous ; stem simple or branched. Leaves subsessile, ½—1 by $\frac{1}{10}$—⅓ in., linear-lanceolate, acute, entire or subserrate, attenuated at the base ; nerves obscure. Flowers sessile, axillary, opposite, solitary ; bracteoles $\frac{1}{20}$—$\frac{1}{12}$ in. long, linear-subulate. Calyx ⅛ in. long ; upper sepal broadly ovate, acute, almost as broad as long, reticulately veined ; the 2 lateral sepals narrowly lanceolate, $\frac{1}{20}$ in. broad, membranous. Corolla bluish-pink with purple veins ; tube hemispheric, attenuated upwards, scarcely exceeding the calyx ; limb subbilabiate, the upper lip deeply emarginate. Anthers white (*C. B. Clarke*). Capsules globose, ⅛ in. in diam., glabrous. Seeds narrowly oblong, yellowish-brown, usually acute at one or both ends. *Herpestis Hamiltoniana*, Benth. Scroph. Ind. (1835) p. 30 ; Hook. f. Fl. B. I. v. 4, p. 272 ; Dalz. & Gibs. p. 178 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.

Rare in the Bombay Presidency except at Malwán. KONKAN : *Stocks* !, *Law* ! ; Malwán, plentiful, *Dalzell* !—DISTRIB. India (Northern provinces, Panjáb, Bengal, Assam, Silhet, W. Peninsula) ; Senegal.

3. **Moniera floribunda,** *T. Cooke.* Erect, 3—12 in. high ; stem subquadrangular, slender, glabrous, more or less branched. Leaves subsessile, ½—1¼ by $\frac{1}{16}$—⅛ in., linear or linear-lanceolate, acute, entire, finely punctate. Flowers numerous, 1—3 (commonly 2) together in an axil ; bracteoles $\frac{1}{16}$ in. long, subulate, inserted on the pedicel a little below the calyx ; pedicels $\frac{1}{16}$—⅛ in. long. Calyx puberulous ;

upper sepal ⅛—¼ by ⅛ in., ovate, subacute, reticulately veined ; the 2 lateral sepals narrow, linear-lanceolate, acute, reticulately veined, membranous. Corolla not seen. Capsules ⅛ in. long, subglobose or broadly ovoid. Seeds $\frac{1}{10}$ in. long, oblong, truncate at both ends, brown. *Herpestis floribunda,* R. Br. Prodr. (1810) p. 442 ; Hook. f. Fl. B. I. v. 4, p. 273 ; Trim. Fl. Ceyl. v. 3, p. 246 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Feb.

The occurrence of this plant in the Bombay Presidency is somewhat doubtful. Woodrow in his list of Bombay plants (*l. c.*) reports its occurrence in S. Kanara, which is outside our area. Law has, in Herb. Kew., specimens from Kanara and Mysore, and of these the Kanara ones are most probably also from S. Kanara.—DISTRIB. S. India ; Ceylon, Java, Australia, Tropical Africa.

7. MIMULUS, Linn.

Decumbent or erect herbs, glabrous, pilose or viscid. Leaves opposite. Flowers axillary, solitary. Calyx tubular, pentagonal, 5-lobed ; lobes short. Corolla 2-lipped ; tube cylindric ; upper lip 2-lobed, outer in bud, erect or reflexed ; lower lip 3-lobed, spreading ; throat with usually a swollen 2-lobed palate. Stamens 4, didynamous, inserted near the base of the corolla-tube included or exserted under the upper lip ; filaments filiform ; anthers 2-celled, the cells at length confluent at the apex. Ovary 2-celled ; ovules many in each cell ; style filiform ; stigma 2-lamellate. Capsule oblong or sublinear, loculicidal, 2-valved, the valves entire or rarely 2-fid. Seeds numerous, minute, oblong.—DISTRIB. Species about 60, chiefly extra-tropical American.

1. **Mimulus gracilis,** *R. Br. Prodr.* (1810) p. 439. A perennial erect ascending or decumbent glabrous herb 6—20 in. high, branched near the base ; stem and branches quadrangular, striate. Leaves radical and cauline, 1½—3 by ⅓—¾ in., sessile (or the lower sometimes shortly petiolate), ½-amplexicaul, linear-oblong or oblong-lanceolate, usually obtuse, entire or nearly so, glabrous, base slightly narrowed. Flowers solitary in each axil ; pedicels slender, ½—1½ in. long. Calyx 5-angled, ¼ in. long in flower (slightly enlarged in fruit) ; teeth $\frac{1}{10}$ in. long, deltoid, acute. Corolla ⅜—½ in. long, glabrous ; tube cylindric below and but little dilated above ; lobes shallow, rounded. Stamens included ; filaments glabrous ; anthers subreniform. Ovary glabrous ; stigma 2-lamellate. Capsules ¼ in. long, obovoid, included in the slightly enlarged calyx. Seeds minute, about $\frac{1}{60}$ in. long, oblong-ellipsoid, smooth. Fl. B. I. v. 4, p. 259 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Mar.—Apr.

Not common. DECCAN : Poona, *Woodrow* ! ; Máwal taluka, river bank, *Bhiva* ! ; Mutha canal, right bank, *Kanitkar* !—DISTRIB. India (W. Himalaya, Panjáb, Behar, N. Bengal, W. Peninsula) ; China, Australia, Tropical and S. Africa.

8. STEMODIA, Linn.

Herbs sometimes woody below, glandular-pubescent, often aromatic. Leaves opposite or 3—4-nately whorled. Flowers axillary,

solitary, passing into terminal leafy spikes or close racemes; bracts leafy; bracteoles 1 or 2. Calyx 5-partite; segments narrow, imbricate, all equal or the upper a little larger. Corolla 2-lipped; tube cylindric; upper lip exterior, suberect, entire or notched, the lower lip spreading, 3-lobed, the throat not plicate. Stamens 4, didynamous, included; filaments filiform; anther-cells stalked, distinct, all fertile. Ovary 2-celled; ovules numerous in each cell; style dilated at the apex, not winged above; stigma usually 2-lobed. Capsule globose, ovoid or acuminate; valves 2, bifid, dehiscing septicidally, or valves 4 dehiscing both septicidally and loculicidally. Seeds minute, numerous.—DISTRIB. Tropical and S. America, Australia, Africa, Tropical Asia; species about 26.

Flowers pedicelled; corolla twice as long as the calyx. 1. *S. viscosa.*
Flowers subsessile; corolla scarcely longer than the calyx..... 2. *S. serrata.*

1. **Stemodia viscosa,** *Roxb. Cor. Pl.* v. 2 (1798) p. 33, t. 163. Erect, much-branched, 3—24 in. high, aromatic; stem and branches angular, viscidly pubescent. Leaves variable, ½—1¾ by ⅛—½ in., sessile, usually oblong, acute (rarely obovate), serrulate or subentire, glandular-pubescent or nearly glabrous, usually tapering, often cordate and amplexicaul at the base. Flowers axillary, solitary, or in terminal few-flowered racemes; pedicels filiform, ¼—⅓ in. long; bracteoles 2, a little below the calyx, linear-subulate, $\frac{1}{12}$ in. long. Calyx ⅛ in. long, 5-partite; sepals narrowly lanceolate, acute, glandular-hairy and ciliate. Corolla ⅓ in. long, violet, glabrous; upper lip broad, entire or emarginate; lower lip hairy in the throat, with 3 rounded or emarginate lobes of about equal length, the mid-lobe the broadest. Filaments glabrous; anther-cells shortly stalked, suborbicular. Ovary glabrous. Capsules ¼ in. long, ovoid-oblong, acuminate, glabrous, 4-valved, slightly longer than the sepals. Seeds oblong-ellipsoid, about $\frac{1}{10}$ in. long. Fl. B. I. v. 4, p. 265; Grah. Cat. p. 143; Dalz. & Gibs. p. 176; Wight, Icon. t. 1408; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174; Watt, Dict. Econ. Prod. v. 6, part 3, p. 359.—Flowers: Nov.—Dec.

KONKAN: *Stocks!*; Kalyan (rice-field near Railway Station), *Woodrow!* DECCAN: *Woodrow!*; Kolhapur, *Cooke!* GUJARAT: Veráwal, *Woodrow*; Unkleshvar, *Woodrow.*—DISTRIB. Central and Western India; Afghanistan.

2. **Stemodia serrata,** *Benth. in DC. Prodr.* v. 10 (1846) p. 381. A robust leafy erect viscidly-pubescent annual; stem obtuse, 4-angled. Leaves ¼—1½ by ⅛—½ in., sessile, narrowly obovate-oblong, acute, serrulate above the middle, entire below it, base narrowed, amplexicaul. Flowers subsessile, or very shortly pedicelled, axillary, solitary; bracteoles 2 beneath the calyx, linear-subulate, about $\frac{1}{12}$ in. long. Calyx ⅛ in. long, divided almost to the base, glandular-hairy; segments ⅛ in. long, linear-lanceolate, acute. Corolla ⅛—¼ in. long; upper lip bifid; lower lip with 3 subequal, oblong-obtuse lobes. Ovary glabrous. Capsules linear-oblong, acute, slightly shorter than the persistent calyx, glabrous. Seeds minute, less than $\frac{1}{10}$ in. long, oblong-ellipsoid. Fl. B. I. v. 4, p. 265; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers: Dec.—Feb.

KONKAN: *Stocks*!, *Law*! ; Pen, *Kanitkar*!—DISTRIB. India (W. Peninsula) ; Nubia, Egypt, Senegambia.

9. LIMNOPHILA, R. Br.

Herbs often paludine or aquatic, glabrous or pubescent, aromatic. Leaves transparently dotted, opposite or whorled, toothed or cut, or, where submerged, often multifid. Flowers sessile or pedicelled, axillary, solitary, or passing into terminal spikes or racemes ; bracts usually leafy ; bracteoles small or 0. Calyx 5-partite, segments subequal or the upper the largest. Corolla 2-lipped ; tube cylindric ; upper lip outermost, suberect, entire or 2-fid ; lower lip spreading, 3-lobed, throat not plicate. Stamens 4, didynamous, included ; anther-cells usually separate and stalked, rarely contiguous. Ovary 2-celled ; ovules numerous in each cell ; style slender, deflexed, at the top ; stigma 2-lamellate. Capsule ovoid or oblong, opening both septicidally and loculicidally, the placentiferous dissepiment separating with the valves. Seeds numerous, small, angular, truncate.—DISTRIB. Warmer regions of Africa, Asia, and Australia ; species about 25.

Leaves pinnately nerved; no whorls of pinnatifid or multifid leaves.	
Calyx not striate in fruit; leaves opposite, petiolate; flowers sessile	1. *L. Roxburghii.*
Calyx striate in fruit.	
Flowers sessile	2. *L. conferta.*
Flowers pedicellate	3. *L. gratissima.*
Leaves with 3—5 parallel nerves running from base to tip, or lower leaves whorled, pinnatifid or multifid; fruiting calyx not striate.	
Flowers sessile or nearly so.	
Flowers white, in terminal and axillary often divaricately branched slender spikes 2—3 in. long	4. *L. polystachya.*
Flowers pink, usually axillary, solitary	5. *L. sessiliflora.*
Flowers pedicellate; pedicels usually longer than the calyx.	
Stem 1—2 ft.; corolla ½ in. long or more	6. *L. racemosa.*
Stem 3—8 in.; corolla ⅛ in. long. Plant smelling strongly or turpentine	7. *L. gratioloides.*

1. **Limnophila Roxburghii,** *G. Don, Gen. Syst.* v. 4 (1837) p. 543 (*not* of Benth.). An erect very aromatic herb 1—2 ft. high ; stems many, stout, glabrous. Leaves all opposite, 1—3 by ⅜—1½ in., elliptic-lanceolate, acute or subobtuse, crenulate, glabrous or pubescent, often hairy on the nerves beneath, transparent-dotted, base acute ; main nerves pinnate, arching from the midrib, numerous, strong and prominent beneath ; petioles variable, sometimes reaching ¾ in. long, sometimes hardly any. Flowers sessile, in axillary shortly pedunculate heads, rarely solitary. Calyx not divided quite to the base, pubescent outside ; tube $\frac{1}{10}$ in. long ; upper segment ¼ in. long, linear-oblong, subobtuse, ciliate, broader than the other 4 which are ⅛ in. long, narrowly lanceolate, very acute, ciliate. Corolla rather less than ½ in. long, bluish-purple with a yellow mouth, pubescent outside ; lower lip with yellow hairs in the throat. Capsules ¼ in. long, oblong-ellipsoid, glabrous. Seeds scarcely $\frac{1}{30}$ in. long,

angular, truncate. Fl. B. I. v. 4, p. 265 ; Grah. Cat. p. 143 ; Dalz. & Gibs. p. 177 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174. *Limnophila Menthastrum*, Benth. in DC. Prod. v. 10, p. 386 ; Dalz. & Gibs. p. 177.—Flowers : Sept.

KONKAN : *Stocks* ! ; Talkat Ghát, *Dalzell & Gibson*. KANARA : Kumpta, *Woodrow*.—DISTRIB. More or less throughout India ; Java, China, Philippines, Pacific Islands.

2. **Limnophila conferta,** *Benth. in DC. Prodr.* v. 10 (1846) p. 387. Erect or procumbent ; stem stout, spongy, usually prostrate or floating below, with long roots from the nodes, glabrous or more or less hairy. Leaves with a strong camphoraceous odor and taste, subsessile, ¾—1½ in. long, oblong or elliptic-oblong, obtuse, crenate-serrate, punctate beneath, rather thick, dull pale-green, glabrous, base narrowed or subamplexicaul ; nerves inconspicuous. Flowers axillary, solitary or in short leafy axillary spikes ; bracteoles beneath the calyx 1/16 in. long, linear-subulate. Calyx ⅛—¼ in. long, not divided quite to the base, usually hairy, becoming striate in fruit ; segments ⅛ in. long, subequal, linear-lanceolate, very acute, the tips spreading. Corolla about ⅓ in. long, violet-pink. Capsules ⅛ in. long, broadly ellipsoid, enclosed in the striate persistent calyx. Seeds scarcely 1/50 in. long. Fl. B. I. v. 4, p. 266 ; Dalz. & Gibs. p. 177 ; Trim. Fl. Ceyl. v. 3, p. 243 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Nov.

KONKAN : *Stocks* ! ; Malwán, *Dalzell* ! KANARA : Kumpta in rice-fields, *Woodrow*.—DISTRIB. More or less throughout India ; Ceylon.

3. **Limnophila gratissima,** *Blume, Bijdr.* (1826) p. 749. Stem decumbent at the base, copiously rooting at the lower nodes, then erect, not much branched, 12—20 in. long, stout, terete, spongy, glabrous, striate. Leaves 1—2 by ¼—¾ in., opposite, or more commonly in whorls of 3, sessile, ½-amplexicaul, lanceolate-oblong, acute, sharply serrate, glabrous ; nerves few, inconspicuous. Flowers on long slender glandular pedicels, solitary and axillary, or in axillary and terminal racemes ; bracteoles beneath the calyx 1/16 in. long, linear-subulate ; pedicels ½—1 in. long. Calyx ¼ in. long, not divided quite to the base, glandular, becoming striate in fruit ; segments lanceolate, acute, subequal, with spreading tips. Corolla ½ in. long, purplish. Capsules rather less than ¼ in. long, ovoid-oblong, covered by the striate calyx. Seeds about 1/50 in. long, truncate at both ends. Fl. B. I. v. p. 268 ; Grah. Cat. p. 144 ; Dalz. & Gibs. p. 177 ; Trim. Fl. Ceyl. v. 3, p. 243.

Margins of ponds, *Dalzell & Gibson*. KONKAN : *Stocks* !, *Law* !—DISTRIB. India (W. Peninsula) ; Ceylon, Malay and Philippine Islands, China, Japan, N. Australia.

4. **Limnophila polystachya,** *Benth. Scroph. Ind.* (1835) p. 26, Floating, glabrous or minutely puberulous ; stem 6—24 in. long, erect or ascending from the floating portion which is densely clothed with multifid leaves. Lower leaves capillaceo-multifid ; upper leaves opposite or 3—4-nately whorled (or in the case of very small plants all the leaves pinnatisect), linear-oblong or lanceolate, sessile, ¾—1½ by 1/16—⅜ in., crenulate ; nerves 3—5, running from the base to the

tip. Flowers sessile, in terminal and axillary often divaricately branched slender spikes 2—3 in. long; bracteoles $\frac{1}{10}$—$\frac{1}{8}$ in. long, linear-lanceolate. Calyx $\frac{1}{8}$ in. long, membranous, glabrous, not striate in fruit, divided about $\frac{1}{2}$-way down or less; segments deltoid-ovate, acute, subequal. Corolla $\frac{1}{3}$ in. long, white. Capsules $\frac{1}{10}$—$\frac{1}{8}$ in. long, subglobose. Fl. B. I. v. 4, p. 269; Wight, Icon. t. 860; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers: Jan.

Not common. S. M.: COUNTRY: Belgaum, *Cooke*! KANARA: N. Kanara, *Woodrow*.—DISTRIB. India (W. Peninsula).

5. Limnophila sessiliflora, *Blume, Bijdr.* (1826) p. 749. Stem glabrous or pubescent. Leaves sessile; the upper often undivided, lanceolate, acute, serrate or dentate, 3-nerved; the lower pinnatisect with numerous very narrow segments, rarely capillaceo-multifid. Flowers axillary, solitary, sessile or shortly pedicellate, or the terminal arranged in a short spike or raceme. Calyx membranous, rather less than $\frac{1}{4}$ in. long, clothed with short gland-tipped hairs, divided about $\frac{1}{2}$-way down, not striate in fruit; segments lanceolate, long-pointed, very acute. Corolla $\frac{3}{8}$ in. long, pink. Capsules $\frac{1}{8}$ in. long, subglobose, glabrous. Seeds about $\frac{1}{30}$ in. long, truncate at both ends. Fl. B. I. v. 4, p. 270; Trim. Fl. Ceyl. v. 3, p. 244. *Limnophila heterophylla,* Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 (*not* of Benth.).—Flowers: Oct.—Nov.

DECCAN: Mahableshwar, *Cooke*!, *Woodrow*! S. M. COUNTRY: Belgaum, *Cooke*!—DISTRIB. Throughout India in rice-fields and swampy places; Ceylon, Java, Japan.

6. Limnophila racemosa, *Benth. Scroph. Ind.* (1835) p. 26. Stem 1—2 ft. long or in deep water longer, stout, erect, mostly submerged, glabrous or hairy. Upper leaves sessile, 1½—2 by ¼—½ in., opposite or 3-nately whorled, ½-amplexicaul and somewhat rounded at the base, oblong-lanceolate, serrate-dentate, glabrous, strongly 3—5-nerved; lower leaves submerged, capillaceo-multifid, often deflexed and root-like. Flowers large, usually in long erect leafy racemes 2—4 in. long; bracteoles $\frac{1}{10}$ in. long, linear-subulate; pedicels ½—½ in. long, filiform. Calyx $\frac{1}{8}$ in. long, thinly membranous, glabrous, not striate in fruit, divided about ½-way down; segments deltoid-ovate, acute, sometimes colored. Corolla ½ in. or more long, pale-violet; lobes of the upper lip short, rounded, those of the lower lip ovate, acute. Capsules subglobose, $\frac{1}{8}$ in. long, enclosed in the membranous calyx. Seeds scarcely $\frac{1}{30}$ in. long, truncate at both ends. Fl. B. I. v. 4, p. 271; Grah. Cat. p. 144; Dalz. & Gibs. p. 177; Wight, Icon. t. 861; Trim. Fl. Ceyl. v. 3, p. 245; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174. *Cyrilla aquatica,* Roxb. Cor. Pl. v. 2 (1798) p. 47, t. 189.—Flowers: Nov.—Jan. VERN. *Mahaka.*

KONKAN: *Law*!; Matheran, *Cooke*!, *Woodrow*! S. M. COUNTRY: Belgaum, *Cooke*! KANARA: N. Kanara, *Woodrow*,—DISTRIB. India (Bengal, Rajputana, W. Peninsula); Ceylon, Java.

7. Limnophila gratioloides, *R. Br. Prodr.* (1810) p. 442. A small plant 3—8 in. high, smelling strongly of turpentine; stems subquadrangular, slender, rooting at the lower nodes, glabrous, striate, usually much branched from the base. Leaves usually all

whorled or pinnatifid, the upper sometimes entire and opposite, ¼—¾ by 1/16—⅛ in., linear-oblong, serrate-dentate, 1-nerved, the lowest sometimes, though not commonly, capillaceo-multifid. Flowers solitary, axillary or racemose ; bracteoles 1/10 in. long, linear-subulate ; pedicels ⅛—⅓ in. long, filiform, divaricate. Calyx membranous, thinly and finely glandular, not striate in fruit, ⅛—⅓ in. long in flower, hemispheric in fruit, divided scarcely ½-way down ; segments narrowly triangular, acute. Corolla pink, ⅓ in. long. Capsules broadly ovoid or subglobose, ⅛ in. long. Seeds 1/10 in. long, truncate or obscurely rounded at the ends. Fl. B. I. v. 4, p. 271 ; Grah. Cat. p. 143 ; Dalz. & Gibs. p. 177 ; Trim. Fl. Ceyl. v. 3, p. 245 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Nov.—Jan. VERN. *Turti.*

On the margins of tanks and in rice-fields. KONKAN : *Stocks* ! ; Pen, *Woodrow* ; Matheran, *Cooke* ! DECCAN : Lanoli, *Woodrow* ! ; Mahableshwar, *Woodrow* ; rice-fields near Poona, *Gangaram* ! GUJARAT : Dakor, *Woodrow*.—DISTRIB. Throughout India in wet places ; Ceylon, Beluchistan, Malayan Archipelago, China, Australia, Tropical Africa.

10. **DOPATRIUM,** Buch.-Ham.

Annual slender glabrous marsh herbs. Leaves few, opposite, the lower small, the upper remote, minute. Flowers small, solitary, axillary, usually violet ; bracteoles 0 ; pedicels filiform or 0. Calyx small, 5-partite ; segments narrow, imbricate. Corolla 2-lipped ; tube slender below, dilated into a large throat ; upper lip outer, short, 2-fid ; lower lip broad, 3-lobed, spreading. Stamens : 2 upper perfect ; filaments filiform ; anther-cells parallel, distinct, equal ; staminodes 2, minute, included in the tube. Style short ; stigma 2-lamellate. Capsules globose or oblong, loculicidal ; valves entire or rarely 2-fid, carrying away the placentas. Seeds numerous, very small, tuberculate.—DISTRIB. Asia, Africa, and Australia ; species 5.

1. Dopatrium junceum, *Buch.-Ham. in Benth. Scroph. Ind.* (1835) p. 31. Somewhat fleshy ; stems 6—12 in. long, usually much-branched at the base, the lower part swollen and spongy, the upper part slender. Leaves few, sessile, the lower oblong, elliptic or slightly obovate, obtuse, ½—1 by ¼ in., the upper much smaller, remote, bract-like. Flowers axillary, opposite, distant ; pedicels 0—½ in. long, filiform, erect in fruit. Calyx 1/16 in. long, divided rather more than ½-way down ; segments oblong, obtuse. Corolla ⅛—⅓ in. long, pale pinkish-violet. Ovary globose, 1-celled with 2 parietal placentas ; style stout, about 1/10 in. long ; stigma broad, 2-lamellate. Capsules 1/10 in. in diam., globose, 1-celled. Seeds 1/10 in. long, oblong, tuberculate. Fl. B. I. v. 4, p. 274 ; Grah. Cat. p. 142 ; Dalz. & Gibs. p. 178 ; Trim. Fl. Ceyl. v. 3, p. 247 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174. *Gratiola juncea,* Roxb. Cor. Pl. v. 2 (1798) p. 16, t. 129.—Flowers : July—Sept.

Swampy places, *Dalzell & Gibson.* DECCAN : Neral, *Kanitkar* !, *Bhiva* !, *Woodrow.* KANARA : *Woodrow.*—DISTRIB. Throughout India in swampy places; Ceylon, Malay Islands, China, Japan, Philippines, Australia.

11. TORENIA, Linn.

Glabrous or pubescent herbs. Leaves opposite, entire, crenate or serrate. Flowers often showy, axillary or in terminal or pseudo-axillary umbels or racemes ; bracteoles 0. Calyx tubular, 3—5-winged, or plaited, or keeled, 2-lipped or 3—5 toothed. Corolla 2-lipped ; tube cylindric, somewhat curved, dilated upwards ; upper lip erect, concave or pinched, notched or 2-fid ; lower larger, spreading, 3-lobed. Stamens 4, didynamous ; the 2 upper included in and adnate to the tube ; the 2 lower adnate to the throat, often appendaged at the base, conniving under the upper lip ; anthers touching or cohering in pairs, the cells often confluent. Ovary 2-celled ; ovules many in each cell ; style slender ; stigma 2-lamellate. Capsule linear or oblong, not exceeding the calyx ; valves separating from the placentiferous dissepiment. Seeds rugose or cancellate.—DISTRIB. Species 20, tropical Asiatic and African, one of them also American.

Stem erect or suberect; calyx winged; longer pair of filaments not toothed at the base..... 1. *T. cordifolia.*
Stem creeping; calyx ribbed but not winged; longer pair of filaments toothed at the base..... 2. *T. bicolor.*

1. Torenia cordifolia, *Roxb. Cor. Pl.* v. 2 (1798) p. 32, t. 161. An erect or suberect sparsely hairy herb 4—10 in. high ; stems and branches 4-angled or sometimes almost 4-winged. Leaves ¾—1½ by ½—1 in., ovate, acute or subobtuse, sharply serrate, glabrous, base usually cuneate ; petioles ¼—½ in. long. Flowers axillary, solitary or several together, fascicled or subumbellate towards the ends of the branches ; pedicels slender, ½—1 in. or more long. Calyx ⅜ in. long, 2-lipped, ovoid, cordate or rounded, not decurrent at the base, 5-toothed ; teeth ciliate ; ribs prominently keeled. Corolla bluish-purple, ⅔ in. long ; upper lip notched ; lower lip equally 3-lobed. Stamens 4, in unequal pairs ; filaments arching, the lower not toothed ; anthers cohering in pairs. Capsules oblong, acute, enclosed in the persistent calyx. Seeds about $\frac{1}{16}$ in. long, truncate at both ends. Fl. B. I. v. 4, p. 276 ; Grah. Cat. p. 144 ; Dalz. & Gibs. p. 180 ; Bot. Mag. t. 3715 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Sept.—Oct.

KONKAN : *Law* !, *Stocks* ! ; S. Konkan, *Graham* ; Vingorla, *Dalzell* ! S. M. COUNTRY : Londa, *Cooke* !, *Woordow*.—DISTRIB. India (W. Himalaya, Central India, Behar, W. Peninsula) ; Java, China.

2. Torenia bicolor, *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 38. Stem creeping and rooting at the nodes, angled, glabrous or nearly so. Leaves ½—1 by ⅜—¾ in., deltoid-ovate, crenate-serrate, sparsely hairy, base subcordate, truncate or rounded, rarely cuneate ; petioles ⅛—¼ in. long. Flowers axillary, 1—3 together ; pedicels in flower ½—⅝ in. long, thickened in fruit and elongating to ¾ in. or more. Calyx glabrous, ½ in. long in flower, reaching ¾ in. long in fruit, very narrow, attenuated towards the base, 5-ribbed (the ribs not winged), 2-lipped, the upper lip with 3 short triangular teeth $\frac{1}{16}$ in. long, the lower lip 2-toothed, the teeth scarcely longer than those of the upper lip. Corolla 1—1¼ in. long ; tube violet, curved,

attenuated at the base ; upper lip rounded, entire, violet ; lower lip 3-fid, white (*Dalzell*). Filaments of the longer stamens toothed at the base. Capsules narrowly oblong, pointed, $\frac{3}{8}$—$\frac{1}{2}$ in. long. Seeds $\frac{1}{10}$ in. in diam., subspherical, foveolate. Fl. B. I. v. 4, p. 278 ; Dalz. & Gibs. p. 181.—Flowers : July.

Very near to *Torenia asiatica*, Linn., of which it is perhaps a variety growing at a low elevation. Well worthy of a place in gardens (*Dalzell*).

KONKAN : *Stocks* ! ; Vingorla, *Dalzell* !—DISTRIB. India (W. Peninsula).

Torenia asiatica, Linn. Sp. Pl. (1753) p. 619. A diffusely branched nearly glabrous annual, creeping below, is often grown and frequently springs up spontaneously in gardens. It has ovate subcordate or lanceolate serrate leaves 1—2 in. long, on petioles usually about $\frac{1}{4}$ in. long, a corolla $1\frac{1}{4}$—$1\frac{1}{2}$ in. long, bluish-purple, with dark violet lateral lobes. The longer filaments are toothed at the base. It is indigenous on the Nilghiris, is easily grown from cuttings, and makes a pretty basket plant in a moist conservatory. Fl. B. I. v. 4, p. 277 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 & Gard. in Ind. ed. 5, p. 404. *Torenia bicolor*, Dalz., has apparently been mistaken for this, which it much resembles.—DISTRIB. India (W. Peninsula, Tenasserim) ; Ceylon, Java, China.

Torenia Fournieri, Linden, ex Fourn. in Illustr. Hortic. v. 23 (1876) p. 129, t. 249. An erect nearly glabrous annual, a native of Cochin-China, is often grown and sometimes springs up spontaneously in gardens. It has a broadly-winged calyx and showy purple flowers. The longer filaments are not toothed at the base. Woodr. Gard. in Ind. ed. 5, p. 404.

12. **ARTANEMA**, Don.

Erect herbs, the angles of the stem and upper surface of the leaves scabrid, otherwise glabrous. Leaves opposite, entire or serrate. Flowers large, blue or purple, racemose at the ends of the branches ; pedicels solitary in the axils of foliaceous bracts ; bracteoles 0. Calyx 5-partite ; segments herbaceous, acuminate, with a broad base, much imbricate. Corolla 2-lipped ; tube elongate, broad ; upper lip erect, broad, emarginate ; lower lip spreading, 3-fid. Stamens 4, perfect, didynamous ; the 2 upper with short filaments included in the tube ; the 2 lower with long arcuate filaments broadly appendiculate at the base, inserted on the throat, conniving at the apex under the upper lip ; anthers approximate in pairs or cohering, the cells confluent at the tip. Ovary 2-celled ; ovules many in each cell ; stigma 2-lamellate. Capsule globose, septicidally dehiscent ; valves entire, separating from the placentiferous axis. Seeds numerous, small, rugose.—DISTRIB. Tropical Asia, Australia, Africa ; species 4.

1. **Artanema sesamoides**, *Benth. Scroph. Ind.* (1835) p. 39. A stout herb, 2—3 ft. high, sparingly branched ; stem acutely

quadrangular, glabrous, often tinged with purple. Leaves sessile or shortly petiolate, 1½—6 by ⅜—1¾ in., lanceolate, acute or acuminate, entire or serrate, more or less scabrid. Flowers large, in erect lax terminal racemes ; pedicels ¼—⅝ in. long ; bracts beneath the pedicels ¼—⅓ in. long, lanceolate, acute. Calyx ⅓—7/16 in. long, divided to the base or nearly so ; sepals ovate, acute, nearly glabrous, much imbricate. Corolla dull violet-purple, ¾—⅞ in. long, reticulately veined ; tube broad. Filaments of the lower stamens long, arching, dilated and furnished with a discoid appendage at the base. Capsules globose, ¼—⅜ in. in diam., glabrous. Seeds 1/10 in. long, oblong, rounded or truncate at the ends, covered with white tubercles, yellowish. Fl. B. I. v. 4, p. 274 ; Grah. Cat. p. 144 ; Dalz. & Gibs. p. 181.

Rare in the Bombay Presidency. KONKAN : *Stocks* !, *Law* !, *Dalzell & Gibson*, *Nimmo* ex *Graham*.—DISTRIB. India (W. Peninsula) ; Ceylon, Malay Peninsula, Sumatra, Java, Philippine Islands, Borneo, Tropical Africa.

13. **VANDELLIA,** Linn.

Herbs usually annual, glabrous or pubescent. Leaves opposite, often toothed, penninerved. Flowers small, usually axillary ; bracteoles 0. Calyx campanulate ; segments 5, free or connate, not winged. Corolla 2-lipped ; tube cylindric ; upper lip outermost, erect, concave, notched or 2-fid ; lower lip broader, spreading, 3-lobed. Stamens 4, didynamous, the 2 upper inserted on the corolla-tube, usually included, the 2 lower inserted on the corolla-throat with arched filaments which are furnished with a dentiform or subulate appendage at or towards the base ; anthers touching or cohering in pairs under the upper lip, the cells divaricate. Ovary 2-celled ; ovules many in each cell ; style slender ; stigma 2-lamellate. Capsule globose or ovoid, or long-cylindric, septicidally 2-valved ; valves separating from the placentiferous dissepiment ; placentas large. Seeds many, rugose.—DISTRIB. Species about 50, chiefly tropical Asiatic.

Calyx not divided below the middle; capsule oblong-ellipsoid	1. *V. crustacea.*
Calyx partite to the base or nearly so.	
Capsule subglobose, equalling or shorter than the calyx	2. *V. hirsuta.*
Capsule linear-lanceolate, much longer than the calyx.	3. *V. pedunculata.*

1. **Vandellia crustacea,** *Benth. Scroph. Ind.* (1835) p. 35. A diffuse glabrous or sparsely hairy annual 4—18 in. high, much-branched from the base ; stems slender, angular. Leaves ⅜—¾ by ¼—½ in., ovate, subacute, coarsely but shallowly serrate or subentire, glabrous ; petioles ⅛—⅜ in. long. Flowers axillary and subracemose at the ends of the branches ; pedicels ½—1½ in. long, slender, strict. Calyx ⅛—⅕ in. long in flower, elongating to ¼ in. long in fruit, 5-ribbed, divided about ¼-way down ; teeth triangular, acute. Corolla ⅛ in. long, purplish. Capsules ⅛ in. long, ellipsoid-oblong, obtuse. Seeds about 1/30 in. long, ellipsoid. Fl. B. I. v. 4, p. 279 ; Grah. Cat. p. 144 ; Dalz. & Gibs. p. 180 ; Wight, Icon. t. 863 ; Trim. Fl. Ceyl. v. 3, p. 250 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Aug.

KONKAN : Neral, *Woodrow*; Matheran, *Woodrow*; Ghotwade near Jambalpada, *Kanitkar*!—DISTRIB. Throughout India ; Ceylon, Tropics of the Old World.

2. **Vandellia hirsuta,** *Buch.-Ham. in Benth. Scroph. Ind.* (1835) p. 36. Stem short, erect, with many long branches from near the base, clothed with spreading hairs. Leaves 1—2 by ½—1 in., elliptic, subacute, crenate, serrate-dentate or subentire, more or less hairy on both sides, the lower leaves tapering into a broad petiole, the upper nearly sessile. Flowers in lax axillary and terminal racemes ; pedicels ¼—⅜ in. long, slender ; bracts beneath the pedicels $\frac{1}{10}$ in. long, lanceolate, acute. Calyx ⅛—⅙ in. long, divided to the base ; sepals linear-lanceolate, hairy, exceeding the capsule. Corolla ¼ in. long, pale-violet. Capsules subglobose, $\frac{1}{10}$ in. long. Seeds about $\frac{1}{50}$ in. long, truncate at both ends, yellowish. Fl. B. I. v. 4, p. 280 ; Dalz. & Gibs. p. 179 ; Trim. Fl. Ceyl. v. 3, p. 250 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174.—Flowers : Sept.

Tolerably common in the Konkan. KONKAN : *Law*!, *Stocks*! ; Vingorla, *Dalzell*! ; Kalyan, *Woodrow*.—DISTRIB. India (Bengal and Sikkim to Ava, W. Peninsula) ; Ceylon, Java, Borneo, China, Philippine Islands.

3. **Vandellia pedunculata,** *Benth. Scroph. Ind.* (1835) p. 37. A small glabrous diffusely branched herb ; stem sometimes creeping at the base and rooting at the nodes, 4—10 in. long, striate, often tinged with purple. Leaves shortly petiolate or sometimes almost sessile, ½—¾ by ⅓—½ in., ovate, subacute, crenate-serrate, glabrous, base subcordate. Flowers solitary, axillary ; pedicels ¾—1¼ in. long. Calyx ⅓ in. long, divided to the base ; sepals lanceolate, very acute. Corolla ⅜ in. long, usually white with a pale violet margin, the lower lip marked with a yellow spot. Capsules twice as long as the calyx, linear-lanceolate, acute, tipped by the persistent style-base. Seeds scarcely $\frac{1}{50}$ in. long, ellipsoid. Fl. B. I. v. 4, p. 282 ; Dalz. & Gibs. p. 179 ; Trim. Fl. Ceyl. v. 3, p. 251. *Vandellia Roxburghii,* G. Don, Gen. Syst. v. 4 (1837) p. 54 ; Grah. Cat. p. 144.—Flowers : Aug.—Sept.

Not common in the Bombay Presidency. KONKAN : *Stocks*! ; Vingorla, *Dalzell*!—DISTRIB. More or less throughout India in damp places such as rice-fields ; Ceylon, Borneo, China, Cochin-China.

EXCLUDED SPECIES.

VANDELLIA LAXA, Benth. Scroph. Ind. (1835) p. 36 (*Vandellia scabra,* var. *laxa*, Hook. f. Fl. B. I. v. 4, p. 281), is noticed in Dalzell's 'Bombay Flora,' p. 179, as occurring at Vingorla in the Konkan. I have seen no specimens from Vingorla nor in fact from the Bombay Presidency at all. Though the country around Vingorla has been well examined by the plant-collectors of the Botanical Survey of W. India, the plant has not been discovered there by any of them nor does Woodrow include it in his list, while Sir J. D. Hooker (Fl. B. I. l. c.) has not seen any specimens from Vingorla.

14. ILYSANTHES, Rafin.

Annual slender glabrous marsh herbs. Leaves opposite, entire or toothed, 1—5-nerved from the base. Flowers small, axillary or passing into terminal racemes ; pedicels often reflexed in fruit ; bracteoles 0.

Calyx deeply 5-lobed ; segments narrow. Corolla 2-lipped ; tube cylindric ; upper lip erect, concave, notched ; lower lip larger, 3-lobed, spreading. Stamens : the 2 upper perfect, subincluded, inserted on the corolla-tube ; the lower pair represented by 2 bilobed staminodes inserted on the corolla-throat, one of the lobes glandular ; anthers connivent, the cells divaricate. Ovary 2-celled ; ovules many in each cell ; style slender ; stigma 2-lamellate. Capsule septicidal ; valves entire, separating from the placentiferous septum. Seeds many, rugose.—DISTRIB. N. and S. America, S. Africa, India ; species 8.

Corolla 3—4 times as long as the calyx..... 1. *I. hyssopioides.*
Corolla twice as long as the calyx..... 2. *I. parviflora.*

1. **Ilysanthes hyssopioides,** *Benth. in DC. Prodr.* v. 10 (1846) p. 419. Stem erect, 3—18 in. high, slender, glabrous, simple or diffusely branched ; branches angled and striate. Leaves in distant pairs, sessile, ¼—¾ by ⅛—¼ in., rather thick, obtuse, 1—3-nerved, usually entire ; the lower leaves oblong or oblong-lanceolate ; the upper smaller, linear. Flowers solitary, axillary ; pedicels ½—1 in. long, filiform, deflexed in fruit. Calyx $\frac{1}{10}$ in. long, divided almost to the base ; segments linear-lanceolate, acute, glabrous. Corolla ⅓—½ in. long (3—4 times as long as the calyx), pale-blue or nearly white, often with dark purple markings. Capsules nearly ¼ in. long, oblong, acute, glabrous. Seeds minute. Fl. B. I. v. 4, p. 283 ; Dalz. & Gibs. p. 179 ; Trim. Fl. Ceyl. v. 3, p. 252 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174. *Bonnaya hyssopioides,* Benth. in Wall. Cat. 3866 ; Grah. Cat. p. 143 ; Wight, Icon. t. 857.—Flowers : Oct.—Nov.

KONKAN : *Stocks* ! ; Matheran, *Woodrow.* DECCAN : Sinhagad near Poona, *Bhiva* ! ; Mahableshwar, *Woodrow.* S. M. COUNTRY : Belgaum, *Cooke* ! GUJARAT : *Woodrow, Kanitkar* !—DISTRIB. India (Silhet, Khasia mountains, W. Peninsula) ; Ceylon, China.

2. **Ilysanthes parviflora,** *Benth. in DC. Prodr.* v. 10 (1846) p. 419. Stem erect, branched. Leaves ½—1 by ¼—½ in., sessile or the lower sometimes attenuated into a short petiole, oblong or oblong-lanceolate, obtuse, usually entire, 1—5-nerved. Flowers axillary and in terminal racemes ; pedicels ¼—¾ in. long, filiform. Calyx $\frac{1}{10}$—⅛ in. long, divided almost to the base ; segments linear-lanceolate, acute. Corolla ⅕—¼ in. long (twice as long the calyx), bluish or nearly white. Capsules ovoid-oblong, acute, ⅛ in. long. Seeds minute. Fl. B. I. v. 4, p. 283 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174. *Bonnaya parviflora,* Benth. in Wall. Cat. 3867 ; Grah. Cat. p. 143.—Flowers : Aug.

Very close to *I. hyssopioides,* from which the smaller corolla and usually shorter pedicels and capsules distinguish it.

KONKAN : *Stocks* ! ; near Kalyan, *Bhiva* ! ; Neral, *Woodrow.* S. M. COUNTRY : Belgaum, *Woodrow.*—DISTRIB. More or less throughout India ; Siam ; Tropical Africa.

15. **BONNAYA,** Link & Otto.

Annual glabrous herbs. Leaves opposite, entire or serrate, obscurely penninerved. Flowers solitary, axillary, or often passing

into terminal racemes ; bracteoles 0. Calyx 5-partite ; segments narrow, hardly imbricate. Corolla 2-lipped ; tube cylindric ; upper lip erect, broad, concave or 2-fid ; lower lip larger, 3-lobed, spreading. Stamens : the 2 upper only perfect, subincluded, with filiform filaments ; the 2 lower reduced to 2 obtuse glandular staminodes ; anthers of the perfect stamens connivent, the cells divaricate. Ovary 2-celled ; ovules many in each cell ; style slender ; stigma 2-lamellate. Capsule narrow, much exserted, septicidal ; valves entire, separating from the placentiferous dissepiment. Seeds many, rugose.—DISTRIB. Warmer regions of the Old World ; species 8.

Leaves sharply, deeply and closely serrate, broad.	
Erect, diffusely branched; leaves sessile; corolla ¼ in. long	1. *B. brachiata.*
Prostrate, creeping; leaves petiolate; corolla exceeding ¼ in. long	2. *B. reptans.*
Leaves shallowly and distantly serrate, the lower sometimes subentire.	
Stems decumbent or creeping	3. *B. veronicæfolia.*
Stems erect; a small plant	4. *B. oppositifolia.*

1. **Bonnaya brachiata,** *Link & Otto, Icon. Pl. Select.* v. 1 (1820) p. 25, t. 11. Erect, diffusely branched, 3—10 in. high ; branches glabrous. Leaves sessile, ½—1¼ by ¼—½ in., oblong, obtuse or subacute, closely and strongly spinous-serrate, glabrous. Flowers in lax terminal racemes ; bracts at the base of the pedicels ⅛—⅕ in. long, linear-subulate ; pedicels ⅛—¼ in. long. Calyx ⅕ in. long, divided almost to the base ; segments linear-subulate, finely aristate. Corolla ¼ in. long, pink. Staminodes short, pubescent. Capsules ½ in. long, narrowly oblong, acute, glabrous. Seeds about $\frac{1}{50}$ in. long, usually truncate at both ends. Fl. B. I. v. 4, p. 284 ; Grah. Cat. p. 143 ; Dalz. & Gibs. p. 178 ; Trim. Fl. Ceyl. v. 3, p. 253 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Sept.—Nov.

Pasture-lands in the rains, *Graham, Dalzell & Gibson.* KONKAN : *Law!* ; near Jambalpada, *Kanitkar!* ; Mazgaon near Savantvádi, *Kanitkar!* GUJARAT : Godra, *Woodrow.*—DISTRIB. Throughout India ; Ceylon, Java, China, Philippine Islands.

2. **Bonnaya reptans,** *Spreng. Syst. Veg.* v. 1 (1825) p. 41. Prostrate, creeping and rooting at the nodes ; branches often 1 ft. long. Leaves distant, ¾—1½ by ½—¾ in., elliptic-oblong or obovate-oblong, rounded at the apex, sharply closely and deeply serrate, base narrowed into a petiole of variable length. Flowers in axillary and terminal racemes ; pedicels ¼—½ in. long, spreading ; bracts beneath the pedicels ¼ in. long, linear-subulate. Calyx ⅓ in. long, deeply divided ; segments ¼ in. long, linear-lanceolate, acute. Corolla exceeding ½ in. long, light-purple. Capsules ½—1 in. long, very slender. Seeds about $\frac{1}{40}$ in. long, yellow. Fl. B. I. v. 4, p. 284 ; Dalz. & Gibs. p. 179 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.

KONKAN : S. Konkan : *Dalzell & Gibson, Woodrow.*—DISTRIB. India (E. Bengal, Sikkim, Assam, Cachar, Madras, W. Peninsula) ; Java, Philippines.

3. **Bonnaya veronicæfolia,** *Spreng. Syst. Veg.* v. 1 (1825) p. 41. Stems decumbent or creeping at the base, often rooting at the nodes ; branches ascending, more or less quadrangular. Leaves ½—1¼ by

$\frac{1}{3}$—$\frac{1}{2}$ in., subsessile, or the lower sometimes narrowed into a short petiole, oblong, acute, shallowly and distantly serrate, the lower leaves sometimes subentire. Flowers in terminal and axillary racemes; pedicels $\frac{1}{4}$—$\frac{5}{8}$ in. long, divaricate, elongating in fruit; bracts beneath the pedicels linear-lanceolate. Calyx $\frac{1}{8}$ in. long, deeply divided; segments $\frac{1}{6}$ in. long, linear-lanceolate, acute. Corolla $\frac{3}{8}$ in. long, violet, the upper lip streaked with darker violet lines. Stamens: the 2 perfect ones with white anthers; staminodes long, exserted, clavate, yellow. Capsules $\frac{3}{8}$—$\frac{1}{2}$ in. long, narrowly oblong, acute, glabrous. Seeds $\frac{1}{10}$ in. long, usually truncate at both ends. Fl. B. I. v. 4, p. 285; Grah. Cat. p. 143; Dalz. & Gibs. p. 178; Wight, Icon. t. 1411; Trim. Fl. Ceyl. v. 3, p. 253; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—VERN. *Shewál.*

Common, *Dalzell & Gibson.* KONKAN: *Stocks!* DECCAN: moist places, *Woodrow!*; bed of the Yenna, Mahableshwar, *Graham*; Mahableshwar, *H. M. Birdwood.*—DISTRIB. Throughout India; Ceylon, Java, Siam, China, Philippine Islands.

VAR. 1. *grandiflora*, Hook. f. Fl. B. I. v. 4 (1884) p. 285. Branches short, stout. Leaves narrowly obovate. Flowers chiefly axillary; corolla $\frac{1}{4}$ in. long, light-blue (*Roxb.*). Capsules scarcely twice as long as the calyx. *Bonnaya grandiflora* (sp.), Spreng. Syst. Veg. v. 1 (1825) p. 41; Grah. Cat. p. 143; Dalz. & Gibs. p. 179. *Gratiola grandiflora*, Roxb. Cor. Pl. v. 2, p. 42, t. 179.

S. KONKAN: *Dalzell & Gibson.*

VAR. 2. *verbenæfolia*, Hook. f. in Fl. B. I. v. 4 (1884) p. 285. Branches usually long and slender. Leaves narrower, subsessile, entire or distantly serrate. Flowers larger, in often elongate naked racemes. *Bonnaya verbenæfolia* (sp.), Spreng. Syst. Veg. v. 1 (1825) p. 42; Grah. Cat. p. 143; Dalz. & Gibs. p. 178; Wight, Icon. t. 1412.

S. KONKAN: *Dalzell & Gibson.*

4. **Bonnaya oppositifolia,** *Spreng. Syst. Veg.* v. 1 (1825) p. 41. A small, erect, usually branched annual $1\frac{1}{2}$—5 (rarely 6) in. high; branches quadrangular, glabrous. Leaves sessile, $\frac{3}{4}$—$1\frac{1}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., linear-oblong, obtuse or subacute, slightly serrate. Flowers axillary or the upper in racemes; bracts beneath the pedicels $\frac{1}{8}$—$\frac{1}{5}$ in. long, linear-subulate; pedicels $\frac{1}{8}$—$\frac{1}{4}$ in. long. Calyx $\frac{1}{8}$ in. long; segments $\frac{1}{12}$ in. long, linear-lanceolate. Corolla $\frac{1}{4}$ in. long, blue (*Roxb.*). Capsules $\frac{1}{3}$ in. long. Seeds minute. Fl. B. I. v. 4, p. 286; Grah. Cat. p. 143; Dalz. & Gibs. p. 179; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Gratiola oppositifolia*, Roxb. Cor. Pl. v. 2 (1798) p. 30, t. 155. —Flowers: Sept.

KONKAN: *Dalzell & Gibson*; Kalyan, *Woodrow.*—DISTRIB. India (W. Peninsula).

16. **PEPLIDIUM,** Delile.

Small prostrate or creeping branched glabrous herbs. Leaves opposite, obovate or spathulate, fleshy, entire. Flowers small, axillary, 1—3-nate, subsessile or shortly pedicellate. Calyx tubular,

5-ribbed, obtusely 5-toothed, enlarged and ovoid-globose in fruit, the ribs almost disappearing. Corolla-tube short ; lobes 5, broad, subequal or one broader. Stamens 2, included ; filaments curved ; anthers 1-celled. Staminodes 0. Ovary 2-celled ; ovules many in each cell ; stigma large, flat, tongue-shaped, curved. Capsule globose or broadly ovoid. Seeds numerous, small.—DISTRIB. Species 2, an endemic Australian one and the following.

1. **Peplidium humifusum,** *Delile, Descrip. de l'Egypte* (1812) p. 148, t. 4. Stems prostrate, 4—8 in. long, slender, rooting at the nodes, sometimes submerged or floating, flexuose, much-branched. Leaves ¼—½ by ⅛—¼ in., obovate, rounded at the apex, fleshy, minutely punctate, base tapering into a short often obscure petiole which is connected by a membrane with the petiole of the opposite leaf. Flowers small, 1—3 in the axils of the leaves ; pedicels very short, sometimes almost 0. Calyx $\frac{1}{10}$ in. long, thinly membranous, 5-ribbed and reticulately veined ; teeth 5, very short, obtuse. Corolla pinkish-white ; tube included in the calyx ; lobes appearing above it. Capsules globose, ⅛ in. in diam., almost enclosed in the enlarged calyx, membranous, bursting irregularly. Seeds scarcely $\frac{1}{30}$ in. long, oblong, usually truncate at both ends. Fl. B. I. v. 4, p. 287 ; Grah. Cat. p. 142 ; Trim. Fl. Ceyl. v. 3, p. 255 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Microcarpæa cochlearifolia,* Sm. in Rees, Cyclop. v. 23, n. 2 ; Wight, in Hook. Bot. Misc. v. 3 (1833) p. 95, Suppl. t. 29.—Flowers : Dec.

Margin of tanks, *Graham.* KONKAN : Dharamtar (Kolaba district), *Woodrow* ; Marmagão, *Woodrow.* SIND : Bubak, *Woodrow.*—DISTRIB. India (W. Peninsula) ; Ceylon, Kurdistan, Egypt, Australia.

17. GLOSSOSTIGMA, Arn.

Minute glabrous creeping herbs. Leaves opposite or fascicled, linear or spathulate, entire. Flowers minute, axillary, solitary ; bracteoles 0. Calyx campanulate, obtusely 3—4-lobed. Corolla shortly tubular ; lobes 5, subequal, spreading. Stamens 2 (in the only Indian species) or 4 ; filaments filiform ; anther-cells diverging, their tips confluent. Ovary perfectly or imperfectly 2-celled ; ovules many in each cell ; style short ; stigma dilated, spathulate, recurved. Capsule included in the calyx, loculicidal ; valves separating from a columnar placentiferous axis. Seeds small, ellipsoid.—DISTRIB. Species 3, all Australian, one of them widely dispersed through Tropical Asia and Africa.

1. **Glossostigma spathulatum,** *Wight & Arn. in Arn. Pugill. in Nov. Act. Nat. Cur.* v. 18 (1836) p. 355. A small tufted creeping and rooting herb. Leaves $\frac{1}{10}$—¼ by ⅛—⅛ in., narrowly spathulate, running down into a flat petiole of variable length (sometimes reaching ½ in. long) which appears like the continuation of the leaf-blade. Flowers axillary, solitary ; pedicels slender, variable in length, ⅛—½ in. long or more. Calyx campanulate, $\frac{1}{12}$ in. long ; lobes 3, shallow, broadly ovate-deltoid, subobtuse. Corolla blue (*Hooker*) ; tube included in the calyx ; lobes of the limb appearing above it.

Stamens 2. Capsules scarcely $\frac{1}{10}$ in. in diam., enclosed in the slightly enlarged calyx. Seeds $\frac{1}{10}$ in. long, ellipsoid. Fl. B. I. v. 4, p. 288 ; Dalz. & Gibs. p. 180 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Microcarpœa spathulata*, Hook. Bot. Misc. v. 2 (1831) p. 101, Suppl. t. 4 ; Grah. Cat. p. 142.—Flowers : Nov.

Margins of tanks and other moist places, *Graham, Dalzell & Gibson.* KONKAN : Malwán, *Woodrow.*—DISTRIB. India (Upper Gangetic plain, Behar, W. Peninsula) ; Tropical Africa and Australia.

18. **CAMPYLANTHUS,** Roth.

Shrubs. Leaves alternate, linear, subfleshy, entire. Flowers in terminal racemes often secund ; pedicels with 2 bracts near the base. Calyx deeply 5-fid or 5-partite ; segments imbricate. Corolla-tube elongate, slender, incurved ; lobes 5, orbicular or ovate, spreading, subequal, imbricate, the lateral exterior in bud. Stamens 2, included ; filaments short ; anther-cells divaricate, their tips confluent. Ovary 2-celled ; ovules many in each cell ; style short or long, straight or inflexed ; stigma capitate. Capsule orbicular or broadly ovoid, compressed, septicidal ; valves 2-fid or 2-partite. Seeds numerous, orbicular, compressed, notched at the hilum ; funicle more or less expanded into a hyaline wing which sometimes surrounds the entire seed.—DISTRIB. Canary and Cape de Verde Islands, Arabia, Sind, Beluchistan ; species 4.

1. **Campylanthus ramosissimus,** *Wight, Icon.* v. 4 (1850) t. 1416. A low much-branched shrub ; branches slender, stiff, divaricate, spinescent. Leaves $\frac{1}{4}$—$\frac{1}{2}$ in. long, somewhat fleshy, linear-oblong or spathulate, obtuse, villous. Flowers in subcorymbose terminal few-flowered racemes ; pedicels usually shorter than the calyx ; bracts at the base of the pedicels broadly lanceolate, acute, scarcely $\frac{1}{20}$ in. long. Calyx $\frac{1}{8}$—$\frac{1}{6}$ in. long, narrowly campanulate, 5-partite almost to the base ; segments lanceolate, acute. Corolla $\frac{1}{2}$ in. long ; tube $\frac{3}{8}$ in. long, curved ; lobes ovate, acute, veined. Capsules $\frac{1}{8}$ in. in diam., orbicular, compressed, glabrous ; valves 2-partite. Seeds not seen. Fl. B. I. v. 4, p. 290 ; Aitch. Pb. & Sind Pl. p. 108 ; Boiss. Fl. Orient. v. 4, p. 433 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Nov.—Jan.

SIND : limestone range near Hydrabad, *Stocks* ! ; Jungadi, *Woodrow* ; hills of Sind, *Stocks,* 522 !—DISTRIB. Beluchistan.

19. **VERONICA,** Linn.

Herbs or shrubs, rarely trees. Leaves opposite, the cauline or all rarely alternate. Flowers solitary, axillary, or in terminal or axillary racemes ; bracts usually conspicuous ; bracteoles 0. Calyx 4—5-partite ; lower segments connate ; the uppermost, if present, smaller. Corolla rotate or shortly hypocrateriform ; lobes spreading, the lateral or one of them outermost in bud, the upper and lower lobes usually narrowest. Stamens 2, adnate to the corolla-tube by the sides of the upper lobe, exserted ; anther-cells parallel or not, obtuse, their tips confluent. Ovary 2-celled ; ovules in each cell

many or few, rarely only 2 ; style simple ; stigma subcapitate. Capsule 2-grooved, compressed or turgid ; dehiscence various. Seeds many or few, ovoid or globose, plano-concave or boat-shaped, rugulose or smooth, sometimes winged.—DISTRIB. Throughout the temperate and cold regions of both hemispheres, few in the Tropics, not numerous in America ; species more than 200.

1. **Veronica Anagallis,** *Linn. Sp. Pl.* (1753) p. 12. An erect succulent usually glabrous herb 3—18 in. high. Leaves sessile and ½-amplexicaul or the lowest petiolate, 1¼—5 by ¼—¾ in., oblong or oblong-lanceolate, obtuse or subacute, entire or more or less serrate, glabrous, base usually cordate. Flowers in axillary lax slender racemes 3—6 in. long ; bracts beneath the pedicels linear-lanceolate, acute, 1/10—⅛ in. long ; pedicels ⅛—¼ in. long, filiform. Calyx 1/16—⅛ in. long, divided to the base ; sepals ovate, subacute. Corolla ⅛—¼ in. across, pink or white ; tube very short. Capsules compressed, orbicular-oblong, ⅛—⅙ in. long, emarginate, glabrous. Seeds ellipsoid-oblong, 1/10 in. long, biconvex. Fl. B. I. v. 4, p. 293 ; Boiss. Fl. Orient. v. 4, p. 437 ; Reichb. Icon. Germ. t. 1702 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Nov.—Jan.

KONKAN : *Stocks* ! DECCAN : *Woodrow* ; Ambarkhind near Bhore, *Kanitkar* ! ; Khair in watercourses, *Nairne.*—DISTRIB. India (Panjáb, Kashmir, Bhotan, Bengal, Assam, W. Peninsula) ; Europe, N. Asia, S. Africa, N. America.

20. BUCHNERA, Linn.

Annual rigid herbs, black when dry. Leaves : lower opposite, broad ; upper alternate, narrow. Flowers sessile, axillary or in bracteate spikes, 2-bracteolate. Calyx tubular, 5-toothed, 10-nerved, sometimes 5-ribbed. Corolla-tube slender ; lobes 5, flat, subequal, spreading, the upper inmost in bud. Stamens 4, didynamous, included ; anthers 1-celled, vertical, dorsifixed, the bases obtuse, the connective sometimes mucronate. Ovary 2-celled ; ovules many in each cell ; style thickened or clavate upwards ; stigma entire or notched. Capsule oblong, loculicidal ; valves entire, coriaceous, septiferous, separating from the placentas. Seeds very many, obovoid or oblong, reticulated.—DISTRIB. Throughout the warmer regions of both hemispheres ; species about 75.

1. **Buchnera hispida,** *Buch.-Ham. in D. Don, Prodr. Fl. Nep.* (1825) p. 91. An erect herb 6—20 in. high ; stem slender (sometimes very slender), hairy, sometimes, but not commonly, branched above. Leaves sessile or narrowed into a more or less obscure petiole, toothed or entire ; the lower crowded, obovate or oblong, 1—2 by ⅛—1 in. ; the upper narrower, linear-lanceolate, passing into alternate narrow floral bracts. Flowers distant, sessile in the axils of linear acute floral bracts, arranged in terminal spikes 6—10 in. long ; bracteoles 1/12—1/10 in. long, subulate, hispid. Calyx ⅛—¼ in. long, tubular, hispid ; teeth 1/16 in. long, lanceolate, acute. Corolla light-purple ; tube nearly ⅛ in. long, slender, hairy inside ; lobes about ⅛ in. long, obovate, obtuse. Capsules oblong, shorter than the calyx.

Seeds about $\frac{1}{30}$ in. long, irregularly cuneate-oblong, usually more or less truncate at one end, rounded at the other. Fl. B. I. v. 4, p. 298; Dalz. & Gibs. p. 182; Wight, Icon. t. 1413; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.

KONKAN: *Stocks*!, *Dalzell*!; Island of Karanja, *Dalzell & Gibson*. DECCAN: Khandala, *Cooke*!; Kirkee, *Woodrow*; Koina valley below Mahableshwar, *Cooke*!; Talegaon, on Railway line, *Bhiva*! S. M. COUNTRY: Belgaum, *Kanitkar*!—DISTRIB. India (Western and Central Himalaya, Central India, W. Peninsula); Madagascar, Tropical Africa.

21. **STRIGA,** Lour.

Herbs usually scabrid, discolored or black when dry. Leaves: the lower opposite, the upper alternate, linear, entire, rarely toothed, sometimes reduced to scales. Flowers axillary, or the upper in bracteate spikes; bracteoles usually 2. Calyx tubular, 4- or 5- or 10- or 15-ribbed, 5 (rarely 4) -toothed or -fid. Corolla 2-lipped; tube slender, abruptly incurved at or above the middle; limb spreading, the upper lip inner in bud, usually short, notched or 2-fid, the lower lip 3-lobed. Stamens 4, didynamous, included; anthers 1-celled, vertical, dorsifixed, bases obtuse, the connective sometimes mucronate. Capsule subglobose or oblong, loculicidal; valves entire, septiferous, separating from the placentas. Seeds numerous, ovoid or oblong, usually reticulated.—DISTRIB. Warmer regions of Asia, Africa, and Australia; species about 30.

Calyx 4—5-ribbed, 1 rib running to the apex of each calyx-tooth.	
Usually parasitic on roots; whole plant reddish-brown; root tuberous; leaves scale-like; corolla pink	1. *S. orobanchioides.*
Not parasitic; whole plant green; root not tuberous; leaves linear; corolla white	2. *S. densiflora.*
Calyx 10—15-ribbed.	
Ribs of the calyx most commonly 10; the secondary ribs ending at the sinus; flowers yellow	3. *S. lutea.*
Ribs of the calyx 15, the secondary ribs continued up the sides of the adjacent calyx-teeth, not ending at the sinus.	
Calyx $\frac{1}{3}$ in. long; corolla white, the tube exserted	4. *S. euphrasioides.*
Calyx $\frac{1}{2}$ in. long or more; corolla yellow, the tube not exserted	5. *S. sulphurea.*

1. **Striga orobanchioides,** *Benth. in Hook. Comp. Bot. Mag.* v. 1 (1835) p. 361, t. 19. A small erect glabrous or puberulous herb 6—12 in. high, parasitic on roots or growing on rocks. Stems many from a tuberous root, simple or branched, dark reddish-purple. Leaves scale-like, ovate-oblong, acute, dark reddish-purple like the stems, passing into floral bracts. Flowers numerous, sessile, erect, in erect usually densely flowered terminal spikes; floral bracts ovate-lanceolate, acute, a little shorter than the calyx; bracteoles rather more than $\frac{1}{2}$ as long as the calyx, linear-lanceolate, acute, ciliolate. Calyx exceeding $\frac{1}{4}$ in. long, 5- or 4-ribbed; teeth 5 or 4, about $\frac{1}{3}$ as long as the tube, narrowly lanceolate, very acute, bristle-tipped.

Corolla 2-lipped, pink, with a white spot at the base of each of its lobes ; tube reaching ½ in. long, incurved above the middle, with hairs in the throat ; limb about ¼ in. across, the upper lip deeply divided, the lobes obovate-oblong, rounded, the lower lip 3-lobed to about ½-way down, the lobes obtuse. Capsules oblong-ellipsoid, ¼ in. long, tipped with the base of the style. Seeds oblong, $\frac{1}{40}$ in. long. Fl. B. I. v. 4, p. 299 ; Dalz. & Gibs. p. 181 ; Wight, Icon. t. 1414 ; Aitch. Pb. & Sind Pl. p. 108 ; Trim. Fl. Ceyl. v. 3, p. 255 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Striga coccinea*, Grah. Cat. p. 145 (*not* of Benth.).—Flowers : Oct.—Nov. VERN. *Támbdi kari-cha gavat.*

KONKAN : *Law* !, *Stocks* ! ; *Dalzell & Gibson* ; Matheran, *Woodrow*. DECCAN : hilly parts, *Dalzell* ! ; on rocks near Mahableshwar, *Woodrow* ! ; Mahableshwar, common, *Cooke* ! ; Fitzgerald Ghát, below Mahableshwar, *Cooke* ! ; Poona, *Woodrow*. GUJARAT : Dakor, *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon, Tropical and S. Africa, Arabia.

I have always found the plant (which is very common at Mahableshwar) with dark reddish-purple stems and pink flowers, and this seems to be its usual character. Trimen (Fl. Ceyl. l. c.) says that it is sometimes green and then has white flowers.—The plant dries black.

2. **Striga densiflora,** *Benth. in Hook. Comp. Bot. Mag.* v. 1 (1835) p. 363. An erect scabrid or strigose herb 6—18 in. high. Stem slender, subquadrangular, harshly strigose, simple or branched ; root not tuberous. Leaves sessile, ½—1½ by $\frac{1}{16}$—⅛ in., linear, acute, erect, passing into floral bracts. Flowers in slender spikes in the axils of floral bracts which are longer than the calyx ; bracteoles 2, linear, acute, ciliate, about ⅔ the length of the calyx. Calyx ⅓—¼ in. long, 5-ribbed ; teeth slightly shorter than the tube, lanceolate-subulate, hairy, ciliate. Corolla white ; tube nearly ⅓ in. long with hairs in the throat, incurved above the middle ; limb ¼ in. or more across, the upper lip much shorter than the lower, 2-fid, the lower lip deeply 3-lobed, the lobes oblong, obtuse. Capsules included in the calyx, ⅛ in. long, oblong-obovoid, rounded at the apex, tipped with the style-base. Seeds minute. Fl. B. I. v. 4, p. 299 ; Dalz. & Gibs. p. 181 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Aug.—Nov.

KONKAN : *Stocks* ! DECCAN : Bowdhán near Poona, *Woodrow* ! ; Khandala, *Cooke* ! ; Koina valley below Mahableshwar, *Cooke* ! GUJARAT : Surat, *Dalzell* ! —DISTRIB. More or less throughout India.

3. **Striga lutea,** *Lour. Fl. Cochinch.* (1790) p. 22. Stems 3—12 in. high, erect, rigid, slender, simple or branched, strigose with prickly hairs. Leaves sessile, ½—1¼ in. long, linear, often rough with pustular prickles. Flowers in long, lax spikes ; bracts usually longer than the calyx ; bracteoles $\frac{1}{10}$ in. long, linear-subulate, strigose. Calyx ⅛ in. long, narrowly tubular in flower, widening in fruit, with 1 strong hirsute rib running from the base of the calyx to the apex of each tooth and with 1 (less commonly 2) secondary ribs between them which terminate at the sinus ; teeth $\frac{1}{16}$ in. long, lanceolate-subulate, rigid, bristle-tipped. Corolla usually bright yellow, occasionally red or white (varying in size with that of the plant), in well-

grown specimens ¼ in. across ; tube ⅜ in. long, pubescent or glabrous outside, much incurved at top beneath the limb ; upper lip not half as long as the lower, broad, scarcely emarginate ; lower lip deeply 3-lobed, the lobes obovate-oblong, obtuse. Capsules ⅛ in. long, oblong-ellipsoid. Seeds minute, irregular. Fl. B. I. v. 4, p. 299 ; Trim. Fl. Ceyl. v. 3, p. 256 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Striga hirsuta,* Benth. in DC. Prodr. v. 10, p. 502 ; Dalz. & Gibs. p. 181 ; Aitch. Pb. & Sind Pl. p. 108.—Flowers : Nov.—Jan.

KONKAN : *Stocks* ! DECCAN : Karli, *Kanitkar* ! ; Khandala, *Bhiva* !, *Graham.* S. M. COUNTRY : Castlerock, *Cooke* ! ; Badami, *Cooke* !, *Woodrow* ! SIND : *Stocks* !—DISTRIB. India (Bengal, Panjáb, Tenasserim, W. Peninsula) ; Ceylon, Siam, Java, China. Arabia, Tropical and S. Africa, Madagascar.

4. **Striga euphrasioides,** *Benth. in Comp. Bot. Mag.* v. 1 (1835) p. 364. A plant of very variable habit, sometimes 4—6 in. high, with filiform simple stem, sometimes a much-branched stout herb reaching 2 ft. high. Leaves linear, 1—2 by $\frac{1}{12}$—⅛ in., sometimes with 1 or 2 teeth on each margin, sessile, scabrous. Flowers sessile or shortly pedicellate, in long, often interrupted, lax erect spikes or racemes ; bracts shorter or longer than the calyx ; bracteoles $\frac{1}{10}$ in. long, subulate. Calyx ⅓ in. long, campanulate, with 15 strong scabrous ribs, 1 rib running from the base of the calyx to the apex of and along the middle of each tooth, with 2 secondary ribs between not ending at the sinus, but extending respectively up the sides of the opposite calyx-teeth, which are thus strongly margined ; calyx-teeth nearly equalling the tube, linear-subulate, very acute, usually reflexed in fruit. Corolla exceeding ½ in. long, white ; tube exserted, exceeding ⅜ in. long, pubescent in the upper part, much incurved beneath the limb ; upper lip much shorter than the lower. Capsules ¼ in. long, oblong-ellipsoid, the top of the valves reflexed after dehiscence. Seeds scarcely $\frac{1}{30}$ in. long, cuneate-oblong, usually truncate at one end. Fl. B. I. v. 4, p. 299 ; Grah. Cat. p. 145 ; Dalz. & Gibs. p. 181 ; Trim. Fl. Ceyl. v. 3, p. 256. *Buchnera euphrasioides,* Vahl, Symb. v. 3 (1794) p. 81 ; Wight, Icon. t. 855.

KONKAN : *Stocks* !, *Dalzell.*—DISTRIB. More or less throughout India ; Ceylon, Java.

5. **Striga sulphurea,** *Dalz. & Gibs. Bo. Fl.* (1861) p. 182. An erect scabrous slender herb ; stems scarcely branched, 4-angled. Leaves sessile, ¾—1½ by $\frac{1}{25}$—$\frac{1}{10}$ in., linear, acute, scabrous, often with 1 or 2 small teeth on each margin. Flowers mostly axillary, subsessile or very shortly pedicellate ; bracteoles small, subulate. Calyx ½ in. long or more, divided to the middle, with 15 prominent strong scabrous ribs as in *Striga euphrasioides* ; calyx-teeth exactly linear, strap-shaped. Corolla yellow ; tube as long as the calyx, pubescent towards the top ; upper lip broad, almost truncate ; lower lip 3-lobed, the lobes obovate, ciliolate, $\frac{1}{12}$—$\frac{1}{10}$ in. long. Capsules rather less than ¼ in. long, oblong. Seeds about $\frac{1}{40}$ in. long, cuneate-oblong, usually truncate at one end. Fl. B. I. v. 4, p. 300.

Rare. KONKAN : *Stocks* ! ; Shivnar hill-fort on wet rocks, *Dalzell & Gibson, Dalzell* ! DECCAN : Ghâts, *Stocks* !—DISTRIB. India (W. Peninsula).

22. **RHAMPHICARPA,** Benth.

Erect branched glabrous herbs drying black. Lower leaves opposite, the upper alternate, narrow, entire or pinnatisect. Flowers axillary, pedicellate, or in bracteate racemes ; bracteoles 1—2 or 0. Calyx campanulate or tubular-campanulate, 5-fid ; lobes acuminate. Corolla-tube slender, elongate, straight or incurved ; lobes 5, broad, spreading, subequal or the upper connate. Stamens 4, didynamous, included in the tube ; anthers 1-celled, vertical, dorsifixed, bases obtuse. Ovary 2-celled ; ovules many in each cell ; style thickened or clavate above ; stigma simple. Capsule compressed at right angles to the septum, usually beaked, loculicidal ; valves septiferous. Seeds numerous, small, obovoid or oblong ; testa reticulate.—DISTRIB. Tropical and S. Africa, India, and Australia ; species 10 or 12.

1. **Rhamphicarpa longiflora,** *Benth. in DC. Prodr.* v. 10 (1846) p. 504. An erect glabrous herb very variable in height and habit, 2—12 in. high ; stem simple, or often, in large plants, much-branched. Leaves 1—1½ in. long, pinnatisect, with filiform segments. Flowers axillary, shortly pedicellate. Calyx ¼ in. long ; tube about $\frac{1}{16}$ in. long ; lobes lanceolate, produced into a long subulate acumen. Corolla white ; tube 1—1½ in. long, very slender, straight ; limb ½—⅝ in. across, the lobes obovate-oblong, obtuse, emarginate. Capsules ½ in. long (including the oblique or incurved beak), ovoid. Seeds about $\frac{1}{50}$ in. long, oblong. Fl. B. I. v. 4, p. 300 ; Grah. Cat. p. 145 ; Dalz. & Gibs. p. 182 ; Wight, Icon. t. 1415 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Oct.—Nov.

KONKAN : *Stocks* !, *Graham* ; Máhar, *Dalzell* ! ; Malwán, *Woodrow* ; Matheran, *H. M. Birdwood.* DECCAN : Khandala, *Kanitkar* !, *Cooke* ! ; Wada below Mahableshwar, *Woodrow.* S. M. COUNTRY : Belgaum, *Ritchie*, 529 !, *Cooke* !, *Law* ex *Graham.*—DISTRIB. India (W. Peninsula).

23. **SOPUBIA,** Buch.-Ham.

Erect herbs. Leaves opposite or the upper alternate, narrow, often laciniate. Flowers spicate or racemose ; bracts leafy ; bracteoles 2. Calyx campanulate ; lobes 5, narrow. Corolla infundibuliform ; tube short, the throat dilated ; lobes 5, broad, spreading, subequal, the 2 upper inmost in bud. Stamens 4, didynamous ; anthers of upper or both pairs of stamens in contact by pairs, one cell of each stamen perfect, ovoid, the other empty and stipitate. Ovary 2-celled ; ovules many in each cell ; style simple ; stigma thickened, sublinguiform, obtuse. Capsule ovoid or oblong, rounded or compressed, retuse or notched, loculicidal ; valves entire or 2-fid, separating from the placentiferous dissepiment. Seeds numerous ; testa somewhat lax.—DISTRIB. Africa, Madagascar, India, Malaya, Australia ; species about 20.

Calyx-teeth filiform, longer than the calyx-tube ; corolla purple	1. *S. delphinifolia.*
Calyx-teeth deltoid-ovate, equalling the calyx-tube ; corolla yellow	2. *S. trifida.*

1. **Sopubia delphinifolia,** *G. Don, Gen. Syst.* v. 4 (1837) p. 560. Stem 1—3 ft. high, erect, subquadrangular, grooved, much-branched, pubescent or glabrous, often spotted with purple. Leaves opposite, 1—1½ in. long, pinnatisect; segments few, long, filiform, distant, spreading, flexuous, often ciliate with minute hairs, the uppermost passing into long simple floral leaves (*bracts*). Flowers numerous, axillary, solitary or in few-flowered terminal racemes; bracteoles on the pedicels a little below the calyx ½ in. long, filiform; pedicels ⅛—¼ in. long, slender. Calyx ¾ in. long, glabrous; tube ¼ in. long, strongly ribbed; teeth long, linear-subulate, erect, ½ in. long. Corolla 1—1½ in. long, rose-colored; limb ¾ in. across, with broad spreading lobes. Filaments hairy. Capsules ¼ in. long, oblong-ellipsoid. Seeds scarcely $\frac{1}{30}$ in. long, cuneate-oblong, striate, usually truncate at one end. Fl. B. I. v. 4, p. 302; Grah. Cat. p. 145; Dalz. & Gibs. p. 182; Trim. Fl. Ceyl. v. 3, p. 257; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175; Watt, Dict. Econ. Prod. v. 6, part 3, p. 277.—Flowers: Aug.—Oct. VERN. *Dudháli.*

Common in cultivated fields at the close of the rains. KONKAN: *Stocks!*, *Law!*; Matheran (Louisa Point), *H. M. Birdwood*; pasture-lands throughout the Konkan, *Graham.* DECCAN: hills N. of Poona, *Raoji!*; Khandala, *Graham, Kanitkar!*; Mahableshwar, *Cooke!* GUJARAT: *Woodrow.*—DISTRIB. India (Behar, Chota Nagpur, W. Peninsula); Ceylon.

The juice of the plant is employed by laborers in the Deccan as an astringent to heal sores on the feet caused by exposure to moisture. It stains the skin at first yellow and subsequently black. See Watt, Dict. Econ. Prod. l. c.

2. **Sopubia trifida,** *Buch.-Ham. in Don, Prodr. Fl. Nep.* (1825) p. 88. A slender glabrous or pubescent erect herb 1—2 ft. high; stem furrowed and angular, more or less pubescent, simple or branched. Leaves sessile, ½—1½ in. long, narrowly linear, acute, the upper undivided, alternate, the lower mostly 3-fid, often in whorls of 3, glabrous above, minutely pubescent beneath. Flowers in bracteate terminal racemes; bracts longer or shorter than the pedicels; bracteoles on the pedicels a little below the calyx, alternate, linear-subulate, ⅛ in. long; pedicels ¼—¾ in. long, slender. Calyx campanulate, ¼ in. long, glabrous and slightly ribbed outside, woolly inside, divided ½-way down; teeth 5, deltoid-ovate, acute, with membranous margins. Corolla subrotate, yellow with a purplish eye (*Trimen*), ½ in. across; tube very short; limb spreading, with 5 rounded lobes. Filaments glabrous. Style long, thickened upwards; stigma tongue-shaped. Capsules ellipsoid, scarcely longer than the slightly enlarged calyx, notched at the apex. Seeds $\frac{1}{30}$ in. long, cuneate-oblong, striate. Fl. B. I. v. 4, p. 302; Trim. Fl. Ceyl. v. 3, p. 257; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers: Oct.

Rare in the Bombay Presidency. KONKAN: *Stocks!*, *Law!* DECCAN: Panchgani, *Woodrow.*—DISTRIB. More or less throughout India in hilly districts; Ceylon.

24. LINDENBERGIA, Lehm.

Annual or perennial usually villous herbs, woody below ; branches erect, straggling or ascending. Leaves opposite or the upper alternate, toothed. Flowers axillary or passing into terminal spikes or racemes, usually yellow ; bracts leafy ; bracteoles 0. Calyx campanulate, semi-5-fid. Corolla-tube cylindric ; upper lip innermost in bud, broad, emarginate, or 2-lobed ; lower lip larger, 3-lobed, spreading, outermost in bud ; throat and lip with a 2-plicate palate. Stamens didynamous, included ; anthers with separate stalked cells, all fertile. Capsule oblong or ovoid, 2-grooved, loculicidal ; valves entire, separating from the placentiferous dissepiment. Seeds numerous, minute.—DISTRIB. East Africa, Arabia, India, and the Malayan Archipelago ; species 8.

Bentham in DC. Prodr. v. 10 (1846) p. 340 puts *Lindenbergia* under the section in which the upper lip of the corolla is always exterior in bud, as do also Bentham and Hooker (Gen. Plant. v. 2, p. 919) and C. B. Clarke (Hook. f. Fl. B. I. v. 4, p. 247). This is not the case in the *Lindenbergias* I have examined, in all of which the upper lip was found to be *innermost* in bud.

Calyx-lobes acute; capsule glabrous..... 1. *L. abyssinica.*
Calyx-lobes obtuse; upper part of capsule pubescent.
Leaves ¾—2 in. long; petioles moderately long..... 2. *L. urticæfolia.*
Leaves ½ in. long; petioles very short..... 3. *L. polyantha.*

1. **Lindenbergia abyssinica,** *Hochst. ex Benth. in DC. Prodr.* v. 10 (1846) p. 377. A viscous-pubescent or pilose herb woody at the base (? perennial) ; stem 11—18 in. high, divaricately branched. Leaves 1—1½ by ¾—1¼ in., broadly ovate, acute, coarsely crenate-serrate, hairy on both surfaces ; petioles ¼—½ in. long. Flowers in lax terminal spikes or racemes ; pedicels 0—$\frac{1}{20}$ in. long. Calyx ⅛—¼ in. long, hairy ; lobes $\frac{1}{12}$ in. long, subtriangular, acute. Corolla ½ in. long, yellow. Capsules scarcely exserted, glabrous. Fl. B. I. v. 4, p. 262.

SIND : *Dalzell,* 81 !

There is in Herb. Kew. but 1 sheet containing rather fragmentary specimens of this plant, which were collected by Dalzell among rocks in Sind. The specimens are not sufficient to allow of accurate determination, but the identification seems correct. Additional specimens from Sind would be valuable.—DISTRIB. Arabia (tolerably abundant at Aden), Somali Country, Abyssinia.

2. **Lindenbergia urticæfolia,** *Link & Otto, Icon. Pl. Rar. Hort. Berol.* (1828) t. 48. Annual, 4—20 in. high, brittle when dry, glandular-villous or glabrate ; stem simple or branched. Leaves ¾—2 by ½—1¼ in., ovate, subacute, crenate-serrate, usually glandular-villous on both sides ; petioles ¼—1 in. long. Flowers solitary or 2-nate in the axils of large leaves, sometimes running out into axillary or terminal leafy racemes ; pedicels short. Calyx ¼ in. long, densely glandular-villous, divided about ⅓ the way down ; lobes triangular-oblong, subobtuse, hairy on both sides. Corolla yellow, ½ in. long, more or less hairy outside, 2-lipped ; upper lip shortly 2-lobed ; lower lip with 3 rounded veined lobes, the mid-lobe narrower than the

lateral ones and projecting beyond them, $\frac{1}{20}$—$\frac{1}{16}$ in. long, quadrate-oblong, rounded at the apex, the throat hairy. Ovary ovoid, glabrous when very young, afterwards pubescent near the apex ; style $\frac{1}{3}$ in. long, exceeding the stamens, simple, filiform. Capsules oblong, hairy in the upper part, $\frac{1}{5}$ in. long. Seeds minute, $\frac{1}{10}$ in. long, ellipsoid-oblong, smooth or nearly so. Fl. B. I. v. 4, p. 262 ; Grah. Cat. p. 143 ; Dalz. & Gibs. p. 176 ; Hook. Icon. Pl. t. 875 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 ; Watt, Dict. Econ. Prod. v. 4, p. 642.—Flowers : Sept.—Nov. VERN. *Dhol.*

KONKAN : Bassein, *Cooke* ! ; Revadanda, *Gungaram* ! ; Marmagáo, *Woodrow*. GUJARAT : *Kanitkar* ! ; Surat, *Cooke* !, *Woodrow* ! ; Baroda, *Woodrow* !—DISTRIB. Throughout India, often on old walls ; Afghanistan.

3. **Lindenbergia polyantha,** *Royle, ex Benth. Scroph. Ind.* (1835) p. 22. Annual, densely glandular-villous ; stems leafy, 12—20 in. long, often branched from the base. Leaves $\frac{1}{2}$ by $\frac{3}{8}$ in. (rarely larger), numerous, ovate or elliptic, acute, serrate-dentate, softly villous on both sides ; petioles very short. Flowers numerous, in densely leafy racemes in the opposite axils of floral leaves (*bracts*) which become smaller upwards ; pedicels 0—$\frac{1}{20}$ in. long ; bracts exceeding the calyx. Calyx $\frac{1}{4}$ in. long ; densely glandular-villous, lobed $\frac{1}{4}$-way down or more ; lobes oblong, obtuse. Corolla yellow, $\frac{1}{2}$ in. long, more or less hairy outside, 2-lipped ; upper lip shortly 2-lobed, pubescent inside ; lower lip with 3 rounded veined lobes, the mid-lobe about $\frac{1}{20}$ in. long, quadrate-oblong, rounded at the apex. Stamens exserted beyond the corolla-tube. Ovary ovoid, usually glabrous ; style as long as or sometimes rather shorter than the stamens. Capsules $\frac{1}{4}$ in. long, pubescent at the top, veined. Seeds minute, oblong. Fl. B. I. v. 4, p. 262 ; Benth. in DC. Prodr. v. 10, p. 377 ; Aitch. Pb. & Sind Pl. p. 106.

Very close to *L. urticæfolia,* of which it may possibly be a starved form.

DECCAN : Khandesh, *Kanitkar* ! SIND : Boogta hills, *Vicary* !—DISTRIB. India (Panjáb, Behar, E. Bengal, W. Peninsula).

25. CENTRANTHERA, R. Br.

Annual rigid scabrid herbs. Leaves opposite or the upper alternate, oblong or linear, obtuse, entire or toothed. Flowers axillary or in bracteate spikes or racemes ; bracteoles 2. Calyx compressed, spathaceous, split on one side, entire or shortly 3—5-lobed on the other. Corolla-tube long, incurved, dilated above ; limb oblique, with 5 broad subequal spreading lobes, the 2 upper inmost in bud. Stamens 4, didynamous, included ; anthers meeting in pairs, the cells transverse, bases spurred or mucronate, often one cell sterile. Ovary 2-celled ; ovules many in each cell ; style simple, dilated above ; stigma tongue-shaped, acute. Capsule ovoid or subglobose, loculicidal ; valves entire, carrying away the placenta. Seeds many, oblong-cuneate ; testa lax, reticulate.—DISTRIB. Tropical and Subtropical Asia, Malayan Archipelago, and Australia ; species 4.

1. **Centranthera hispida,** *R. Br. Prodr.* (1810) p. 438. An erect hispid often hoary herb 3—20 in. high ; stem stout, simple or more or less branched above. Leaves variable, ½—1¼ by ⅛—⅜ in., subsessile, linear-oblong or sometimes elliptic-oblong, hispid on both sides with tuberculate hairs. Flowers rather large, subsessile in bracteate spikes ; bracts longer or shorter than the calyx ; bracteoles ⅛ in. long, linear-lanceolate. Calyx ⅓ in. long, ovoid, acute, densely hispid, split down one side, the other side entire. Corolla infundibuliform, rose-colored or white, ¾ in. long or even more ; lobes subequal, rounded. Filaments sparsely clothed with long white hairs ; anthers meeting in pairs, the cells spurred, 1 imperfect. Capsules rather more than ¼ in. long, broadly ovoid-oblong, grooved, slightly rugose. Seeds $\frac{1}{25}$ in. long, oblong-cuneate or almost conical, truncate at one end, spirally striate. Fl. B. I. v. 4, p. 301 ; Grah. Cat. p. 145 ; Dalz. & Gibs. p. 182 ; Trim. Fl. Ceyl. v. 3, p. 259 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Sept.—Oct.

KONKAN : Vingorla, *Woodrow*! ; Savantvádi, *Kanitkar*! ; Malwán, *Woodrow* ; Collem below the Castlerock Ghát, *Cooke*! ; Matheran, *H. M. Birdwood.* DECCAN : Wada below Mahableshwar, *Woodrow* ; Koina valley below Mahableshwar, *Cooke*! S. M. COUNTRY : Rámghát, *Graham.*—DISTRIB. Throughout India ; Ceylon, Java, China, Philippine Islands, Australia.

26. **PEDICULARIS,** Linn.

Annual or perennial herbs. Leaves alternate, opposite or whorled, pinnatifid or pinnatisect. Flowers in bracteate terminal spikes or racemes ; bracteoles 0. Calyx spathaceous, entire or split down one side nearly to the base, 2—5-toothed at the apex. Corolla 2-lipped ; tube nearly cylindric ; upper lip erect, hooded (*galeate*), laterally compressed, obtuse, acute, or beaked ; lower lip with 3 spreading lobes. Stamens 4, didynamous ; anthers under the upper lip meeting in pairs, the cells equal, parallel, all perfect. Style long, slender ; stigma capitate. Capsule compressed, usually more or less oblique and often beaked, loculicidal. Seeds various, usually numerous.—DISTRIB. Chiefly in N. temperate regions and mountains, a few in the Tropics in the mountains of S. America and S. India ; species about 120.

1. **Pedicularis zeylanica,** *Benth. Scroph. Ind.* (1835) p. 54. Annual, 6—18 in. high ; stem erect, simple or branched, leafy, slightly pubescent. Leaves fleshy, 1—1½ by ¼—½ in., oblong-lanceolate, obtuse, cut into 12—20 pairs of obtuse crenate lobes, glabrous above, more or less pubescent beneath, the lower leaves shortly petiolate, the upper sessile. Flowers rather large, in elongate lax erect racemes or spikes ; pedicels 0—½ in. long. Calyx ⅛—½ in. long, cleft nearly to the base on one side. Corolla pink ; tube ½—⅝ in. long by ⅛ in. broad at the top ; upper lip rounded, not beaked ; lower lip ⅜ in. in diam., the lobes broad, subacute. Capsules ½—⅝ in. long, obliquely ovoid, acuminate. Seeds black, suborbicular, reticulate, $\frac{1}{25}$ in. in

diam. Fl. B. I. v. 4, p. 317 ; Wight, Icon. t. 1419 ; Prain, Sp. Pedic. in Annal. Roy. Bot. Gard. Calc. v. 3 (1891) p. 153, t. 14 ; Trim. Fl. Ceyl. v. 3, p. 260.

Rare. KONKAN : hills, *Stocks !*, *Dalzell !* DECCAN : Mahableshwar hills, *H. M. Birdwood.*—DISTRIB. India (W. Peninsula) ; Ceylon.

The following non-indigenous species not belonging to any of the foregoing genera are (except *Scoparia dulcis*) cultivated as ornamental plants in the Bombay Presidency :—

Antirrhinum majus, Linn. Sp. Pl. (1753) p. 617. A perennial herb, but in India usually cultivated as an annual, a native of the Mediterranean region. The well-known *Snapdragon* of English gardens. Dalz. & Gibs. Suppl. p. 64 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 & Gard. in Ind. ed. 5, p. 404.

Antirrhinum maurandioides, A. Gray, in Proc. Amer. Acad. v. 7 (1868) p. 376. A twiner, a native of Texas, with filiform stems, triangular-hastate alternate petiolate leaves, and light bluish-purple flowers on long slender pedicels. *Maurandia antirrhiniflora,* Humb. & Bonpl. ex Willd. Enum. Hort. Berol. (1809) p. 659 & in Hort. Berol. (1816) t. 83. *Maurandya antirrhiniflora,* Grah. Cat. p. 142. *Maurandya antirrhinifolia,* Dalz. & Gibs. Suppl. p. 64.

Maurandia scandens, A. Gray, in Proc. Amer. Acad. v. 7 (1868) p. 377. A handsome climber, a native of Mexico, with softly hairy somewhat hastate leaves and showy purple-violet flowers, often employed to decorate trellises around verandas. The plant climbs by a remarkable arrangement, the petiole folding itself over any available support and holding on by pressing like a letter-clip (*Woodrow*). Woodr. Gard. in Ind. ed. 5, p. 405. *Lophospermum scandens,* D. Don, in Trans. Linn. Soc. v. 15 (1827) p. 353 ; Dalz. & Gibs. Suppl. p. 64.

Maurandia semperflorens, Jacq. Hort. Schœnb. v. 3 (1798) p. 20. A slender climber, scandent by its petioles and pedicels, a native of Mexico. Leaves alternate, hastate or hastately 5-lobed, cordate ; petioles long, twining. Flowers rosy-purple, streaked with white ; pedicels long, twining. Dalz. & Gibs. Suppl. p. 64. *Maurandya semperflorens,* Bot. Mag. t. 460 ; Grah. Cat. p. 142.

Maurandia Barclaiana, Lindl. Bot. Reg. v. 13 (1827) t. 1108. A handsome climber, a native of Mexico, often grown to ornament veranda-trellises. It has alternate petiolate angled cordate acuminate leaves, and solitary axillary flowers pale in the corolla-tube and with violet and purple shades in the limb. *Maurandia Barclayana,* Woodr. Gard. in Ind. ed. 5, p. 405. *Maurandya Barclayana,* Dalz. & Gibs. Suppl. p. 63.

Russelia juncea, Zucc. in Flora, v. 15, part 2 (1832) Beibl. p. 99. A handsome plant, a native of Mexico, much grown in gardens, bushy, 3—4 ft. high, with long rush-like stems and bright scarlet

tubular flowers which bloom throughout the year. The plant, which was introduced into Bombay about the year 1850, is easily cultivated, every part of it that touches the ground during the rainy season taking root. Dalz. & Gibs. Suppl. p. 64 ; Woodr. Gard. in Ind. ed. 5, p. 404. *Russelia floribunda*, Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 (*not* of H. B. & K.).

Russelia rotundifolia, Cav. Icon. v. 5 (1799) p. 9, t. 415. Not so showy a plant as the former, than which it is less common, a native of Mexico. It has opposite sessile suborbicular cordate reticulately veined leaves, and scarlet flowers in axillary and terminal racemes. Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 174 & Gard. in Ind. ed. 5, p. 404. *Russelia floribunda*, H. B. & K. Nov. Gen. Pl. v. 2, p. 359 ; Dalz. & Gibs. Suppl. p. 64.

Scoparia dulcis, Linn. Sp. Pl. (1753) p. 116. A small branched leafy annual herb, 1—3 ft. high, with opposite and 3-nately whorled leaves, 4 oblong sepals, and white flowers. This weed, a native of Tropical America, is becoming naturalized in many parts of India, notably in Bengal. Woodrow reports having found it in a salt swamp near Bombay, flowering in November. I have not seen his specimens. Fl. B. I. v. 4, p. 289 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.

EXCLUDED SPECIES.

MAZUS RUGOSUS, Lour. Fl. Cochinch. (1790) p. 385. Dalzell & Gibson (Bo. Fl. p. 176) mention this as occurring on garden walks in Tanna, but, though often searched for, neither I nor any of the Poona plant-collectors have found it. There is 1 specimen in Herb. Kew. collected by Dalzell, on which appears in his own handwriting "Found in a garden, but I do not think indigenous."

ORDER XCI. OROBANCHACEÆ.

Perennial root-parasites without leaves or chlorophyll ; stem usually simple, stout or slender, scaly. Flowers hermaphrodite, irregular, solitary or in spikes or racemes ; bracts large, scale-like ; bracteoles 1—2, scale-like or 0. Calyx spathaceous or 2-lipped, or with 4—5 free or connate segments. Corolla hypogynous, curved, usually distinctly 2-lipped (occasionally subequally 5-lobed) ; upper lip often vaulted ; throat usually with 2 villous folds. Stamens didynamous, inserted on the corolla-tube ; anthers 1—2-celled, the cells frequently spurred at the base, opening by slits or apical pores, 1 cell often imperfect. Disk glandular or unilateral or 0. Ovary of 2 (rarely 3) connate carpels 1 (rarely 2) -celled ; ovules many (rarely few), anatropous, on 2 (rarely 3) pairs of free or confluent parietal placentas which sometimes ultimately meet in the centre of the ovary. Capsule usually 1-celled, sometimes imperfectly or perfectly 2-celled ; valves 2 (rarely 3). Seeds many, minute ; testa usually pitted or tuberculate ;

albumen fleshy ; embryo ovoid, often undivided.—DISTRIB. Temperate and tropical regions ; genera 11 ; species about 150.

Corolla-lobes all broad, subequal.	
Anther-cells unequal.	
Calyx spathaceous, split in front nearly to the base	1. ÆGINETIA.
Calyx tubular-campanulate, 5-toothed or 5-lobed.	2. CHRISTISONIA.
Anther-cells equal	3. CISTANCHE.
Corolla 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed	4. OROBANCHE.

1. ÆGINETIA, Linn.

Leafless herbs with branched or simple naked or scaly scapes or stems. Flowers few, large, solitary or corymbose ; bracteoles 0. Calyx spathaceous, split down the front nearly to the base. Corolla broad, incurved, tubular, obscurely 2-lipped ; lobes 5, broad, spreading, the 2 upper connate. Stamens 4, didynamous, included ; anthers meeting in pairs, with 1 perfect cell, the absent cell in the lower pair represented by an empty clavate and deflexed spur. Ovary 1-celled ; placentas large, 2- or more lobed, filling the cavity, ovuliferous all over ; style slender ; stigma large, peltate. Capsule partially 2-valved. Seeds crowded, minute, reticulate.—DISTRIB. Tropical Asia ; species 4 or 5.

1. **Ægineti a indica,** *Linn. Sp. Pl.* (1753) p. 632. Whole plant purplish, drying brown ; rhizome rather small, tuberous, with numerous short branched coral-like roots. Scapes 1 or several from the rhizome, 6—12 in. high, erect, slender, with or without a few scales at the base. Flowers large, solitary, like the bowl of a tobacco-pipe on the top of the naked scape, nodding. Calyx ¾—1½ in. long, completely closed in bud, pointed, glabrous, veined. Corolla purple ; tube 1—1½ in. long, curved, inflated ; limb ¾—1 in. across, the lobes small, equal, rounded. Lower pair of anthers with thick blunt spurs behind. Capsules ¾ in. long, ovoid, beaked, enclosed in the persistent calyx and corolla. Seeds numerous, minute, reticulate, pale-yellow. Fl. B. I. v. 4, p. 320 ; Grah. Cat. p. 146 ; Dalz. & Gibs. p. 202 ; Wight, Icon. t. 895 ; Trim. Fl. Ceyl. v. 3, p. 261 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Oct.

KONKAN : *Dalzell & Gibson, Law* ! ; Salsette, *Nimmo* ex *Graham* ; Sewree near Bombay, *Woodrow* ; Neral, *Bhiva* ! DECCAN : Khandala, below bushes, *Graham* ; Koina valley below Mahableshwar, *Cooke* !—DISTRIB. Throughout India ; Ceylon, China, Japan, Philippine Islands.

2. CHRISTISONIA, Gardn.

Fleshy low scaly parasitic herbs ; stems simple or tufted from a short or long rootstock ; scales alternate, obtuse or acute. Flowers with or without bracteoles. Calyx tubular, terete or angular, 5-toothed or -lobed. Corolla-tube long, inflated or infundibuliform, straight or curved ; limb with 5 broad subequal rounded lobes, the

2 upper (inner in bud) suberect, the 3 lower spreading. Stamens 4, included or subexserted ; filaments stout ; anther-cells 1 perfect and 1 imperfect, which latter is spurred or appendaged, rarely both perfect. Disk 0. Ovary 1-celled with 2 bipartite placentas, or 2-celled from the placentas meeting in the axis ; ovules many ; style long, incurved at the tip ; stigma large, 2-lobed, the upper lobe very small, the lower very large, orbicular or clavate. Capsule ovoid or subglobose, loculicidal. Seeds very numerous, minute, many perfect with striate testa, others imperfect with lax testa ; embryo half as long as the albumen.—DISTRIB. Tropical Asia ; species 10.

Pedicels short, less than ½ in. ..... 1. *C. Lawii.*
Pedicels long, sometimes exceeding 2 in. ..... 2. *C. calcarata.*

1. **Christisonia Lawii,** *Wight, Icon.* (1850) t. 1427. Stems several, very stout, 1—3 in. high, thickened upwards, often slightly curved, densely clothed with closely imbricate dark-brown scales which become larger upwards. Flowers from the upper scales ; pedicels less than ½ in. long ; bracteoles 0. Calyx ½ in. long, tubular, divided about ⅓ the way down ; teeth 5, triangular, acute. Corolla minutely pubescent on both sides, reaching 2 in. long, tubular, the tube dull white, the limb bluish-purple outside, yellow inside ; limb sub-bilabiate, the 2 upper lobes erect, the 3 lower horizontal, all subequal, rounded at the apex and with slightly waved margins. Stamens didynamous, the lower pair much shorter than the upper ; filaments inserted below the middle of the tube, clothed with minute short white hairs ; anthers pale, 2-celled, one of the cells fertile, ovate, with a subulate apex and a pore, the other cell sterile, subulate, shaped like an inverted comma. Ovary 1-celled ; style longer than the stamens, white, glabrous ; stigma with 2 rounded lobes ; placentas 2, quite free though closely approaching (*Ritchie*). Capsules not seen. Fl. B. I. v. 4, p. 322 ; Dalz. & Gibs. p. 202 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : July—Aug.

KONKAN : Salsette, *Dalzell & Gibson* ; Tanna, *Law* ex *Wight*. DECCAN : Purandhar, *Woodrow*. S. M. COUNTRY : between Rámghát and Belgaum, *Dalzell & Gibson* ; Belgaum, *Ritchie*, 1930!—DISTRIB. India (W. Peninsula).

2. **Christisonia calcarata,** *Wight, Icon.* (1850) t. 1426. Glabrous except the corolla ; stem usually simple ; scales broadly ovate, concave, obtuse, not imbricating in the upper part of the stem, crowded below. Flowers racemose ; pedicels very long, sometimes exceeding 2 in. ; bracteoles 0. Calyx ½—¾ in. long, tubular ; teeth ⅛—⅛ in. long, broadly triangular, acute. Corolla 1½—2½ in. long, tubular, pubescent, the tube white, the lobes of the limb pale-blue ; tube cylindric, slightly dilated upwards ; limb obliquely 2-lipped, the upper lip with 2, the lower with 3 rounded lobes. Filaments pubescent ; anthers 2-celled, the lower cell sterile, produced into a conical acute spur. Stigma 2-lobed. Capsules ¼—⅜ in. in diam., globose, crowned by the persistent calyx-teeth. Seeds about ⅒ in. in diam., subglobose or ovoid, reticulate. Fl. B. I. v. 4, p. 322. *Christisonia Stocksii,* Hook. Icon. Pl. v. 9, t. 836 ; Dalz. & Gibs. p. 202.—Flowers : July—Aug.

Sir Joseph Hooker suggests (Fl. B. I. 1. c.) that this plant may be a more developed state of *C. Lawii*.

KONKAN : *Law* !, *Dalzell* ! ; Tanna, *Law* ex *Wight;* Salsette, on roots of a *Strobilanthes, Dalzell* ! SIND : on roots of a *Strobilanthes, Stocks* ex *Hooker.* —DISTRIB. India (W. Peninsula).

3. CISTANCHE, Hoffmgg. & Link.

Scapigerous herbs ; scape or stem simple, scaly. Flowers in dense spikes, yellow, violet, or purple ; bracteoles 2. Calyx broadly tubular-campanulate ; lobes 5, subequal, obtuse. Corolla-tube long, curved, dilated above ; limb spreading, oblique, with 5 broad subequal lobes. Stamens 4, subexserted ; anthers subtransverse, often villous, the cells equal, parallel, bases obtuse. Ovary 1-celled ; placentas 4, equidistant or in pairs ; stigma broad. Capsule ovoid, laterally compressed, 4-valved to the base. Seeds numerous, subglobose, reticulately punctate. —DISTRIB. Mediterranean region, N. Africa ; Tropical, Western, and Central Asia ; species 12.

1. **Cistanche tubulosa,** *Wight, Icon.* t. 1420 *bis* (1850). General color of plant yellow with an occasional tinge of purple (*Stocks*) ; stem ½—5 ft. high, sometimes reaching 2 in. in diam., unbranched, furrowed, fleshy, glabrous or more or less pubescent, densely covered with triangular acute scales. Flowers numerous, in dense spikes 6—10 in. long, sometimes 3 in. in diam. ; bracts lanceolate, with membranous margins, acuminate, longer than the calyx ; bracteoles with membranous margins, shorter than the calyx, linear-lanceolate. Calyx tubular-campanulate, ½—¾ in. long ; lobes about ⅓ as long as the tube, rounded, subequal, with membranous margins, veined. Corolla yellow, hairy at the base inside, 1—2 in. long, the lower half tubular, erect, the upper half campanulate, bent outwards from the middle ; limb shortly 5-lobed, the lobes rounded, reflexed. Filaments woolly at the base ; anthers subexserted, woolly, not or scarcely apiculate. Placentas 4, subequidistant. Style exserted, curved below the stigma. Capsules 1 in. long, ovoid-oblong, laterally compressed, beaked. Seeds numerous, subglobose, $\frac{1}{20}$ in. in diam., deeply pitted. Fl. B. I. v. 4, p. 324 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Cistanche lutea,* Wight, Ill. v. 2, p. 180, t. 158*b*, fig. 4 (*not* of Hoffmgg. & Link).—Flowers : Dec.

Scarcely differs from *C. lutea,* Hoffmgg. & Link, the apiculation of the anthers being the distinctive character. This, however, in Tropical African specimens, does not seem to be always a constant one.

SIND : common, *Stocks* !, *Dalzell* ! ; Karachi, *Oman* !, *Cooke* !, *Constable* !, *Woodrow*.—DISTRIB. India (Panjáb) ; Central Asia and westwards to Arabia.

4. OROBANCHE, Linn.

Scapigerous scaly herbs ; scapes or stems simple or branched, stout or slender ; scales acute. Flowers in dense or lax or interrupted spikes or racemes ; bracts scale-like ; bracteoles 2 or 0. Calyx

unequally 4-fid or 2-partite from back to front, the segments entire or 2-fid with rarely a 5th tooth or segment. Corolla 2-lipped ; tube curved, dilated above, circumscissile below ; upper lip erect, crenulate, notched or 2-fid ; lower some what spreading, 3-lobed. Stamens 4, didynamous, included ; anther-cells equal, parallel, the bases usually mucronate. Disk 0 or glandular. Ovary 1-celled ; placentas 4, equidistant or paired ; ovules very many ; style simple ; stigma funnel-shaped or peltate, or more or less laterally 2-lobed. Capsule 2-valved, the valves often cohering with the style. Seeds very many, small, subglobose or ovoid.—DISTRIB. Chiefly in the northern and subtropical regions of the Old World ; species about 100.

Bracteoles 0; stamens inserted at about the middle of the corolla-tube; anthers glabrous	1. *O. cernua* var.
Bracteoles 2; stamens inserted near the base of the corolla-tube; anthers woolly	2. *O. ægyptiaca.*

1. **Orobanche cernua,** *Lœfl. It. Hisp.* (1758) p. 152, VAR. **desertorum,** *Ritter Beck, Monogr. Orob. in Biblioth. Bot.* Heft 19 (1890) p. 142, fig. 33 (1). Stems 1 or more, stout or slender, pale-brown, puberulous ; scales ovate or ovate-lanceolate, acuminate, $\frac{1}{3}$—$\frac{1}{2}$ in. long. Spikes very dense, cylindric, obtuse ; bracts ovate-lanceolate, longer than the calyx, thick and with numerous strong parallel nerves. Calyx $\frac{3}{4}$ in. long, membranous ; sepals lanceolate, cuspidate, with a strong midrib and conspicuous parallel nerves. Corolla curved outwards, $\frac{3}{4}$ in. long, glabrous, with a violet limb and white tube ; upper lip 2-lobed, the lobes small, erecto-patent with irregularly crenate margins ; lobes of the lower lip subequal, small, suborbicular ; tube constricted in the middle. Stamens inserted about or a little below the middle of the tube ; filaments dilated at the base, glabrous or sometimes pubescent at the very base ; anthers obovate, the cells mucronate at the base, glabrous. Capsules ellipsoid, scarcely exceeding the calyx. Seeds scarcely $\frac{1}{50}$ in. long, ovoid, reticulate. *Orobanche nicotianæ*, Wight, Ill. v. 2 (1850) p. 179, t. 158 ; Hook. f. Fl. B. I. v. 4, p. 326.

I have seen no specimens of this plant from the Deccan, where it is said to occur on tobacco, nor is it included in Woodrow's list. Dalzell's specimen in Herb. Kew. is from Coimbatore.—DISTRIB. India (W. Peninsula).

2. **Orobanche ægyptiaca,** *Pers. Syn.* v. 2 (1807) p. 181. Stem 4—20 in. high, more or less branched from the base ; scales few, lanceolate, sparingly pubescent or glabrescent, $\frac{1}{3}$—$\frac{5}{8}$ in. long. Flowers sessile, or the lower shortly pedicellate, numerous, in cylindric spikes which are at first condensed, afterwards usually lax, the lower flowers often remote ; bracts lanceolate, pubescent ; bracteoles narrowly linear, shorter than the calyx. Calyx pubescent, $\frac{3}{8}$ in. long, campanulate, 4-toothed, submembranous ; teeth lanceolate-subulate from a broad base, about equalling the tube and with a strong mid-nerve. Corolla $\frac{3}{4}$—$1\frac{1}{4}$ in. long, pubescent outside, the upper part blue or lilac, the lower part nearly white ; upper lip 2-lobed, the lobes obtuse or subacute ; lower lip equally 3-lobed, the lobes usually rounded ; tube slightly curved near the top, constricted above the insertion of the stamens about $\frac{1}{4}$ in. above the base. Filaments inserted low down

in the tube, pubescent at the base ; anthers obovate, woolly, the cells usually separating from a mucronate base. Stigma large, with 2 nearly semicircular lobes. Capsules nearly ½ in. long, oblong, acuminate, glabrous, 2-valved. Ripe seeds about $\frac{1}{10}$ in. in diam., subglobose or ovoid, reticulate. Ritter Beck, Monogr. Orob. in Biblioth. Bot. Heft 19 (1890) p. 100, fig. 14 (1). *Orobanche indica*, Buch.-Ham. in Roxb. Fl. Ind. v. 3 (1832) p. 27 ; Hook. f. Fl. B. I. v. 4, p. 326 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175 ; Watt, Dict. Econ. Prod. v. 5, p. 495. *Phelipæa indica*, G. Don, Gen. Syst. v. 4 (1837) p. 632 ; Grah. Cat. p. 146 ; Dalz. & Gibs. p. 202.—Flowers : Oct.

I cannot find that the calyx is divided to the base on the upper side as stated under Sec. II. (*Trionychon*) in Fl. B. I. (*l. c.*).

DECCAN and GUJARAT, parasitic on tobacco plants, also on *Papaver*, *Cannabis*, and some species of *Brassica* (Prain).—DISTRIB. More or less throughout the plains of India, Central and Western Asia

ORDER XCII **LENTIBULARIACEÆ.**

Herbs, aquatic or in wet places, often furnished with bladder-like appendages for the capture and digestion of small organisms. Leaves rosulate, or when submerged capillaceo-multifid, sometimes obsolete. Flowers yellow, purple, blue or white, irregular, hermaphrodite, on 1-many-flowered simple or sparingly branched scapes or peduncles ; bracts small or 0 ; bracteoles 2 or 0. Calyx inferior, 2—5-lobed or -partite, regular or more or less 2-lipped. Corolla gamopetalous, 2-lipped, spurred ; upper lip usually the smaller, entire or emarginate, innermost in bud ; lower lip 2—6-lobed ; tube very short. Stamens 2, inserted on the base of the corolla, alternate with the lobes of the lower lip ; filaments usually curved ; anthers 2-celled, the cells ovate, diverging, usually transversely confluent, dehiscing longitudinally. Ovary superior, 1-celled, globose ; ovules numerous (rarely few), on a free basal placenta, anatropous ; style short ; stigma unequally 2-lobed. Capsule 1-celled, few- or many-seeded, globose, dehiscing by 2—4 valves, or circumscissile, or irregularly rupturing. Seeds minute, variously shaped ; albumen 0.—DISTRIB. Cosmopolitan ; genera 5 ; species about 200.

1. **UTRICULARIA,** Linn.

Annual or perennial herbs floating, or terrestrial in wet places or on wet rocks, usually provided with bladder-like organs. Leaves in floating species multifid with capillary segments, in erect or twining species entire, frequently with minute bladders. Flowers in simple or branched, few- or many-flowered racemes ; pedicels bracteate and often 2-bracteolate. Calyx 2-partite ; lobes entire or subentire, often enlarged in fruit, subequal. Corolla 2-lipped ; upper lip entire, emarginate or 2-fid ; lower lip usually much larger than the upper, 3—6-lobed ; tube with a straight or curved spur. Stamens 2 ; filaments broad ; anthers dorsifixed, cells subdistinct or quite confluent.

Ovary subglobose, 1-celled; ovules many, sessile on a central fleshy placenta, anatropous; style short; stigma unequally 2-lobed. Capsule globose, 2—4-valved or dehiscing irregularly. Seeds many, variously shaped, small; albumen 0.—DISTRIB. Mainly in the tropics of both hemispheres; species 100 or more.

Aquatic; stolons submerged; leaves whorled, with capillary persistent segments.
- Flowers on short pedicels; peduncles with a whorl of spongy floats below the inflorescence ..... 1. *U. stellaris.*
- Flowers on long pedicels; peduncles without floats.
  - Large; leaves 1½—3 in. long; seeds not or scarcely winged ..... 2. *U. flexuosa.*
  - Small; leaves rarely exceeding ¼ in. long, seeds with a broad corky wing ..... 3. *U. exoleta.*

Terrestrial; leaves usually evanescent except in *U. striatula* (no. 10)
- Leaves more or less linear; sepals nearly equal; seeds reticulate.
  - Scales and bracts of the scape attached by their bases.
    - Scapes erect.
      - Pedicels recurved in fruit.
        - Spur much shorter than the lower lip, nearly straight, conical ..... 4. *U. albo-cærulea.*
        - Spur about equalling the lower lip, falcately curved, linear-subulate ..... 5. *U. arcuata.*
      - Pedicels not recurved in fruit.
        - Spur straight, lower sepal entire at the apex ..... 6. *U. affinis.*
        - Spur curved; lower sepal usually 2-toothed. 7. *U. cærulea.*
    - Scapes twining ..... 8. *U. reticulata.*
  - Scales and bracts of the scape attached by the middle ..... 9. *U. nivea.*
- Leaves orbicular or reniform, persistent, sepals very unequal; seeds glochidiate ..... 10. *U. striatula.*

1. **Utricularia stellaris,** *Linn. f. Suppl.* (1781) p. 86. An aquatic herb, the peduncles suspended in water by means of a whorl of oblong vesicles about their middle; stolons submerged, often very slender, sometimes filiform, not much branched. Leaves all submerged, ½—1½ in. long, often in whorls of 4, pinnately cut into numerous capillary slender pectinate segments, each pinna usually provided near the base with a small globular-ovoid bladder $\frac{1}{16}$—$\frac{1}{12}$ in. in diam., with a truncate mouth. Flowers in slender erect few—12-flowered racemes; peduncles 1—8 in. long; floats in whorls of 4—8 attached about ½ in. below the lowest flower, broadly ellipsoid or ovoid, reticulately veined, ¼—⅓ in. long, with a tuft of reduced filiform pinnæ at the apex; bracts $\frac{1}{16}$—$\frac{1}{12}$ in. long, broadly ovate, obtuse; bracteoles 0; pedicels $\frac{1}{10}$—⅛ in. long, thickened, usually deflexed in fruit. Calyx 2-partite, $\frac{1}{10}$—⅛ in. long; sepals subequal, suborbicular, veined, enlarged in fruit. Corolla yellow, ¼ in. across; upper lip rotund-ovate, $\frac{1}{10}$—⅛ in. long; lower lip subquadrate, ⅛ in. long; spur subcylindric, stout, blunt, appressed to the lower lip, than which it is rather shorter. Capsules globose, ⅛ in. in diam. Seeds scarcely $\frac{1}{50}$ in. in diam., discoid, prismatic in cross section, 4—6-angled, concavo-convex by the inflexion of the entire thin slightly-

winged margin. Fl. B. I. v. 4, p. 328 ; Grah. Cat. p. 165 ; Dalz. & Gibs. p. 135 ; Wight, Icon. t. 1567 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 174 ; Kamienski, in Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 112, fig. 47, E ; Trim. Fl. Ceyl. v. 3, p. 267 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175.—Flowers : Nov.

KONKAN : *Stocks* !, *Dalzell & Gibson* ; Malwán, *Woodrow* ! S. M. COUNTRY : Belgaum, Kákti tank, *Ritchie*, 1965 !—DISTRIB. Throughout India in rice-swamps and tanks ; Ceylon, Malaya, S.E. Asia, Australia, Tropical and S. Africa.

2. **Utricularia flexuosa,** *Vahl, Enum.* v. 1 (1805) p. 198. Stolons floating in large masses a little below the surface, often very long, rather stout, much-branched. Leaves 1½—3 in. long, usually in whorls of 4, pinnately divided into numerous filiform pectinate segments, each pinna usually with a nearly globose bladder near its base. Flowers few, in erect racemes ; peduncles long, sometimes reaching 9 in., naked or with a few small scales, without a whorl of floats below the flowers, but the whorl of leaves at the base of the peduncles often with the rhachis much inflated (acting as a float) and the segments very short ; bracts ovate, small ; pedicels ¼—¾ in. long, at first erect, afterwards deflexed. Calyx ⅛—⅙ in. long ; sepals ovate-oblong, obtuse, veined, somewhat enlarged in fruit. Corolla yellow, ⅓—½ in. across ; spur rather shorter than the lower lip, conical, acute. Capsules ⅛ in. in diam., globose, beaked with the thick persistent style. Seeds $\frac{1}{30}$—$\frac{1}{20}$ in. in diam., discoid, prismatic in cross section, irregularly 4—6-angled, concavo-convex by the inflexion of the thin scarcely winged margin. Fl. B. I. v. 4, p. 329 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 175 ; Trim. Fl. Ceyl. v. 3, p. 267 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Utricularia fasciculata*, Roxb. Fl. Ind. v. 1, p. 143 ; Wight, Icon. t. 1568.—Flowers : Nov.

The absence of floats on the peduncle distinguishes this species from *U. stellaris*, than which it is also larger in all its parts.

DECCAN : Poona, *Woodrow*.—DISTRIB. Throughout India in rice-swamps and tanks ; Ceylon, S.E. Asia, Malaya, N. Australia.

3. **Utricularia exoleta,** *R. Br. Prodr.* (1810) p. 430. A small aquatic herb floating in water or growing on liquid mud ; stolons varying in length, branched, the branches often fascicled, very slender, flattened. Leaves variable, rarely more than ¼ in. long, very sparingly dissected, the segments normally capillary, but sometimes 1 or several of them represented by bladders, or sometimes the whole leaf represented by a bladder ; bladders $\frac{1}{20}$ in. long or less, obliquely ovoid, the mouth nearly apical, truncate and with slender branched rather long cilia. Flowers in 2—3-flowered (often reduced to a single flower) racemes ; peduncles 1½—3 in. long, with a minute bract or scale usually below the middle ; bracts below the pedicels membranous, $\frac{1}{25}$ in. long, broadly ovate, truncate or rounded ; pedicels ⅛—⅓ in. long, slender, permanently obliquely erect. Calyx $\frac{1}{10}$ in. long ; sepals subequal, broadly elliptic, obtuse, membranous, not conspicuously veined, scarcely enlarged in fruit. Corolla yellow with orange streaks, ⅛—¼ in. long ; upper lip ovate or suborbicular, entire or nearly so, $\frac{1}{12}$—⅛ in. long ; lower lip ⅛ in. long, subquadrate, more

or less 2-lobed ; spur conical, obtuse, as long as or slightly longer than the lower lip. Capsules globose, $\frac{1}{8}$—$\frac{1}{6}$ in. in diam. Seeds about $\frac{1}{20}$ in. in diam., orbicular, flat, surrounded by a more or less crenulate corky wing which is about as broad as the nucleus. Fl. B. I. v. 4, p. 329 ; Trim. Fl. Ceyl. v. 3, p. 268 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 175. *Utricularia diantha,* Rœm. & Schult. Syst. Mant. 1 (1822) p. 169 ; Wight, Icon. t. 1569 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 176.—Flowers : Feb.

Rare. KONKAN : Dapoli, *Nairne.* KANARA : Samasgi (N. Kanara), *Woodrow.*—DISTRIB. Throughout India, but not very common; Ceylon, Malaya, China, Australia, Africa, Portugal.

4. **Utricularia albo-cœrulea,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 279. A small plant 4—8 in. high, growing on wet rocks ; roots sparingly branched, their fibres slender and with a few minute bladders. Leaves radical, small, scarcely $\frac{1}{4}$ in. long, spathulate-oblong, very deciduous. Scapes terete, erect, usually 1—2 (less commonly 4—5)-flowered, sometimes with a few small ovate-oblong acute scales attached by their bases ; bracts beneath the pedicels broadly ovate-oblong, membranous, $\frac{1}{20}$ in. long, attached by their bases ; pedicels $\frac{1}{4}$—$\frac{1}{2}$ in. long, recurved in fruit. Calyx $\frac{1}{10}$ in. long ; sepals ovate, acute, enlarged in fruit. Corolla large, fragrant, having an odor of heliotrope ; upper lip $\frac{1}{6}$—$\frac{1}{5}$ in. long, suborbicular, rounded and usually notched at the apex, white, ribbed with purple veins ; lower lip large, $\frac{3}{4}$—$\frac{1}{2}$ in. long and broad, quadrate-orbicular, slightly 4-lobed, very convex, bluish-purple, the centre white with a yellow spot at the base ; spur pendent, slightly curved, conical, acute, much shorter than the lower lip. Stigma sessile or nearly so. Capsules globose, $\frac{1}{10}$—$\frac{1}{8}$ in. in diam., covered by the enlarged sepals which are at length slightly decurrent on the pedicel. Seeds $\frac{1}{80}$ in. long, oblong, rounded at both ends, scrobiculate. Fl. B. I. v. 4, p. 330 ; Dalz. & Gibs. p. 135 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 177 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 176.—Flowers : Sept.-Nov. VERN. *Kajat cha ghás* ; *Sita chi ásre* (Sita's tears).

Rare. KONKAN : *Stocks* !; Vingorla on wet rocks, *Dalzell*; Ratnagiri, *Nairne.* DECCAN : Mahableshwar, *Cooke* !, *Woodrow* !—DISTRIB. Apparently endemic.

5. **Utricularia arcuata,** *Wight, Icon.* v. 4 (1850) t. 1571, fig. 1. Roots branched, furnished with small bladders. Leaves $\frac{1}{4}$—$\frac{3}{8}$ in. long, radical, deciduous, linear-oblong or linear-spathulate, obtuse, furnished with small globose bladders about $\frac{1}{25}$ in. in diam. Scapes 3—8 in. high, 3—8-flowered, erect, sometimes bifid, often with 2—3 minute ovate scales ; bracts $\frac{1}{12}$ in. long, ovate, acute, attached by their bases ; pedicels $\frac{1}{4}$—$\frac{1}{3}$ in. long, slender, recurved in fruit. Calyx $\frac{1}{8}$ in. long ; sepals ovate, acute, subequal or the upper a little larger, enlarged in fruit. Corolla bluish-purple ; upper lip $\frac{1}{8}$ in. long, orbicular-obovate, usually entire ; lower lip $\frac{1}{2}$ in. in diam., orbicular, entire (rarely emarginate) ; spur $\frac{1}{3}$—$\frac{1}{2}$ in. long, slender, linear-subulate, falcately curved. Stigma subsessile. Capsules subglobose, $\frac{1}{8}$ in. in diam., enclosed in the enlarged sepals. Seeds $\frac{1}{80}$ in. long,

oblong-ellipsoid, rounded at both ends, scrobiculate, the outer cells of the testa elongate. Fl. B. I. v. 4, p. 330 ; Dalz. & Gibs. p. 136.—Flowers : Sept.

KONKAN : *Dalzell* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1967 ! KANARA : *Law* !—DISTRIB. India (W. Peninsula), apparently endemic.

6. **Utricularia affinis,** *Wight, Icon.* v. 4 (1850) t. 1580, fig. 1. A small glabrous herb. Scapes slender, 2—8 in. high. Leaves $\frac{1}{8}$—$\frac{1}{3}$ in. long, linear-oblong, obtuse, bearing bladders, very evanescent. Flowers distant, in erect racemes ; bracts $\frac{1}{16}$ in. long, ovate, acute, attached by their bases ; pedicels $\frac{1}{16}$—$\frac{1}{8}$ in. long, not deflexed nor recurved in fruit. Calyx $\frac{1}{8}$ in. long ; upper sepal slightly larger than the lower, broadly ovate or suborbicular, sometimes apiculate ; lower sepal ovate, subacute. Corolla bluish-purple ; upper lip $\frac{1}{8}$ in. long, oblong or obovate-oblong, cuneate, notched ; lower lip $\frac{1}{5}$—$\frac{1}{4}$ in. in diam., suborbicular or somewhat subovate, usually entire, delicately veined ; spur $\frac{1}{5}$ in. long, nearly at right angles to the axis of the flower, narowly conic, straight or nearly so. Style very short but distinct. Capsules $\frac{1}{10}$ in. long, ovoid, enclosed in the enlarged sepals. Seeds about $\frac{1}{80}$ in. in diam., subglobose, scrobiculate, the cells of the testa subhexagonal not elongate. Fl. B. I. v. 4, p. 330 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 178 ; Trim. Fl. Ceyl. v. 3, p. 269. *Utricularia decipiens*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 279.—Flowers : Sept.-Nov.

KONKAN : *Law* !, *Stocks* !, *Dalzell* ! ; Vingorla, *Dalzell & Gibson*. S. M. COUNTRY : Belgaum, *Ritchie*, 1972 !—DISTRIB. India (W. Peninsula) ; Ceylon.

7. **Utricularia cœrulea,** *Linn. Sp. Pl.* (1753) p. 18. Scapes erect. Roots when growing in swampy places matted, with stout fibres bearing globose bladders $\frac{1}{30}$—$\frac{1}{16}$ in. in diam. Leaves $\frac{1}{2}$—2 in. long, linear-oblong, subobtuse, entire, green, with conspicuous subparallel nerves, more or less attenuated towards the base. Scapes 2—8 in. high, simple. Flowers in the racemes 2—10, distant ; bracts $\frac{1}{12}$ in. long, ovate, acuminate ; pedicels $\frac{1}{6}$—$\frac{1}{3}$ in. long, slender, suberect in fruit. Calyx $\frac{1}{6}$ in. long ; upper sepal broadly ovate, acuminate ; lower sepal slightly narrower than the upper, usually with 2 small acute triangular teeth at the apex. Corolla bluish-purple ; upper lip $\frac{1}{8}$—$\frac{1}{4}$ in. long, obovate-oblong, veined ; lower lip $\frac{1}{3}$ in. long, broadly ovate, subacute, reticulately veined ; spur violet (*Trimen*), $\frac{1}{4}$ in. long, narrowly conic, curved, subacute. Style short but distinct. Capsules ovoid, $\frac{1}{10}$—$\frac{1}{8}$ in. long, enclosed in the enlarged sepals. Seeds about $\frac{1}{80}$ in. long, ellipsoid or subglobose, reticulate, the outer cells of the testa oblong. Fl. B. I. v. 4, p. 331 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 179 (*not* of A. DC.) ; Trim. Fl. Ceyl. v. 3, p. 268 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 176. *Utricularia uliginoides*, Wight, Icon. t. 1573. *U. purpurascens*, Grah. Cat. p. 165.—Flowers : Oct.—Dec.

KONKAN : *Law* !, *Stocks* ! DECCAN : Mahableshwar, *Cooke* !, *Woodrow* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1970 ! KANARA : Supa on the Kála naddi, *Ritchie* !—DISTRIB. India (W. Peninsula) ; Ceylon.

8. **Utricularia reticulata,** *Smith, Exot. Bot.* v. 2 (1805) t. 119 Glabrous. Leaves numerous, ½—¾ in. long, narrowly linear-oblong, obtuse, usually deciduous before flowering, furnished with numerous small bladders. Scapes flower-bearing for half their length, slender, weak, flexuose, twining, 6—24 in. long, with 2 or 3 distant bracts. Flowers the largest of the Bombay species, distant, few in each raceme ; bracts ⅛—¼ in. long, ovate, very acute, attached by their bases ; pedicels ¼—⅓ in. long, suberect. Calyx rather more than ¼ in. long in flower ; sepals ovate, acute or acuminate, much enlarged and decurrent on the pedicel in fruit. Corolla large, measuring sometimes ¾ in. and more across, bluish-purple, veined with darker veins ; upper lip ⅓ in. long, broadly obovate, entire ; lower lip ½—⅝ in. in diam., suborbicular, entire, bullate in the centre, with a white spot near the base ; spur ¼ in. long, conic, nearly straight. Capsules ¼ in. long, ellipsoid, enclosed by the greatly enlarged sepals. Seeds about $\frac{1}{50}$ in. long, ovoid or subrhomboid, reticulate. Fl. B. I. v. 4, p. 331 ; Dalz. & Gibs. p. 135 ; Wight, Ill. v. 2, t. 143 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 180 ; Trim. Fl. Ceyl. v. 3, p. 269 ; Woodr. in Journ. Bom. Nat. v. 12 (1898) p. 176. *Utricularia graminifolia,* Grah. Cat. p. 165 (*not* of Spreng.).—Flowers : Oct.

KONKAN : *Law* !, *Stocks* !, *Dalzell* ! ; Máhad in rice-fields, *Kanitkar* ! DECCAN : in rice-fields tolerably common ; Jambgaon, *Gangaram* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1966 !—DISTRIB. India (W. Peninsula) ; Ceylon.

9. **Utricularia nivea,** *Vahl, Enum.* v. 1 (1805) p. 203. Scapes 4—12 in. high, sometimes branched, often with 2 or 3 distant scales attached by their middle and acute at both ends. Leaves ½—¾ in. long, linear, obtuse, very evanescent. Flowers in close racemes or spikes crowded towards the top of the scape ; bracts $\frac{1}{10}$ in. long, attached at or near the middle, acute at both ends ; pedicels very short, recurved, sometimes 0. Calyx puberulous, $\frac{1}{10}$ in. long ; sepals equal, broadly ovate or suborbicular, very obtuse. Corolla white, or very pale-blue or reddish-purple ; upper lip $\frac{1}{10}$ in. long, oblong-obovate, obtuse, entire or notched ; lower lip ⅕ in. long, broadly ovate or suborbicular, with somewhat crenulate margins ; spur stout, conic, subacute, exceeding the lower lip. Capsules globose, $\frac{1}{10}$ in. in diam. Seeds minute, scrobiculate. Wight, Icon. t. 1582 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 186 ; Dalz. & Gibs. p. 135 ; Trim. Fl. Ceyl. v. 3, p. 270. *Utricularia racemosa,* Wall. Cat. (1828) 1496 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 186 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 333. *U. filicaulis,* Wall. Cat. (1828) 1501 ; Oliv. in Journ. Linn. Soc. l. c.

KONKAN : *Stocks* ! ; Vingorla, *Dalzell & Gibson.* S. M. COUNTRY : Belgaum, *Ritchie,* 1968 !—DISTRIB. India (Nipal, Khasia mountains, Chota Nagpur, W. Peninsula) ; Ceylon, Malaya, China, Borneo.

10. **Utricularia striatula,** *Sm. in Rees, Cyclop.* v. 37 (1819) n. 17. A small slender herb often growing on wet rocks ; stolons filiform, creeping, bearing leaves and bladders. Leaves scattered along the stolons, usually in small rosettes at the base of the scapes, rarely more than ⅛ in. in diam., orbicular or reniform, petiolate ; petioles ⅛—¼ in. long. Bladders only from the stolons, obliquely

ovoid, $\frac{1}{25}$ in. long, the mouth with 2 fimbriate oblong antennæ. Scapes filiform, 1—6 in. long, with or without scales, few- to 10-flowered ; bracts about $\frac{1}{16}$ in. long and like the scales attached much below the middle ; bracteoles 2, oblong-lanceolate, shorter than the bracts ; pedicels capillary, $\frac{1}{20}$—$\frac{1}{5}$ in. long, distant, spreading. Sepals very unequal, more or less orbicular ; the upper at length up to $\frac{1}{8}$ in. long and adnate to the capsule ; the lower $\frac{1}{25}$ in. long, reflexed. Corolla large for the size of the plant, violet, with a yellow spot at the base of the lower lip ; upper lip $\frac{1}{12}$ in. long, suborbicular, emarginate, rather broader than long ; lower lip $\frac{1}{4}$ in. long, rather broader than long, 5-toothed or -lobed ; spur $\frac{1}{8}$ in. long, subulate, deflexed. Stigma subsessile. Capsules subglobose. Seeds oblong-ellipsoid, minute, elegantly glochidiate. *Utricularia orbiculata*, Wall. Cat. (1828) 1500 ; Oliv. in Journ. Linn. Soc. v. 3 (1859) p. 187 ; Dalz. & Gibs. p. 136 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 334 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p 176. *U. glochidiata*, Wight, Icon. t. 1581.—Flowers : Sept.

KONKAN : *Law* !, *Stocks* ! ; abundant on the wet rocks in the Railway-cuttings on the Bhor Ghát, (G. I. P. R.) in September, *Cooke* ! DECCAN : Panchgani Ghát on wet rocks, *Cooke* !, *Woodrow* ! ; Lanoli, *Woodrow* ; Khandala, *Woodrow*.—DISTRIB. More or less throughout India in the hills ; Ceylon ; Malaya, S. China, Tropical Africa.

ORDER XCIII. GESNERIACEÆ.

Herbs or undershrubs. Leaves opposite, alternate, or solitary, entire or toothed ; stipules 0. Flowers hermaphrodite, usually irregular, on axillary or terminal peduncles, cymose, rarely 1-flowered ; bracts small or large ; bracteoles usually small. Calyx-segments 5, valvate or open (very rarely imbricate). Corolla gamopetalous, tubular ; lobes usually 5, imbricate in bud. Stamens inserted on the corolla-tube, usually didynamous, sometimes 5 fertile, often only 2 fertile ; anthers 2- or often by early confluence 1-celled, usually conniving or connate in pairs, dehiscing longitudinally. Disk annular or shortly cylindric (sometimes unilateral), or 0. Ovary 1- or imperfectly 2-celled ; ovules numerous, anatropous, on 2-fid parietal sometimes subconfluent placentas ; style linear ; stigma capitate or 2-lobed. Fruit capsular or baccate, dehiscent or indehiscent. Seeds small, numerous, fusiform or ovoid, smooth, sometimes tipped with a long hair ; albumen scanty or 0 ; embryo straight.—DISTRIB. Mostly in S.E. Asia, Polynesia, and Tropical America ; genera about 85 ; species about 900.

Seeds tipped with a long hair; perfect stamens 4, didynamous. Epiphytic undershrub with fleshy leaves ..... 1. ÆSCHYNANTHUS.

Seeds not tipped with hairs; stamens not didynamous.

Capsule loculicidally dehiscent.

Capsule linear or long-lanceolate, much exceeding the calyx; placentas not bearing seeds on their inner faces; perfect stamens 2..... 2. CHIRITA.

Capsule ellipsoid or oblong, scarcely exceeding the calyx; placentas bearing seeds on all sides.	
Perfect stamens 4	3. KLUGIA.
Perfect stamens 2	4. RHYNCHOGLOSSUM.
Capsule circumscissilely dehiscent. Flowers subcapitate; perfect stamens 2; capsule globose...	5. EPITHEMA.

1. ÆSCHYNANTHUS, Jack.

Epiphytic undershrubs. Leaves opposite, fleshy or thickly coriaceous, usually entire. Flowers often showy, fascicled in the axils or at the tops of the branches (rarely solitary); bracts ovate, usually small. Calyx truncate, 5-fid or 5-partite. Corolla tubular, ventricose or enlarged above, usually incurved; lobes 5. Stamens 4, perfect, didynamous, attached at or below the middle of the tube, usually exserted; anthers cohering in pairs, their tips often free during flowering. Disk annular. Ovary superior, oblong or linear, stipitate; style short or long; stigma dilated, truncate, peltate or concave; placentas naked on the inner face, bearing ovules on the involute margins. Capsule long, linear, loculicidally 2-valved; valves placentiferous. Seeds very many, oblong or linear, with 1 or more hairs at the end near the hilum and 1 at the apex.—DISTRIB. India, Malaya; species more than 60.

1. **Æschynanthus Perottetii,** *A. DC. Prodr.* v. 9 (1845) p. 261. An epiphytic shrub; branches long, smooth, more or less compressed, swollen at the nodes. Leaves subfleshy, 2—4½ by ¾—1 in., lanceolate, obtusely acuminate, reticulately veined, glabrous, base acute or rounded; petioles ¼—⅜ in. long, stout. Pedicels ⅜—½ in. long, near the apices of the branches, subumbellately 2—6-flowered or often solitary in the axils of the terminal pair of leaves. Calyx ¼—⅜ in. long, 5-partite nearly to the base; tube about ⅛ in. long; segments narrowly linear, obtuse. Corolla 1¼—1½ in. long, scarlet, glabrous or slightly pubescent outside, deciduous, being soon pushed off by the expanding capsule; tube curved, enlarged at the mouth; mouth oblique; lobes reflexed, rounded, ciliate, marked with dark purple lines, the 2 lateral lobes longer than the other 3. Stamens much exserted; filaments minutely glandular-pubescent. Capsules reaching 8 in. long, linear, glabrous. Seeds about 1/20 in. long, narrowly oblong-ellipsoid, acute and with a long hair at each end. Fl. B. I. v. 4, p. 339; Dalz. & Gibs. p. 135; C. B. Clarke, in DC. Monogr. v. 5, part 1 (1883) p. 25; Talb. Trees, Bomb. ed. 2, p. 254; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 176. *Æschynanthus ceylanica,* Wight, Icon. t. 1347. *Æ. grandiflorus,* Grah. Cat. p. 146 (*not* of Spreng.).—Flowers: Oct.—Jan.

KONKAN: Ghâts, *Talbot.* DECCAN: Koina valley, below Mahableshwar, *Cooke!, Woodrow!* S. M. COUNTRY: Párva Ghât, *Stocks!, Dalzell!*; Rámghât, *Ritchie,* 1861! KANARA: on trees in evergreen forests of N. Kanara Ghâts, common on the Nilkund Ghât, *Talbot.*—DISTRIB. India (W. Peninsula).

I have included in the above the vars. *malabarica* and *planiculmis* (C. B. Clarke, in DC. Prodr. l. c.). The former is said to differ in the leaves which

are acute at the base (the bases of the type being rounded) and in a shorter calyx. But I have found *on the same plant* leaves with acute and rounded bases, while the length of the calyx in plants whose leaves are acute at the base has often reached $\frac{3}{8}$ in. Dalzell & Gibson (Bo. Fl. p. 135) describe the leaves of the *Æschynanthus* of Parwar (now Párva) Ghát (not Panoar as entered by error in DC. Monogr. l. c. p. 26 and in Fl. B. I. l. c. p. 340) as *rather obtuse* at the base.

The var. *planiculmis* (DC. Monogr. l. c. p. 26) (*platyculmis* in Hook. f. Fl. B. I. v. 4, p. 340) is distinguished by its flattened branches, a condition not uncommon in epiphytic plants and depending on the force with which the young stems have been pressed against the supporting tree, as well perhaps as on the time of year in which the specimens were collected. The succulent branches of epiphytes are often swollen in the rainy season and dry up much in the hot weather.

It seems probable that the species *Æ. ceylanica* (Gard. in Calc. Journ. Nat. Hist. v. 6 (1846) p. 474), which differs from *Æ. Perottetii* by a slightly shorter corolla, should be included in that species. The chief distinctive character on which Gardner (*l. c.*) relies, viz. the difference in the length of the capsule, does not exist.

2. **CHIRITA,** Buch.-Ham.

Herbs or low undershrubs. Leaves opposite, often unequal (sometimes whorled or alternate), elliptic or ovate (rarely lanceolate). Flowers in many- or few-flowered axillary cymes, sometimes reduced to a single flower ; bracts free or connate, deciduous. Calyx 5-fid or 5-partite ; lobes acute. Corolla infundibuliform ; tube elongate, straight or incurved ; limb 2-lipped, the lobes 5, rounded. Stamens inserted on the corolla-tube, 2 perfect, 2—3 barren ; filaments flattened, geniculate ; anthers usually applied to the stigma, the cells 2, divaricate, often confluent. Ovary linear, 1-celled ; placentas intruded as far as the axis, then reflexed, bearing many ovules on their margins ; style short or long ; stigma when young oblique, peltate, notched on the lower margin, in age the upper margin usually produced, oblong, bifid. Capsule elongate, linear, sessile, opening loculicidally to the base ; valves 2-partite the following season. Seeds ellipsoid, smooth, sometimes minutely umbonate ; testa often striate, reticulate.—DISTRIB. Chiefly Indian ; a few W. Malayan and Chinese ; species about 35.

1. **Chirita hamosa,** *R. Br. in Benn. Pl. Jav. Rar.* (1838—1852) p. 117. Annual ; stem 8—20 in. high, erect, sparsely hairy. Leaves opposite, subequal, 3—6 by 2—4 in., ovate or elliptic, acute, obscurely crenulate, thin, sparsely hairy on both sides, base rounded or subcordate ; petioles $\frac{1}{2}$—$\frac{3}{4}$ in. long. Peduncles adnate to the petiole ; pedicels $\frac{1}{3}$—$\frac{1}{4}$ in. long, hairy. Calyx $\frac{1}{4}$ in. long, divided almost to the base, hairy ; tube $\frac{1}{20}$ in. long ; segments linear, subacute. Corolla $\frac{1}{2}$ in. long ; tube slender, nearly white; limb pale blue or somewhat rosy. Stigma 2-fid, elongate after flowering. Capsules $1\frac{1}{4}$—$3\frac{1}{2}$ in. long, linear, acute, often much curved, slender, pubescent. Seeds about $\frac{1}{30}$ in. long, ellipsoid, apiculate, rugose. Fl. B. I. v. 4, p. 360 ; C. B. Clarke, in DC. Monogr. v. 5, part 1 (1883) p. 128. *Didymocarpus cristata,* Dalz. in Kew Journ. Bot. v. 3 (1851) p. 225 ; Dalz. & Gibs. p. 134.—Flowers : Sept.—Oct.

Rare. Without locality, *Dalzell* in Herb. Kew.! KONKAN: *Stocks*!, *Law*! S. M. COUNTRY: rocks near Párva Ghát, *Dalzell & Gibson*.—DISTRIB. Throughout India widely dispersed.

3. KLUGIA, Schlecht.

Herbs; stems rooting near the base, then erect, somewhat succulent, simple or branched, glabrous or pubescent. Leaves alternate (or subopposite, one of the pair reduced to an auricle), acuminate, unequal-sided, cordately auricled on one side of the unequal base, subentire or sinuate, many-nerved. Flowers in terminal or leaf-opposed many-flowered racemes; bracts minute or 0. Calyx campanulate, 5-angled or winged; segments 5, narrowly triangular. Corolla-tube cylindric; limb 2-lipped, the upper lip very short, erect, entire or emarginate, the lower lip broad, rounded or shortly 3-lobed. Perfect stamens 4, included, inserted above the middle of the tube; filaments slightly flattened; anthers approximated by pairs, 2-celled, the cells short, divaricate, soon confluent. Disk fleshy, annualar or shortly cylindric. Ovary superior; placentas bearing ovules all over. Capsule included in the calyx, broadly ellipsoid, loculicidal, 2-valved. Seeds ellipsoid, truncate at both ends, reticulate.—DISTRIB. Species 4, of which 3 are Indian, the other Central American.

1. **Klugia Notoniana,** *A. DC. Prodr.* v. 9 (1845) p. 276. Annual, 1—2 ft. high; stem watery, stout, branched, shining, terete, glabrous or slightly hispid with a few short bristly hairs. Leaves few, 2—8 by 1—2½ in., ovate-oblong, very unequal-sided, acuminate, sinuate, often minutely denticulate, the smaller side acute at the base, the larger semicordate, auriculate, extending much lower down on the petiole, scabrous above, glabrous, pubescent or scabrous and paler beneath; lateral nerves very numerous, parallel, prominent beneath; petioles ½—1½ in. long, stout. Flowers numerous, in racemes reaching 4 in. long; rhachis pubescent on one side only; bracts $\frac{1}{10}$—⅛ in. long, linear-subulate, persistent; pedicels $\frac{1}{10}$—⅛ in. long, nodding, filiform, pubescent. Calyx ¼ in. long, usually glabrous; tube 5-winged, the upper wing extended into a large erect rounded crest; lobes $\frac{1}{10}$—⅛ in. long, narrowly triangular, acute. Corolla-tube ¼ in. long, white; limb bluish-purple; upper lip $\frac{1}{10}$ in. high, oblong, rounded; lower lip ½—¾ in. in diam., entire, blotched with yellow at the base. Capsules ⅛ in. in diam., concealed in the calyx. Seeds about $\frac{1}{10}$ in. long, oblong-ellipsoid. Fl. B. I. v. 4, p. 366; Wight, Icon. t. 1353; Trim. Fl. Ceyl. v. 3, p. 277; C. B. Clarke, in DC. Monogr. v. 5, part 1 (1883) p. 159; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 176. *Klugia scabra*, Dalz. & Gibs. Bo. Fl. (1861) p. 134.—Flowers: Sept.—Oct.

KONKAN: Wari Country, *Dalzell & Gibson*. DECCAN: Khandala, *Cooke*!; Wada Ghát below Mahableshwar, *Cooke*!, *Woodrow*!; Malkapur, *Woodrow*. S. M. COUNTRY: *Ritchie*, 1908!—DISTRIB. India (W. Peninsula); Ceylon.

I quite agree with Trimen (*l.c.*) that *Klugia scabra*, Dalz. & Gibs. Bo. Fl. (*l. c.*), is not deserving of even varietal rank.

4. **RHYNCHOGLOSSUM,** Blume (*Rhinchoglossum*).

Herbs, usually glabrous. Leaves alternate, elliptic, acuminate, unequal-sided, cordate on one side of the unequal base, subentire or sinuate. Flowers in long many-flowered racemes ; bracts small. Calyx campanulate, 5-lobed. Corolla tubular ; tube cylindric ; mouth contracted ; limb 2-lipped, the upper lip short, 2-fid, the lower longer, 3-lobed. Stamens 2, perfect, included ; anthers connivent, 2-celled, the cells ellipsoid, subparallel, the slits ultimately subconfluent at the apex. Ovary ovoid, 1-celled ; placentas much intruded, divided into 2 thick lamellæ bearing numerous ovules on all sides ; style linear ; stigma minutely 2-lobed. Capsule included in the calyx, ellipsoid, membranous. Seeds narrowly ellipsoid, smooth ; testa minutely reticulate.—DISTRIB. Species 2 in India and Malaya.

1. **Rhynchoglossum obliquum,** *Blume, Bijdr.* (1826) p. 741 (*Rhinchoglossum*), VAR. **parviflora,** *C. B. Clarke, in DC. Monogr.* v. 5 (1883) p. 162. A succulent herb usually glabrous or nearly so, very variable in size, 2—20 in. high. Leaves 2—6 by 1—3 in., elliptic-oblong, acuminate, thinly membranous, usually glabrous, unequal-sided ; the smaller side acute at the base, the larger semicordate, extending much lower on the petiole ; lateral nerves numerous, parallel, curved, prominent beneath ; petioles ½—1 in. long. Flowers in racemes reaching 4½ in. long, solitary or 2 together ; rhachis glabrous ; bracts at the base of the pedicels $\frac{1}{10}$ in. long, subulate ; pedicels ⅛—¼ in. long, filiform, nodding. Calyx ⅛ in. long, divided about ½-way down or less ; lobes triangular, acute. Corolla blue ; tube ⅛ in. long ; upper lip $\frac{1}{16}$ in. long, with 2 triangular acute lobes ; lower lip ⅛ in. long, with 3 shallow obtuse lobes. Capsules ⅛ in. long, ovoid. Seeds narrowly ellipsoid, about $\frac{1}{10}$ in. long. Fl. B. I. v. 4, p. 367. *Rhynchoglossum obliquum,* DC. Prodr. v. 9 (1845) p. 274 ; Wight, Ill. v. 2, p. 182, t. 159 *bis,* fig. 7 ; C. B. Clarke, Comm. & Cyrt. Beng. t. 88 ; Woodr. in Journ. Bomb. Nat. v. 12 (1898) p. 176. *R. zeylanicum,* Hook. Bot. Mag. t. 4198—Flowers : Oct.

KONKAN : elevated parts. *Dalzell* ! ; Dasgaon, *Woodrow* ; Western Ghâts, *Woodrow* ! DECCAN : Wada below Mahableshwar, *Woodrow* ! ; Pertabgarh Fort, on walls near the gate, *Woodrow* ! KANARA : Kála naddi, *Ritchie,* 1909 !—DISTRIB. Throughout India in and near the hills, common.

5. **EPITHEMA,** Blume.

Small succulent pubescent herbs; stem simple or branched. Leaves few or solitary ; lower alternate ; upper often opposite. Flowers small, in dense pedunculate scorpioid cymes ; peduncles long, 1 or more from the upper axils, free or confluent with the petiole or leaf-base ; bract large, solitary, 1-sided, hooded or subspathaceous ; bracteoles small, narrow, or 0 ; pedicels very short. Calyx campanulate ; lobes 5, acute, valvate in bud. Corolla small, blue or white, tubular, 2-lipped ; lobes 5, slightly unequal. Stamens : 2 upper perfect ; 2 lower reduced to staminodes ; anthers cohering, 2-celled,

cells short, divaricate, soon confluent. Ovary ovoid, 1-celled; placentas stalked, peltate, bearing ovules on all sides; style filiform; stigma small, subcapitate. Capsule globose, membranous, included in the calyx, dehiscing circumscissilely. Seeds numerous, stipitate, oblong or ellipsoid, subacute at both ends, striate (often spirally).—DISTRIB. From India to the Philippines, Tropical Africa; species perhaps 6.

1. **Epithema carnosum,** *Benth. Scroph. Ind.* (1835) p. 57, VAR. **hispida,** *C. B. Clarke, in DC. Monogr.* v. 5 (1883) p. 178. Stem 2—12 in. high, slightly branched, erect, succulent, rough with bristly hairs. Leaves few (sometimes only 1), the upper opposite, nearly sessile, the lower alternate, petiolate, 1—6 in. long, nearly as broad as long, broadly elliptic or ovate, obtuse, more or less inciso-serrate, covered on both sides with bristly hairs; lower petioles 2—4 in. long. Flowers in close scorpioid cymes; peduncles 1—4 in. long, solitary or 2—5 together, terminal or axillary, rough with bristly hairs, free or racemosely (not fasciculately) confluent with the petiole or leaf-base; bract $\frac{1}{8}$—$\frac{3}{4}$ in. long, at the summit of the peduncle below the inflorescence, leafy, broadly ovate, cordate, cucullate, obtuse, dentate; pedicels 0—$\frac{1}{8}$ in. long. Calyx $\frac{1}{8}$—$\frac{1}{3}$ in. long, pubescent; lobes slightly shorter than the tube, triangular, acute, with a subulate point. Corolla blue, $\frac{1}{4}$—$\frac{1}{3}$ in. long, with a ring of hairs inside; tube longer than the subequal lobes. Capsules $\frac{1}{12}$ in. in diam., globose. Seeds scarcely $\frac{1}{16}$ in. long, with a long funicle, oblong, acute at both ends, spirally striate. Fl. B. I. v. 4, p. 369. *Epithema ceylanicum,* Wight, Ill. t. 159 *bis,* fig. 3; Icon. t. 1354 (*not* of Gardn.); Dalz. & Gibs. p. 135.

Rare; chiefly on the Southern Ghâts of the Presidency. Without locality in Herb. Kew., *Dalzell*! S. M. COUNTRY: Chorla Ghât, *Stocks*!—DISTRIB. India (W. Peninsula).

Several non-indigenous plants of the Order (chiefly Brazilian) are grown in gardens and conservatories, where they are very showy and ornamental. The following are the chief species grown, but several hybrids are being introduced:—

Gesneria Douglasii, Lindl. in Trans. Hort. Soc. v. 7 (1830) p. 62. A handsome herbaceous plant, a native of Brazil. Leaves 5—7 in a whorl, about 6 in. from the ground, ovate, crenate-serrate, ciliate, downy, with a fine gloss on each side. Corolla tubular, pink or orange, striped and bordered with blood-red spots. Dalz. & Gibs. Suppl. p. 65.

Achimines hirsuta, DC. Prodr. v. 7 (1838) p. 536. A native of Brazil, about 2 ft. high, hairy. Leaves ovate-oblong, coarsely serrate. Corolla reddish with yellow eye and spotted throat; limb flat, with rounded serrulate segments. *Achimines Skinneri,* Gordon, in Journ. Hort. Soc. v. 2 (1847), p. 293, t. 4, fig. 2; Dalz. & Gibs. Suppl. p. 65.

Sinningia tubiflora, Fritsch, in Engl. & Prantl. Pflanzenf. v. 4, 3 B (1894) p. 182. A fine plant 2 ft. or more high, a native of Brazil.

Leaves 5 in. long, oblong-lanceolate, subacuminate, shortly petiolate, ciliate, green with darker markings. Corolla white or pale-yellow; tube 2½ in. long. *Gloxinia tubiflora,* Hook. Bot. Mag. t. 3971. *Achimines tubiflora,* Britton, in Ann. N.Y. Acad. Sc. v. 7 (1893) p. 185; Woodr. Gard. in Ind. ed. 5, p. 406.

Sinningia speciosa, Hiern, in Kjoeb. Vidensk. Meddel. (1877-78) p. 91. A short-stemmed plant, a native of Brazil, with oblong velvety crenate leaves and violet-purple flowers. Woodr. Gard. in Ind. ed. 5, p. 407. *Gloxinia speciosa,* Lodd. Bot. Cab. v. 1 (1818) t. 28; Grah. Cat. p. 146 ; Dalz. & Gibs. Suppl. p. 65.

Nægelia zebrina, Regel, in Flora, v. 31 (1848) p. 249. A very showy plant about 2 ft. high, a native of Mexico. Leaves suborbicular, cordate, velvety, deep green, marbled. Flowers in racemes or panicles with long pedicels ; corolla drooping, orange-scarlet above, pale-orange below, the segments of the limb almost equal, pale-orange spotted with red. Woodr. Gard. in Ind. ed. 5, p. 406. *Gesneria zebrina,* Paxt. Mag. Bot. v. 8 (1841) p. 271 ; Graham, in Bot. Mag. t. 3940.

Gloxinia maculata, L'Hérit. Stirp. Nov. (1784) p. 149. A native of S. America, with simple spotted stems. Radical leaves 6 by 4 in., ovate, cordate, obtuse, doubly toothed, green and shining above, reddish beneath. Flowers in racemes ; corolla large, pale-blue, widely tubular. Grows well in the Deccan if treated with care and flowers profusely in October and November. Woodr. Gard. in Ind. ed. 5, p. 408.

Episcia tesselata, Linden, ex Lemaire, Ill. Hortic. v. 16 (1869) sub t. 607. A herbaceous plant, a native of Peru, with subcordate petiolate leaves of a beautiful dark olive-green with a bronzy sheen above, vinous-red beneath. Flowers numerous, aggregated in axillary fascicles, subsessile, yellow. *Centrosolenia bullata,* Lemaire, Ill. Hortic. v. 16 (1869) t. 607 ; Woodr. Gard. in Ind. ed. 5, p. 407.

Episcia fulgida, Hook. f. in Bot. Mag. v. 30 (1874) t. 6136. A handsome herbaceous plant, a native of Colombia. Leaves ovate, subcordate, crenate, ciliate, richly marbled. Flowers axillary, solitary, on long pedicels ; corolla bright-scarlet with a long tube. *Cyrtodeira fulgida,* Linden, ex André, Illustr. Hortic. v. 20 (1873) t. 181 ; Woodr. Gard. in Ind. ed. 5, p. 408.

ORDER XCIV. **BIGNONIACEÆ.**

Trees or shrubs. Leaves opposite, 1—3 times unequally pinnate or sometimes undivided. Flowers hermaphrodite, irregular, in racemes or panicles usually terminal ; bracts 0. Calyx gamosepalous, campanulate or spathaceous ; lobes 2—5 or 0. Corolla 2-lipped, tubular-ventricose ; lobes 5, subequal, imbricate in bud. Stamens 4, didynamous, often with an imperfect (in *Oroxylum* a perfect) fifth inserted where the corolla-tube is suddenly swollen ; anthers 2-celled, included or shortly exserted ; cells elliptic or oblong, parallel or

divaricate, with longitudinal dehiscence. Disk usually thick or annular. Ovary subsessile, 2-celled ; ovules numerous, in many rows (rarely 1—2 rows), anatropous ; style long, glabrous ; stigma of 2 elliptic lobes. Capsules mostly elongate, loculicidally or septicidally 2-valved ; septum enlarging in fruit, deciduous with the placentas. Seeds compressed, discoid (rarely subtrigonus), usually prominently winged ; albumen 0.—DISTRIB. Throughout the Tropics of the whole world, largely in Trop. America, a few in the warm temperate zones of both hemispheres ; genera about 105 ; species about 550.

Perfect stamens 5	1. OROXYLUM.
Perfect stamens 4.	
Leaves simple	2. TECOMELLA.
Leaves pinnate.	
Capsule not winged, cylindric or subquadrangular.	
Calyx spathaceous, cleft to the base on one side in flower; corolla-tube not ventricose...	3. DOLICHANDRONE.
Calyx not spathaceous; corolla-tube ventricose.	
Capsule with a flat or angular dissepiment.	4. HETEROPHRAGMA.
Capsule with a cylindric spongy dissepiment.	
Ovules 2-seriate in each cell; seeds ridged, sunk in deep pits in the placenta.....	5. STEREOSPERMUM.
Ovules many-seriate in each cell; seeds flat, not ridged, not sunk in the placenta.	6. RADERMACHERA.
Capsule with double wings on the margins, oblong, compressed	7. PAJANELIA.

1. OROXYLUM, Vent.

A glabrous usually small tree. Leaves opposite, large, 2—3-pinnate ; leaflets entire, ovate. Flowers in long terminal racemes. Calyx large, campanulate, coriaceous ; limb truncate or obscurely toothed, persistent. Corolla large, campanulate, purplish or white ; lobes 5, round, crisped, toothed, subequal. Stamens 5, perfect, exserted ; filaments straight, 4 of them subequal, the fifth one shorter ; anthers 2-celled, the cells parallel, oblong. Disk large, cushion-like. Ovary 2-celled, subsessile, contracted below ; ovules numerous, many-seriate ; style long ; stigma of 2 large blades. Capsule very large, broadly linear, strongly compressed parallel to the septum, 2-valved, opening septifragally. Seeds many, thinly discoid, with a broad hyaline wing.—DISTRIB. India, Ceylon, Malaya, Cochin-China, Ava ; species 1.

1. **Oroxylum indicum,** *Vent. Dec. Gen. Nov.* (1808) p. 8. A small tree 25—40 ft. high, branched at top ; bark light-brown, soft, with green juice and often with numerous corky lenticels. Leaves very large, 3—5 ft. long, 2—3-pinnate with opposite pinnæ ; rhachis very stout, cylindric ; leaflets 2—4 pairs, 2½—5 by 1½—4 in., ovate or elliptic, acuminate, glabrous, base rounded or sometimes cordate ; petiolules of the lateral leaflets ¼—⅝ in. long. Flowers numerous, fetid, in large erect racemes 1—2 ft. long or even more ; pedicels ¼—1¼ in. long. Calyx 1 by ¾ in., leathery, oblong-campanulate, glabrous. Corolla usually lurid-purple, reaching 4 in. long, fleshy ; lobes about 1½ in. long with crisped margins. Stamens 5, slightly

exserted beyond the corolla-tube, one of them a little shorter than the other 4 ; filaments cottony at the base. Capsules 1—3 ft. by 2—3½ in., straight, tapering to both ends, flat, hardly ⅓ in. thick, acute ; valves semi-woody. Seeds very numerous, 2½ in. long, winged all round except at the base. Fl. B. I. v. 4, p. 378 ; Trim. Fl. Ceyl. v. 3, p. 281 ; Talb. Trees, Bomb. ed. 2, p. 255 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 ; Watt, Dict. Econ. Prod. v. 5, p. 495. *Bignonia indica*, Linn. Sp. Pl. (1753) p. 625 ; Grah. Cat. p. 125 ; Bedd. For. Man. in Flor. Sylvat. p. clxviii. *Calosanthes indica*, Blume, Bijdr. p. 761 ; Wight, Icon. t. 1337-38 ; Dalz. & Gibs. p. 161. —Flowers : May—July. VERN. *Tetu*.

KONKAN : *Stocks* ! ; Salsette jungles and throughout the Konkan and Ghâts, *Dalzell & Gibson* ; Western Ghâts, *Woodrow*. KANARA : Kâla naddi, *Ritchie*, 1883 ! ; very common in the evergreen forests near the Nilkund Ghât, *Talbot*. —DISTRIB. Throughout India except in the western drier area ; Ceylon, Malaya, Cochin-China, Ava.

The root-bark is much used in medicine by the natives of India as a tonic and astringent in diarrhœa and dysentery. Ground to powder and mixed with turmeric it is used in Bombay as an application to sore backs of horses and bullocks. See Watt, Dict. Econ. Prod. l. c.

2. **TECOMELLA,** Seem.

A glaucescent shrub or small tree. Leaves usually opposite, simple, oblong, obtuse, entire. Flowers in terminal racemes or panicles. Calyx tubular-campanulate, subequally 5-toothed. Corolla tubular-campanulate, ventricose with a wide mouth ; lobes rounded, subequal, imbricate. Stamens exserted ; anther-cells divergent and pendulous. Disk cupular. Ovary oblong ; ovules numerous in each cell. Capsule linear-oblong, more or less compressed at right angles to the septum ; valves opening loculicidally. Seeds discoid, winged, the wing absent at the base of the seed and very narrow at its apex.—DISTRIB. India, Beluchistan, Arabia.

1. **Tecomella undulata,** *Seem. in Ann. & Mag. Nat. Hist.* ser. 3, v. 10 (1862) p. 30. A shrub or small tree with drooping branches and stellately grey-tomentose innovations, otherwise glabrous. Leaves simple, 2—5 by ⅜—1¼ in., narrowly oblong, obtuse, entire with undulate margins. Flowers inodorous, in corymbose few-flowered racemes terminating short lateral branches ; pedicels ¼—½ in. long. Calyx ⅜—7/16 in. long, campanulate ; lobes ⅛ in. long, broadly ovate, obtuse, mucronate. Corolla 1½—2½ in. long, orange-yellow, campanulate, veined ; lobes 5, subequal, rounded. Stamens exserted ; filaments glabrous. Stigma 2-lamellate ; lobes spathulate-oblong, rounded. Capsules 8 by ⅜ in., slightly curved, linear-oblong, acute, smooth ; valves thin. Seeds (including the wing) 1 by ⅜ in. ; wing very narrow round the apex of the seed, absent at its base. K. Schum. in Engl. & Prantl, Pflanzenf. v. 3 B, p. 239. *Tecoma undulata*, G. Don, Gen. Syst. v. 4 (1837) p. 223 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 378 ; Dalz. & Gibs. p. 161 ; Aitch. Pb. & Sind Pl. p. 110 ; Talb. Trees, Bomb. ed. 2, p. 256 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 ; Watt, Dict. Econ. Prod.

v. 6, part 4, p. 1. *Bignonia undulata*, Sm. Exot. Bot. v. 1, p. 35, t. 19; Grah. Cat. p. 124—Flowers: Feb.—Apr. VERN. *Raktarohida; Lohero.*

Dalzell without locality, in Herb. Kew.! DECCAN: Khandesh, *Graham*; W. Khandesh, *Dalzell & Gibson, Woodrow.* GUJARAT: Banás river, *Vaupell* ex *Graham, Dalzell & Gibson.* SIND: *Stocks* ex *Aitchison.*—DISTRIB. India (W. Peninsula, Panjáb, Rajputana); Beluchistan, Arabia.

Well worthy of cultivation for its elegant foliage and showy flowers. The bark is employed in Sind as a remedy for syphilis; the leaves are eaten by cattle; the wood is strong, tough, and durable, takes a fine polish, and is highly prized for furniture and carved work. See Watt, Dict. Econ. Prod. l. c.

3. DOLICHANDRONE, Seem.

Trees, glabrous or tomentose. Leaves opposite, 1-pinnate. Flowers in terminal racemes or panicles. Calyx spathaceous, cleft to the base on one side. Corolla more or less tubular; lobes of limb 5, subequal, round, crisped, crenate or incised. Stamens 4, didynamous, included; anthers glabrous, the cells oblong, more or less parallel. Disk annular, cushion-like. Ovary sessile; ovules numerous, usually many-seriate; style long; stigma 2-lobed. Capsule large, subterete or compressed, loculicidally 2-valved, imperfectly 4-celled. Seeds thinly discoid, with a broad wing at each end.—DISTRIB. India, China, Ceylon, Malaya, Tropical Africa, Australia; species about 20.

Leaflets reaching 3½ in. long, elliptic, acuminate; petiolules of lateral leaflets ¼—½ in. long; capsule slightly compressed, speckled	1. *D. crispa.*
Leaflets reaching 1½ in. long, suborbicular; petiolules of lateral leaflets 0—1/16 in. long; capsule much compressed, not speckled	2. *D. falcata.*

1. **Dolichandrone crispa,** *Seem. in Journ. Bot.* v. 8 (1870) p. 381. A deciduous tree 35—60 ft. high; young parts velvety-pubescent. Leaves opposite, pinnate, 8—12 in. long; leaflets 2—3 pairs and an odd one, 1½—3½ by ⅞—1¾ in., elliptic, acuminate (sometimes, but rarely, obtuse), glabrous, entire, tapering and often unequal-sided at the base; main nerves 4—6 pairs with reticulate venation between; petiolules of the lateral leaflets ¼—½ in. long, those of the terminal leaflets much longer. Flowers in 1—8-flowered corymbose racemes; pedicels ½—1½ in. long. Calyx ¾—1 in. long, puberulous when young, at length glabrous. Corolla white, fragrant; tube 1—2 in. long, ⅛—⅓ in. in diam., cylindric; limb reaching 2 in. across the mouth when expanded; lobes rounded, crisped-crenate. Capsules reaching as much as 18 in. long by ⅝ in. wide, slightly compressed, arcuate, speckled, smooth; valves woody. Seeds 1¼ by ¼ in. (including the wing), subrectangular, with broad membranous wings at the ends. Fl. B. I. v. 4, p. 379; Talb. Trees, Bomb. ed. 2, p. 257. *Bignonia crispa*, Buch.-Ham. in Roxb. Fl. Ind. v. 3, p. 103; Grah. Cat. p. 125. *Spathodea crispa*, Wall. Cat. 6515; Dalz. & Gibs. p. 160.—Flowers: Mar.—Oct. VERN. *Gudmurki.*

S. M. COUNTRY: Gokak, *Ritchie*, 1123!; Belgaum districts, *Ritchie*, 1123!; Sutguti (Belgaum districts), *Talbot*; Duddi on the Gatpraba river, *Law* ex

Graham; Kuputguda hill (Dharwar districts), *Talbot*.—DISTRIB. India (W. Peninsula).

2. **Dolichandrone falcata,** *Seem. in Journ. Bot.* v. 8 (1870) p. 381. A deciduous tree 20—50 ft. high, the young parts pubescent or shortly villous. Leaves simply pinnate, 3—6 in. long; leaflets opposite, ½—1½ by $\frac{7}{16}$—1½ in., suborbicular or obovate, sometimes very shortly acuminate (the terminal leaflet rather larger than the lateral ones), pubescent or glabrous, base cuneate or rounded, usually unequal-sided; main nerves about 4 pairs, conspicuous beneath; petiolules of the lateral leaflets 0—$\frac{1}{10}$ in. long. Flowers in terminal few-flowered racemes; pedicels ½ in. long. Calyx ½—¾ in. long, pubescent, with a short stout mucro at the apex. Corolla white, 1 in. long or even more; tube very narrow (about $\frac{1}{10}$ in.) at its base, gradually enlarging upwards; lobes of the limb obovate-oblong with crisped undulate margins. Capsules flat, much falcately curved, 10—18 in. long by ¾ in. wide, glabrous. Seeds 1 in. long by ¼ in. broad, rectangular, winged at the two ends. Fl. B. I. v. 4, p. 380; Talb. Trees, Bomb. ed. 2, p. 257; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354; Watt, Dict. Econ. Prod. v. 3, p. 174. *Dolichandrone Lawii,* Seem. in Journ. Bot. v. 8 (1870) p. 380; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 380. *Spathodea falcata,* Wall. Cat. 6517; Dalz & Gibs. p. 160; Bedd. Fl. Sylvat. t. 71. *Bignonia spathacea,* Roxb. Cor. Pl. v. 2, p. 24, t. 144 (*excluding capsules*); Grah. Cat. p. 125.—Flowers: Mar.—May. VERN. *Medasinghi.*

KONKAN: deciduous forests, *Talbot*; Vale of Nagotna river above the village, *Graham*. DECCAN: Poona, *Woodrow*; Chattersinghi hill near Poona, *Kanitkar*!; Khandala, *Graham, Bhiva*! S. M. COUNTRY: Belgaum north, *Ritchie*, 1125!; Duddi, *Law* ex *Graham*. KANARA: N. Kanara, in deciduous forests, *Talbot*.

I have followed Talbot (who from his knowledge of the tree in the southern districts of the Presidency, where it is tolerably abundant, is in a position to form an accurate judgment respecting it), in uniting *D. Lawii*, Seem., with *D. falcata*.—DISTRIB. India (W. Peninsula).

The wood is hard and seasons well. It is used for building and agricultural purposes.

4. HETEROPHRAGMA, DC.

Trees. Leaves large, 1-pinnate. Flowers large, in terminal velvety-tomentose panicles. Calyx ovoid, closed when young, irregularly 3—5-lobed in flower. Corolla tubular-ventricose, rosy, white or yellow; lobes 5, rounded, subequal. Stamens 4, didynamous, included; anthers glabrous, the cells linear-oblong, diverging. Disk cushion-shaped. Ovary sessile; ovules numerous, many-seriate on each placenta; style long; stigma 2-lobed. Capsule elongate, cylindric or more or less compressed, falcate or twisted, loculicidally 2-valved with a flat or 4-angled dissepiment. Seeds compressed, with a membranous wing at each end.—DISTRIB. Species 5, of which 3 are Indian, the other African.

1. **Heterophragma Roxburghii,** *DC. Prodr.* v. 9 (1845) p. 210. A large tree with dark-brown bark. Leaves simply pinnate, 1—2 ft.

long, tomentose when young, afterwards glabrous, usually crowded near the ends of the branches ; leaflets 3—5 pairs and an odd one, 2—5 by 1¼—2 in., elliptic-oblong, obtuse, sometimes with a short acumination, entire or serrulate, often unequal-sided at the base ; petiolules of the lateral leaflets 0—¼ in. long. Flowers fragrant, in large, terminal, many-flowered densely fulvous-tomentose panicles ; pedicels short, stout. Calyx ½—¾ in. long, densely tomentose outside, clothed inside with long silky tawny hairs, irregularly lobed ⅓—½-way down, or on one side more deeply divided, or obscurely 2-lipped. Corolla reaching 2 in. long or more, pale rose-colored or white, often with a pink margin ; tube pubescent outside when young, usually becoming glabrous ; mouth of the limb 2 in. across, the lobes about ½ in. long with crisped margins. Filaments densely woolly at the very base, otherwise glabrous. Capsules straight, ½ in. thick, 8—12 by 1½—2 in., linear, pointed, velvety when young, afterwards glabrous ; dissepiment 4-winged, making the capsule 4-celled. Seeds 1½ by ¾—1 in. Fl. B. I. v. 4, p. 381 ; Dalz. & Gibs. p. 160 ; Bedd. For. Man. in Flor. Sylvat. p. clxix ; Talb Trees, Bomb. ed. 2, p. 257 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 ; Watt, Dict. Econ. Prod. v. 4, p. 227. *Bignonia quadrilocularis*, Roxb. Cor. Pl. v. 2, p. 24, t. 145 ; Grah. Cat. p. 125.—Flowers : Feb.—Apr. VERN. *Varas.*

KONKAN : Elephanta, *Graham;* Matheran, *Cooke* ! ; near Chowk plateau, Matheran, *H. M. Birdwood.* DECCAN : near Poona, *Woodrow* ! ; Ghâts, *Dalzell* ! ; Khandesh, *Graham;* Mahableshwar near the Yenna Waterfall, *Graham, Cooke* ! ; Kadakvasla, *Cooke* ! S. M. COUNTRY : Padshapur jungles, *Dr. Lush* ex *Graham* ; Turkeri near Belgaum, *Ritchie,* 1122 !—DISTRIB. India (Central Provinces, W. Peninsula).

5. STEREOSPERMUM, Cham.

Trees. Leaves opposite, imparipinnate. Flowers in terminal panicles. Calyx campanulate, 2—5-lobed or 5-toothed. Corolla tubular-campanulate, curved, often pubescent or woolly outside, bearded inside on the lower, glabrous on the upper side ; limb 5-lobed, sub-bilabiate, the 2 upper lobes more or less connate. Stamens 4 (with a rudimentary 5th), didynamous, included ; anthers glabrous, the cells much divergent. Disk cupular, fleshy. Ovary elongate, 2-celled ; ovules many, 2-seriate in each cell, horizontal. Capsule linear, cylindric or 4-gonous, often spirally twisted, 2-valved ; valves coriaceous ; dissepiment at length free, spongy, filling the whole capsule. Seeds numerous, with a membranous wing at each end ; nucleus thick, with a transverse groove on one side and a prominent ridge on the other, which fits into a deep pit in the placenta.—DISTRIB. Tropical Asia and Africa ; species about 12.

Branches of the panicle slender, glabrous; corolla under 1 in. long, yellow tinged with purple; capsule subquadrangular ..... 1. *S. chelonoides.*
Branches of the panicle short, viscidly hairy; corolla dull-purple, 1 in. and more long; capsule cylindric. 2. *S. suaveolens.*

1. Stereospermum chelonoides, *DC. Prodr.* v. 9 (1845) p. 210. A large deciduous tree, 30—60 ft. high, with many spreading

branches, glabrous or nearly so; bark thick, yellowish. Leaves 1-pinnate, 12—18 in. long; leaflets 3—5 pairs and an odd one, 4—5 by 1—2 in., elliptic, caudate-acuminate, glabrous, base acute or rounded, often unequal-sided; main nerves 8—10 pairs with reticulate venation between; petiolules of the lateral leaflets ⅜—½ in. long. Flowers fragrant, in lax drooping terminal panicles with articulated slender glabrous branches. Calyx ¼ in. long, campanulate, glabrous, usually purple, shortly 3—5-toothed. Corolla ¾ in. long, yellow, veined and tinged with reddish-purple, more or less pubescent outside, bearded inside on the lower, glabrous on the upper side; lobes of the limb rounded, crisped. Filaments with a short tuft of woolly hairs at the very base, otherwise glabrous. Capsules 1—2 ft. by ½ in., subquadrangular, curved, pointed, more or less spirally twisted, often dotted with white specks; dissepiment subcylindric, brown, with open notches to receive the seeds. Seeds 1—1¼ in. long, readily splitting along the transverse furrow. Fl. B. I. v. 4, p. 382; Wight, Icon. t. 1341; Bedd. Flor. Sylvat. t. 72; Trim. Fl. Ceyl. v. 3, p. 283; Talb. Trees, Bomb. ed. 2, p. 258; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354; Watt, Dict. Econ. Prod. v. 6, part 3, p. 366, *Bignonia chelonoides*, Linn. f. Suppl. (1781) p. 282; Grah. Cat. p. 125. *Heterophragma chelonoides*, Dalz. & Gibs. p. 160.—Flowers: Apr.—June. VERN. *Padal.*

Dalzell without locality in Herb. Kew.! KONKAN: Bankot, *Woodrow*; throughout the Konkan in moist forests, *Talbot*. DECCAN: Khandala, *Woodrow*; Lanoli Grove, *Woodrow*; ravine near Pár, *Graham*. S. M. COUNTRY: Belgaum, *Ritchie*, 1124! KANARA: N. Kanara, in evergreen and deciduous moist forests, *Talbot*—DISTRIB. Throughout moister India; Ceylon, Ava.

The leaves, roots, and flowers have some repute in native medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Stereospermum suaveolens,** *DC. Prodr.* v. 9 (1845) p. 211. A deciduous tree 30—60 ft. high, more or less pubescent; young parts viscous-hairy. Leaves 1—2 ft. long, simply pinnate; leaflets 3—4 pairs and an odd one 3—6 by 2—3 in., broadly elliptic, usually acuminate, often serrulate, rough above, pubescent beneath, base usually rounded and unequal-sided; main nerves 6—8 pairs with reticulate venation between; petiolules of the lateral leaflets 1/10 in. or less long. Flowers sweetly fragrant, in large lax trichotomous viscidly-hairy panicles. Calyx ⅜ in. long, campanulate, viscidly hairy; lobes 3—5, short, broad. Corolla 1—1½ in. long, infundibuliform, dull purple, pubescent outside, bearded inside on the lower, glabrous on the upper side; limb oblique, 2-lipped; lobes rounded, crisped-crenate, the 3 lower lobes longer than the 2 upper. Filaments without a tuft of hairs at the base. Capsules 1—2 ft. by ⅜ in., straight, cylindric, slightly ribbed, somewhat rough with elevated whitish specks; valves thick, hard. Seeds 1¼ by ½ in. with a long membranous wing at each end, the nucleus furrowed across the middle, sunk into the notches of the cylindric brown spongy dissepiment. Fl. B. I. v. 4, p. 382; Wight, Icon. t. 1342; Bedd. For. Man. in Flor. Sylvat. p. clxix; Talb. Trees, Bomb. ed. 2, p. 258; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354; Watt, Dict. Econ. Prod. v. 6, part 3, p. 367. *Bignonia suaveolens*, Roxb. Fl. Ind. v. 3,

p. 104 ; Grah. Cat. p. 125. *Heterophragma suaveolens*, Dalz. & Gibs. p. 161.—Flowers : Mar.—Apr. VERN. *Parul.*

Dalzell without locality in Herb. Kew.! KONKAN : Uran in Bombay harbour, *Dalzell*! DECCAN : Poona (planted), *Woodrow*; Párghát below Mahableshwar, *Graham*. S. M. COUNTRY : dry forests of the Dharwar districts, *Talbot*. KANARA : Kála naddi, *Ritchie*, 1882!—DISTRIB. Throughout India in drier localities than *S. chelonoides*; often planted.

6. **RADERMACHERA,** Zoll. & Moritz.

Trees. Leaves opposite, 1—3-pinnate. Flowers in terminal panicles. Calyx truncate or obtusely lobed. Corolla infundibuliform or campanulate, not bearded within on the lower side ; limb 5-lobed, sub-bilabiate, the 2 upper lobes more or less connate. Stamens 4 (with a rudimentary 5th), didynamous, included ; anthers glabrous, the cells much divergent. Disk cupular, fleshy. Ovary elongate ; ovules numerous, many-seriate in each cell, horizontal. Capsule linear, cylindric, 2-valved, often spirally twisted ; valves coriaceous or woody ; dissepiment at length free, spongy, thick, filling the whole capsule. Seeds numerous, small, with a membranous wing at each end ; nucleus thin, flat, not ridged, resting in a very slight depression, but not sunk in the septum ; cotyledons flat, not folded.—DISTRIB. India, Singapore, Java, Philippines ; species about 8.

This genus, established in 1854 by Zollinger & Moritz (Zoll. Syst. Verz. Ind. Archip. p. 53), has been placed under *Stereospermum* in the 'Genera Plantarum' of Bentham & Hooker, but many authors are now agreed as to the advisability of again separating the two genera. Mr. W. B. Hemsley (Hook. Icon. Pl. t. 2728) points out the grounds which render this separation desirable. In *Stereospermum* the ovules are arranged in 2 rows in each cell, the embryo is folded, and the seeds in consequence ridged on one side, fitting into deep pits in the placenta. In *Radermachera* the ovules are many-seriate [8-seriate according to Bureau (Adansonia, v. 2, p. 192)], the seeds are flat, not ridged, resting in very slight depressions, but not at all immersed in the placenta, while the cotyledons are not folded.

1. **Radermachera xylocarpa,** *K. Schum. in Engl. & Prantl, Pflanzenf.* v. 4, 3 B (1895) p. 243. A middle-sized deciduous tree with light-grey bark. Leaves 2-pinnate, 1—4 ft. long ; main rhachis angular ; leaflets 2—4 pairs with an odd one, 2—3 by 1—1½ in., elliptic-oblong, acute or acuminate, entire, glabrous when mature, reticulately veined, base acute or rounded, often unequal-sided ; petiolules of lateral leaflets 0—¼ in. long. Flowers fragrant, appearing after the leaves, in dense compound erect somewhat rigid pubescent panicles. Calyx ½ in. long, pubescent outside ; lobes 3—5, irregular, short, broad. Corolla 1½—2 in. long, white tinged with yellow, glabrous on both sides ; tube narrow within the calyx, then much swollen upwards ; limb somewhat oblique, with subequal rounded crisped lobes. Filaments hairy at the base. Disk cupular, fleshy. Ovary elongate ; ovules numerous, many-seriate in each cell ; stigma 2-lamellate. Capsules 1—3 ft. long, slightly curved, rough with numerous large irregular hard tubercles ; valves woody, 1—1½ in. broad ; dissepiment cylindric, bearing the seeds on shallow depressions. Seeds 1¼ in. long (including the membranous wing), thinly

discoid, ¼ in. broad. *Stereospermum xylocarpum*, Benth. & Hook. Gen. Pl. v. 2, p. 1047 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 383 ; Talb. Trees, Bomb. ed. 2, p. 258 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 367. *Bignonia xylocarpa*, Roxb. Fl. Ind. v. 3, p. 108 ; Wight, Icon. tt. 1335-36 ; Grah. Cat. p. 125 ; Dalz. & Gibs. p. 159 ; Bedd. Flor. Sylvat. t. 70.—Flowers : Apr.—May. VERN. *Kharsing* ; *Kadashing*.

KONKAN : hills about Nagotna, *Giberne* ex *Graham* ; jungles about Ratnagiri, *Elphinstone* ex *Graham*. DECCAN : Dang jungles in Khandesh, *Graham* ; Párghát, *Giberne* ex *Graham* ; Thal Ghát, *Graham, Dalzell & Gibson*. S. M. COUNTRY : Belgaum, *Ritchie*, 469 ! ; Rámghát, *Ritchie*, 469 ! ; common in the dry forests of the Dharwar districts, *Talbot*.—DISTRIB. India (W. Peninsula, extending north to the Satpuras).

The wood is good and handsome, tough and elastic, taking a good polish ; it deserves to be better known and to be in more general use for cabinet-work (*Gamble*). From the yellow resinous substance which often fills the pores of the heart wood an oily extract is obtained which is employed in cutaneous diseases (*Dalzell & Gibson*). Roxburgh says that one of the capsules would make a *dangerous bludgeon*.

7. **PAJANELIA,** DC

A large glabrous tree. Leaves large, 1-pinnate ; leaflets numerous, entire. Flowers large, in terminal thyrsoid panicles. Calyx large, ovoid, closed in bud, swollen and campanulate in flower, 5-lobed. Corolla large, tubular-ventricose ; lobes 5, subequal, crisped. Stamens 4, didynamous ; anthers glabrous, the cells linear, divergent. Disk broad. Ovary sessile ; ovules many-seriate on each placenta ; style long ; stigma 2-lobed. Capsule large, narrowly oblong, compressed, winged, loculicidally 2-valved. Seeds compressed, with a membranous wing at each end and sometimes with a small wing on one or both of the long sides.—DISTRIB. East Indies ; species 1.

1. **Pajanelia multijuga,** *DC. Prodr.* v. 9 (1845) p. 227. A glabrous tree 30—60 ft. high. Leaves imparipinnate, 1½—3 ft. long ; rhachis angular ; leaflets 9—12 pairs and an odd one, 4—8 by 1½—3 in., ovate or elliptic, acute or acuminate, glabrous, entire, very unequal-sided at the base ; petiolules of the lateral leaflets ⅛—⅓ in. long. Flowers in large robust erect panicles 12—18 in. long. Calyx 1—1½ in. long, ovoid, glabrous, divided rather less than ½-way down ; lobes usually acute. Corolla with dull-purple tube and yellow lobes, 2½—4 in. long, pubescent outside in the upper part ; tube narrow below, swollen above ; lobes rather more than ½ as long as the tube, obovate-oblong, rounded and incised at the apex. Filaments glabrous at the base. Capsules 12—20 by 2½—3½ in., straight, compressed, 2-winged on each margin, glabrous, oblong or oblong-obovate, pointed. Seeds compressed, ¾ by ¼—⅜ in., winged at the two ends and often with a small wing on one or both of the long sides. Bureau, Monog. Bignon. (1864) t. 20 ; Jackson, in Index Kewen. v. 2, p. 403. *Panjanelia Rheedei*, Wight, Icon. (1850) tt. 1343—44. *Pajanelia Rheedei*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 384 ; Bedd. For. Man. in Flor. Sylvat. p. clxix ; Talb. Trees,

Bomb. ed. 2, p. 259 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 4. *Pajanelia longifolia*, K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, 3 B (1895) p. 244. *Bignonia longifolia*, Willd. Sp. Pl. v. 3, p. 306.—Flowers : cold season. VERN. *Aminge* ; *Doundi*.

In the Bombay Presidency apparently confined to Kanara, where (*fide* Talbot) it occurs in the moist forests of N. Kanara along the banks of nálas in the Yellapur taluka.—DISTRIB. India (Khasia hills and Sylhet, W. Peninsula, Birma, the Andamans).

The wood is excellent and deserves to be better known; it is used in the Andamans, where the tree grows to a large size, for canoes (*Gamble*).

The following non-indigenous species, not belonging to any of the foregoing genera, are grown throughout the Presidency as ornamental plants. Most of them are characterised by large and handsome flowers :—

Millingtonia hortensis, Linn. f. Suppl. (1781) p. 291. A tall handsome tree of rapid growth with corky bark (hence often called the *Indian Cork-tree* by Anglo-Indians), strikingly beautiful dark green foliage and white fragrant flowers with long slender corolla-tubes. It is believed to be indigenous in Birma and the Malay Archipelago, but is extensively planted in avenues and gardens throughout India. It flowers Oct.-Dec., but does not ripen seed in W. India, and is propagated by suckers from the roots. Fl. B. I. v. 4, p. 377 ; Dalz. & Gibs. Suppl. p. 55 ; Woodr. Gard. in Ind. ed. 5, p. 411 ; Talb. Trees, Bomb. ed. 2, p. 256 ; Watt, Dict. Econ. Prod. v. 5, p. 247. *Bignonia suberosa*, Roxb. Cor. Pl. v. 3, p. 11, t. 214 ; Grah. Cat. p. 126.—VERN. *Akasnim* ; *Kavla-nim*.

Bignonia magnifica, Bull. in Gard. Chron. v. 12 (1879) p. 72. A free-growing plant of scandent habit, recently introduced from B. Columbia. The flowers, which are produced in large branching panicles, are of great size, about 3½ in. across, ranging from delicate mauve to rich purplish crimson, relieved by a conspicuous throat of light primrose color. Woodr. Gard. in Ind. ed. 5, p. 410.

Bignonia incarnata, Aubl. Hist. Pl. Guian. v. 2 (1775) p. 645, t. 261. A scandent shrub with smooth shining ternate leaves (the terminal leaflet of the upper leaves generally transformed into a tendril). Corolla 2½ in. long, 1¼ in. wide at the mouth, pale-lilac veined with deep-purple ; the tube white inside. It is a native of B. Guiana and is propagated by layering. Woodr. Gard. in Ind. ed. 5, p. 410, A.

Bignonia unguis-cati, Linn. Sp. Pl. (1753) p. 623. A very beautiful climber which clings to stone work by small hooked tendrils. It bears a profusion of bright yellow flowers for a short time during the hot season. One plant, a very large one, used to adorn the north side of the main building of the College of Science, Poona. *Bignonia gracilis*, Lodd. Bot. Cab. (1831) t. 1705 ; Woodr. Gard. in Ind. ed. 5, p. 409 ; Dalz. & Gibs. Suppl. p. 56.

Tecomaria capensis, Spach, Hist. Veg. Phan. v. 9 (1840) p. 137.

A scandent shrub with pinnate leaves and dense racemes of orange-red flowers 2 in. long, with a long arcuate corolla-tube, a native of the Cape of Good Hope. *Tecoma capensis*, Lindl. Bot. Reg. t. 1117 ; Dalz. & Gibs. Suppl. p. 55.

Pandorea jasminoidea, K. Schum. in Engl. & Prantl, Pflanzenf. v. 4, 3 B (1894) p. 230. A scandent shrub a native of New Holland, becoming common about bungalows. It has pale bluish flowers. *Tecoma jasminoides*, Lindl. Bot. Reg. (1837) t. 2002 ; Dalz. & Gibs. Suppl. p. 56 ; Woodr. Gard. in Ind. ed. 5, p. 411.

Pyrostegia ignea, Presl, Bot. Bemerk. (1844) p. 93. A scandent shrub a native of Brazil. The lower leaves are 3-foliolate, the terminal leaflet transformed into a tendril in the upper leaves. The flowers are orange-red, 2½ in. long, with a long corolla-tube, arranged in terminal racemes. *Bignonia venusta*, Ker-Gawl, Bot. Reg. (1817) t. 249 ; Dalz. & Gibs. Suppl. p. 56 ; Woodr. Gard. in Ind. ed. 5, p. 410.

Campsis radicans, Seem. Journ. Bot. v. 5 (1867) p. 372. A shrubby plant with red flowers, a native of N. America. It is apt to produce long trailing branches in a rich soil (*Woodrow*). *Tecoma radicans*, Juss. Gen. (1789) p. 139 ; Dalz. & Gibs. Suppl. p. 55 ; Woodr. Gard. in Ind. ed. 5, p. 411. *Bignonia radicans*, Linn. Sp. Pl. (1753) p. 624 ; Bot. Mag. (1799) t. 485.

Stenolobium stans, Seem. Journ. Bot. v. 1 (1863) p. 88. A tall graceful hardy shrub with somewhat quadrate branches and showy yellow flowers, a native of America, but almost run wild in some places in the Konkan and N. Kanara. It is especially useful as a screen. Bureau, Monogr. Bign. t. 13. *Tecoma stans*, Juss. Gen. (1789) p. 139 ; Dalz. & Gibs. Suppl. p. 55 ; Talb. Trees, Bomb. ed. 2, p. 256 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 & Gard. in Ind. ed. 5, p. 411. *Bignonia stans*, Linn. Sp. Pl. ed. 2 (1763) p. 871.

Spathodea campanulata, Beauv. Fl. D'Owar. v. 1 (1805) p. 47, tt. 27—28. A small tree a native of Tropical Africa, with orange-scarlet bell-shaped flowers, 3 by 2½ in., which appear in November. The climate of Bombay seems to suit it and it may be seen in full flower in November in the Victoria Gardens in the Presidency town. Woodr. Gard. in Ind. ed. 5, p. 413.

Dolichandrone stipulata, Benth. & Hook. f. Gen. Pl. v. 2 (1876) p. 1046. A tree 30—40 ft. high. Leaves 1—1½ in. long ; leaflets 3—5 pairs and an odd one. Corolla yellowish-brown outside, purple inside, 2—3 in. long. Capsules woolly-tomentose. A native of Rangoon and Pegu, raised in the old Botanic Gardens at Hewra and Dapuri from Calcutta seed. Fl. B. I. v. 4, p. 379 ; Watt, Dict. Econ. Prod. v. 3, p. 174. *Bignonia stipulata*, Roxb. Hort. Beng. p. 47 ; Dalz. & Gibs Suppl. p. 56.

Heterophragma adenophyllum, Seem. ex Benth. & Hook. f. Gen. Pl. v. 2 (1876) p. 1046. A deciduous tree 30—50 ft. high with large leaves, a brownish-yellow densely tomentose corolla, and variously contorted and twisted capsules, a native of Birma and the Andamans,

is more or less cultivated in gardens. The wood is said to be excellent for cabinet-work. Fl. B. I. v. 4, p. 381 ; Watt, Dict. Econ. Prod. v. 4, p. 226. *Bignonia adenophylla*, Wall. ; Dalz. & Gibs. Suppl. p. 56. Mr. H. M. Birdwood [Cat. Fl. Matheran & Mahableshwar (1897) p. 24] mentions having found a tree near the Chauki at Matheran which was no doubt planted.

Colea mauritiana, Boj. Hort. Maurit. (1837) p. 220. A shrub 10—15 ft. high, a native of Madagascar. Leaflets 2 pairs and an odd one. Flowers springing from the stem, remote from the leaves. Corolla red veined with yellow, quite yellow within. *Bignonia Colei*, Boj. in Bot. Mag. (1828) t. 2817 ; Dalz. & Gibs. Suppl. p. 56.

Crescentia Cujete, Linn. Sp. Pl. (1753) p. 626. The *Calabash-tree*, a native of Tropical America, is, in the gardens in the Presidency, a small tree of irregular growth bearing flowers which are in color a mixture of green, purple, red, and yellow, produced on the stem and older branches and followed by a fruit somewhat resembling a pumalo varying from 2 to 12 in. in diam. with a hard rind. The fruit is used in S. America to boil water in. Jacq. Hist. Select. Stirp. Amer. (1763) p. 175, t. 111 ; Dalz. & Gibs. Suppl. p. 57 ; Woodr. Gard. in Ind. ed. 5, p. 412.

Kigelia pinnata, DC. Prodr. v. 9 (1845) p. 247. A handsome small tree, a native of Tropical Africa, with pinnate leaves and long pendulous racemes of dull liver-colored flowers which appear in the hot season. It grows rapidly if planted on the margin of a tank in rich soil, and is propagated by seed. Woodr. Gard. in Ind. ed. 5, p. 412.

Parmentiera cereifera, Seem. Bot. Voy. Herald (1852-57) p. 182, t. 32. An unarmed tree a native of Panama. There used to be a tree in the compound of the Western India Club at Poona. Its curious yellow waxy-looking candle-shaped fruit has obtained for it the name "*Candle-tree of Panama.*" Seemann (*l. c.*) in a description of a forest of these trees in the valley of the river Chagres said that a person entering it might almost fancy himself transported into a chandler's shop. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354.

Order XCV. **PEDALIACEÆ.**

Herbs, rarely undershrubs. Leaves opposite or the upper alternate, entire, toothed, incised or pedatifid ; stipules 0. Flowers irregular, hermaphrodite, solitary (rarely fascicled or racemose), usually axillary. Calyx gamosepalous, usually deeply 4—5-lobed. Corolla tubular-ventricose ; limb 5-lobed, obscurely 2-lipped ; lobes imbricate. Stamens 4, didynamous (rarely 2). Disk hypogynous, fleshy. Ovary 2 (rarely 1) -celled ; ovules many or few, superposed ; style filiform ; stigma shortly 2-lobed. Fruit hard, indehiscent, or a 2 (rarely 3—4) -valved capsule. Seeds in the Indian species wingless ; albumen 0.—Distrib. Genera 12 ; species about 55, in the warmer regions of both hemispheres, abundant in Africa.

Fruit spinous, indehiscent; seeds 2—1 in each cell..... 1. Pedalium.
Fruit capsular, 2—4-valved, spineless; seeds many in each cell ..... 2. Sesamum.

1. **PEDALIUM,** Linn.

A glabrous annual. Leaves opposite or alternate, petiolate, rather broad, inciso-dentate. Flowers axillary, solitary, yellow, suberect, shortly pedicellate ; pedicels 2-glandular at the base. Calyx small, 5-partite. Corolla-tube slender below, enlarged above ; limb sub-bilabiate ; lobes 5, round, spreading, subequal. Stamens 4, didynamous, included ; anther-cells ovate, parallel, distinct, pendulous. Ovary 2-celled ; ovules 2 in each cell. Fruit hard, indehiscent, 2-celled ; upper portion pyramidal-ovoid, obtuse, obscurely 4-gonous, each angle armed with a conical horizontal sharp spine. Seeds 2—1 in each cell, pendulous, oblong.—DISTRIB. India, Ceylon, Tropical Africa ; species 1.

1. **Pedalium Murex,** *Linn. Syst. Nat.* ed. 10 (1759) p. 1123. A much-branched herb 6—15 in. high ; stems and branches often slightly rough with scaly glands. Leaves opposite, pale glaucous-green, somewhat fleshy, 1—2 by ¾—1½ in., broadly ovate-oblong, truncate or obtuse, coarsely crenate-serrate or sublobate, glabrous above, the lower side usually covered with minute scales, base acute ; petioles ¼—¾ in. long. Flowers axillary, solitary ; pedicels ⅛ in. long. Calyx small, scarcely ⅛ in. long, minutely scaly outside, divided rather more than ½-way down ; lobes 5, linear-triangular, acute. Corolla 1 in. long, about ¾ in. across at the mouth, bright-yellow ; tube ¾ in. long, slender ; lobes broad, rounded. Filaments glandular-hairy at the base. Fruit ½—¾ in. long, narrowed at the base, pyramidal-ovoid above the spines, bluntly 4-angled, with stout sharp conical horizontal spines from the angles. Fl. B. I. v. 4, p. 386 ; Grah. Cat. p. 127 ; Dalz. & Gibs. p. 162 ; Wight, Icon. t. 1615 ; Trim. Fl. Ceyl. v. 3, p. 285 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 123.—Flowers : Oct. VERN. *Málvi-gokhra* ; *Mothe-gokhru.*

Common on the sandy shores of Kathiawar and Gujarat. KONKAN : Shrivardhan near Jinjira (Kolaba districts), *Woodrow* ; in compounds near the Marine lines Bombay, *Graham.* S. M. COUNTRY : Badami, *Bhiva* !, *Woodrow* ! GUJARAT : Porbandar (Kathiawar), *Cooke* !—DISTRIB. As the genus.

The herb is medicinally much valued by the natives. Agitated with water the fresh leaves have the property of rendering the water mucilaginous without altering the taste, color, or odor of the liquid. The mucilaginous liquid is taken as a remedy for gonorrhœa and dysuria and is said to dissolve calculi. See Watt, Dict. Econ. Prod. l. c.

2. **SESAMUM,** Linn.

Erect or prostrate herbs. Leaves opposite below, alternate above, entire, toothed, lobed or divided. Flowers axillary, solitary or few and fascicled, shortly pedicellate. Calyx small, 5-partite. Corolla 2-lipped ; tube ventricose ; lobes rounded, those of the upper lip usually rather smaller than the others. Stamens 4, didynamous, included ; anthers sagittate, the cells subparallel, distinct. Ovary 2-celled, the cells each soon divided into 2 chambers by the intrusion of a false dissepiment from between the placentas ; ovules numerous,

1-seriate in each chamber ; style filiform ; stigma 2-lobed. Capsule oblong or ovoid, usually 4-angled and 4-grooved, loculicidally 2-valved, 4-chambered. Seeds many, obliquely oblong, somewhat compressed, foveolate.—DISTRIB. India, Tropical and S. Africa ; species 10.

1. **Sesamum laciniatum,** *Klein, ex Willd. Sp. Pl.* v. 3 (1800) p. 359. A prostrate herb 1—3 ft.; stems and branches grooved, sparsely hairy with long soft white hairs. Leaves ½—1½ in. long, nearly as broad as long, orbicular or elliptic in outline, variously lobed and laciniate, sparsely hairy above, hairy on the nerves and clothed beneath with a white somewhat mealy tomentum ; petioles 0—⅛ in. long. Flowers solitary, axillary ; pedicels ⅛ in. long. Calyx ⅓ in. long, deeply divided, hairy outside ; segment linear, ½ in. long, strongly ciliate. Corolla 1—1¼ in. long, tubular-ventricose, minutely pubescent outside, purple, with a yellow palate (*Clarke*). Capsules ⅜ by ⅓ in., scabrous-pilose, 2-valved, oblong, compressed, rounded and strongly mucronate at the apex. Seeds ⅛—¼ by ⅒ in., obovoid-oblong, foveolate, glabrous. Fl. B. I. v. 4, p. 387 ; Wight, Icon. t. 1345 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354.—Flowers : Sept.-Oct.

Rare. S. M. COUNTRY; Badami, *Cooke*!, *Woodrow*!; Gokak, ***Ritchie,*** 1885!—DISTRIB. India (W. Peninsula).

Sesamum indicum, Linn. Sp. Pl. (1753) p. 634. An annual, largely cultivated throughout India for the oil furnished by its seeds. It is probably a native of Tropical Africa, but its original habitat is not known with certainty. It has been cultivated in India from a very remote period, and is grown in many of the tropical regions of the world. The plant is usually about 2 ft. high ; stem erect with long ascending branches from the base. Upper leaves lanceolate, entire, the lower often cut at the base into 2 or more serrate segments, glabrous above, puberulous beneath. Flowers pinkish-purple, ill-smelling ; corolla pubescent outside. Capsules ¾—1 in. long, bluntly quadrangular, shortly beaked, pubescent ; valves separating ½-way down, gaping. Seeds oblong, slightly compressed, glabrous, black or white. The seed is known in commerce as *Gingelly* or *Sesamé* and is exported largely from India, the exports in 1883-84 reaching upwards of 140,000 tons, of which more than 100,000 tons were consigned to France. The plant is known in the Bombay Presidency by the native name of *Til,* and the seeds are of two kinds, the black (*Kála-til*) and the white (*Safed-til*) ; the former of which is the more common and yields a superior oil. For a full description, consult Watt, Dict. Econ. Prod. v. 6, part 2, pp. 502—541 ; Fl. B. I. v. 4, p. 387 ; Dalz. & Gibs. p. 161 ; Trim. Fl. Ceyl. v. 3, p. 285 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354. *Sesamum orientale,* Linn. Sp. Pl. (1753) p. 634 ; Grah. Cat. p. 126.—Flowers : Aug.—Sept.

The following, which do not belong to any of the foregoing genera, are grown as ornamental plants:—

Martynia diandra, Glox. Obs. Bot. (1785) p. 14, t. 1. A native of Mexico, becoming naturalized and springing up on rubbish-heaps and in waste places. Leaves large, opposite, cordate, sinuately lobed and minutely dentate, often covered with a glutinous dew-like substance. Flowers diandrous, handsome, ill-smelling, rose-colored, in racemes. The curious beetle-shaped hard and woody fruit with 2 sharp anterior hooks is often an object of curiosity. Grah. Cat. p. 127; Dalz. & Gibs. Suppl. p. 58; Woodr. Gard. in Ind. ed. 5, p. 413.—VERN. *Vichuacha-jhar*.

Ceratotheca triloba, E. Mey. ex Bernh. in Linnæa, v. 16 (1842) p. 29. A showy annual from Natal, attaining 3 ft. in height, introduced into the Bombay Presidency in 1888. The flowers are of varying tints of purple or lilac. The capsules are 2-horned. The plant grows readily in the Deccan without any special care and may be seen in the Empress Garden at Poona. Woodr. Gard. in Ind. ed. 5, p. 414.

ORDER XCVI. **ACANTHACEÆ.**

Herbs or shrubs, rarely trees. Leaves opposite, usually entire stipules 0. Flowers hermaphrodite, usually irregular, in cymes, racemes, or spikes (rarely solitary); bracts large or small, sometimes 0; bracteoles usually 2, sometimes more under the individual flowers, free or connate into an epicalyx. Calyx 5 (rarely 4) -partite (in *Thunbergia* small, often multifid). Corolla 2-lipped or subequally 5-lobed; lobes imbricate or twisted in bud. Stamens 4 or 2, inserted on the corolla-tube; anthers 2- or 1-celled, the cells sometimes remote. Disk often conspicuous. Ovary superior, 2-celled; ovules 1 or more in each cell, 1- or 2-seriate, anatropous; style simple, filiform, or thickened below; stigma usually 2-lobed, the lobes sometimes unequal. Fruit a loculicidal capsule, the valves often elastically recurved, the septum splitting, the seeds borne on each half. Seeds usually hard, attached (except in a few genera) to recurved subacute supports (*retinacula*), ovoid or compressed, smooth or rugose, rarely hispid; albumen 0 or (rarely) scanty.—DISTRIB. Tropical and warm temperate regions; genera 140; species about 2,000.

Climbers; seeds not supported on hard retinacula.
- Calyx minute, annular or 10—15-toothed; pollen globose, obscurely banded, smooth or very minutely tuberculate ..... 1. THUNBERGIA.
- Calyx 5-lobed (often obscurely); pollen cog-wheel-shaped ..... 2. MEYENIA.

Erect or prostrate (not climbing) herbs or shrubs.
- Seeds not supported on hard retinacula.
  - Ovules many in each cell.
    - Ovules superposed in 2 rows in each cell; corolla-lobes imbricate; leaves not pinnately divided.
      - Calyx 4-partite; stamens 2.
        - Bracts rigid; peduncle of spike covered with alternate scales..... 3. TUBIFLORA.

Bracts herbaceous; spikes sessile or, if pedunculate, the peduncle without scales ..... 4. NELSONIA.
Calyx 5-partite; stamens 4 ..... 5. STAUROGYNE.
Ovules not in 2 rows in each cell; corolla-lobes contorted, twisted to the left in bud; lower leaves pinnately divided ..... 6. CARDANTHERA.
Seeds supported on hard upward-curved retinacula.
Corolla without an upper lip; lower lip large, expanded, 3-lobed; ovules 2 in each cell.
Lower filaments with an excurrent process.... 7. BLEPHARIS.
Lower filaments without an excurrent process. 8. ACANTHUS.
Corolla 2-lipped or with 5 subequal lobes.
Corolla-lobes twisted to the left in bud.
Ovules more than 2 in each cell; capsule normally with 6 or more seeds.
Corolla distinctly 2-lipped.
Inflorescence spinous ..... 9. ASTERACANTHA.
Inflorescence not spinous ..... 10. HYGROPHILA.
Corolla subequally 5-lobed.
Bracteoles large, usually exceeding the calyx; capsule with a solid base ..... 11. RUELLIA.
Bacteoles small, narrow; capsule seed-bearing throughout ..... 12. HEMIGRAPHIS.
Ovules 2 in each cell; capsule with 4 or fewer seeds.
Placentas separating elastically from the base of the ripe capsule; stamens 4.
Bracteoles very large, reticulately nerved ..... 13. PETALIDIUM.
Bracteoles 0 ..... 14. MICRANTHUS.
Placentas not separating elastically from the base of the ripe capsule.
Anthers minutely mucronate or spurred at the base; stamens 4. 15. DYSCHORISTE.
Anthers not spurred at the base.
Corolla subequally 5-lobed.
Corolla-tube long, linear, slender; stamens 2 ..... 16. DÆDALACANTHUS.
Corolla-tube narrow below, usually infundibuliform upwards; stamens 4 (except in *S. reticulatus*) ..... 17. STROBILANTHES.
Corolla deeply 2-lipped; stamens 4 ..... 18. CALACANTHUS.
Corolla-lobes imbricate in bud.
Ovules 3—10 in each cell; capsule normally 6- or more-seeded.
Capsule compressed at right angles to the septum; seeds ovoid, hardly compressed.
Flowers in panicled often unilateral racemes, without axillary cladodes ..... 19. ANDROGRAPHIS.
Flowers clustered in the midst of axillary cladodes ..... 20. HAPLANTHUS.
Capsule subterete; seeds much compressed ..... 21. GYMNOSTACHYUM

Ovules 2 or rarely 1 in each cell.
- Corolla-lobes 5, subequal.
  - Anthers 1-celled.
    - Stamens 4, didynamous; calyx 5-partite, the 2 inner sepals smaller than the outer ..... 22. CROSSANDRA.
  - Anthers 2-celled.
    - Calyx 4-partite, the 2 opposite outer sepals much larger than the inner; stamens 2 only perfect ..... 23 BARLERIA.
    - Calyx 2-lipped, 5-lobed; stamens 4..... 24. NEURACANTHUS.
    - Calyx-segments 5, subequal, small.
      - Stamens 4; corolla-tube inflated above. 25. ASYSTASIA.
      - Stamens 2; corolla-tube long, slender. 26. ERANTHEMUM.
- Corolla distinctly 2-lipped.
  - Stamens 4; anthers 2-celled..... 27. LEPIDAGATHIS.
  - Stamens 2.
    - Anthers 1-celled; bracts larger than the calyx-segments ..... 28. HYPOESTES.
    - Anthers 2-celled.
      - Placentas separating elastically from the valves from the base upwards.
        - Bracts in unilateral spikes ..... 29. RUNGIA.
        - Bracts clustered in the leaf-axils or laxly cymose ..... 30. DICLIPTERA.
      - Placentas not separating elastically from the valves.
        - Anther-cells parallel, subequal; bracts large imbricate ..... 31. ECBOLIUM.
        - Anther-cells one higher up than the other.
          - Anther-cells (at least the lower) with a white basal spur-like appendage.
            - Capsule usually 4-seeded; seeds rough or tuberculate ..... 32. JUSTICIA.
            - Capsule 2-seeded; seeds smooth usually shining... 33. MONECHMA.
          - Anther-cells not spurred at the base.
            - Anther-cells apiculate ..... 34. ADHATODA.
            - Anther-cells muticous.
              - Bracts and bracteoles small, subequal; corolla white..... 35. RHINACANTHUS.
              - Bracts larger than the bracteoles, in opposite valvate pairs; corolla rose or purple. 36. PERISTROPHE.

1. THUNBERGIA, Linn. f.

Climbers. Leaves opposite, often cordate, hastate or angular. Flowers axillary, solitary, or in pairs, or racemose; bracts at the base of the pedicels leaf-like; bracteoles large, the margins cohering at least when young. Calyx small, annular; teeth 10—16 or obscure. Corolla conspicuous; tube swollen, curved; limb oblique with rounded lobes twisted to the left in bud. Stamens 4, didynamous, inserted near the base of the corolla-tube; anthers 2-celled, the cells parallel, oblique, spurred or not at the base; pollen globose, obscurely banded, smooth or most minutely tubercled. Disk annular or cushion-

shaped. **Ovary 2-celled ; ovules 2 in each cell, collateral ; style long ; stigma funnel-like, 2-lobed or entire, or style 2-fid with capitate stigmas. Fruit a capsule, globose below, suddenly narrowed into a** barren sword-shaped beak. Seeds 2 in each cell, ovoid or dorsally compressed, glabrous, base plane or excavated ; funicle minute or conic.—DISTRIB. S.E. Asia, Tropical and S. Africa, Mascarene Islands ; species 96.

Flowers white, solitary or 2 together; calyx deeply 12—15-toothed	1. *T. fragrans.*
Flowers yellow in long pendent racemes; calyx with obscurely crenulate margin	2. *T. mysorensis.*

1. **Thunbergia fragrans,** *Roxb. Cor. Pl.* v. 1 (1795) p. 47, t. 67. A twining perennial ; stems long, slender, dilated at the nodes, sparsely retrorsely hairy or glabrous. Leaves 2—3½ by ¾—1½ in., deltoid-ovate, acute or obtuse, apiculate, entire, or sometimes with a few large angular apiculate lobes at the base, base rounded, cordate or hastate ; petioles ¼—1¼ in. long. Flowers axillary, solitary, or 2 together ; pedicels 1—2 in. long ; bracteoles ¾ by ⅛ in., oblong-lanceolate, acute. Calyx ⅛—⅙ in. long, deeply divided, pubescent ; teeth 12—15, linear-lanceolate, acute. Corolla 1½ in. long, pure white, not fragrant, pubescent outside ; tube ¾—1 in. long, slightly contracted below the limb ; limb with 5 obovate truncate, coarsely toothed, spreading lobes. Capsules glabrous, 1 in. long or more (including the beak), the basal part globose, the beak ¾ in. long, empty, dagger-shaped. Seeds 4 or (by suppression) fewer ⅛ in. in diam., hemispheric, excavated on the plane face, reticulato-rugose. Fl. B. I. v. 4, p. 390 ; Grah. Cat. p. 163 ; Dalz. & Gibs. p. 183 ; Trim. Fl. Ceyl. v. 3, p. 288 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354.—Flowers : Oct.—Nov. VERN. *Chimine.*

KONKAN : *Dalzell & Gibson*; Kanheri jungles, *Graham*; Panchgani, abundant, *Cooke*!, *Woodrow*!, *H. M. Birdwood.*—DISTRIB. Throughout India in elevated districts; Ceylon, Malaya, Philippines, N. Australia.

The specific name is a misnomer if applied to indicate fragrant flowers. In fact, Roxburgh himself (Cor. Pl. l. c.) says "The plant possesses an agreeable fragrance, and the beauty of its flowers, though not fragrant, entitles it to a place in the flower-garden." I am well acquainted with the plant, which grows in profusion about Panchgani, but have never detected any fragrance therefrom. J. Graham (Cat. Bo. Pl.), Dalzell & Gibson (Bo. Fl.), Trimen (Fl. Ceyl.), T. Anderson (Thw. Enum. p. 224), all agree that the flowers are ***not*** fragrant, while Ridley [Trans. Linn. Soc. ser. 2, v. 3 (1893) p. 332] remarks that the plant is no more fragrant in the Malay Peninsula than in Ceylon.

2. **Thunbergia mysorensis,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 448. An extensive glabrous climber with long slender branches. Leaves opposite, 3—5 by 1—1½ in., elliptic-lanceolate, acuminate, glabrous, entire, subcrenate or toothed, base rounded, acute or subcordate ; nerves 3 from the base with reticulate venation between them ; petioles ½—1 in. long. Flowers in long lax pendent racemes ; bracts beneath the pedicels ⅛—½ in. long, linear-lanceolate, very acute ; bracteoles 2 beneath the calyx, 1 in. long, ovate-oblong, acuminate, parallel-nerved, with reticulate venation between the nerves, purplish-green, closed in bud, afterwards opening at first down one side. Calyx about 1/16 in. long, salver-shaped, with an

obscurely crenulate margin, glabrous. Corolla 2-lipped, reaching 2 in. long and as broad across the mouth ; tube purplish ; limb bright-yellow or orange, or maroon-colored. Filaments with a tuft of hairs at the very base ; anthers bearded and with a slender subulate spur ¼—⅓ in. long at the base of each cell. Ovary sunk in a deep fleshy disk ; stigma funnel-shaped. Capsules not seen. Fl. B. I. v. 4, p. 393 ; Talb. Trees, Bomb. ed. 2, p. 260 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Hexacentris mysorensis*, Wight, Icon. t. 871 ; Bot. Mag. (1854) t. 4786 ; Dalz. & Gibs. p. 183.—Flowers : Dec.—Jan.

KANARA : in the evergreen forests of N. Kanara near the falls of Gairsoppa, *Talbot*.

Dalzell (Bo. Fl. p. 183) did not believe that the plant extended far enough from Mysore to reach the Bombay Presidency, although found within the latitude of Dharwar. It is planted in Poona and Mahableshwar.—DISTRIB. Nilgiri hills and Mysore.

Thunbergia grandiflora, Roxb. Hort. Beng. (1814) p. 45. A large climber a native of Eastern Bengal, with large cordate ovate or sometimes angular leaves and racemes of bluish flowers. The plant is propagated by suckers and is of easy culture. Two varieties are cultivated, one with smooth leaves which flowers when of small size, and another with rough hairy leaves of more vigorous growth. Fl. B. I. v. 4, p. 392 ; Grah. Cat. p. 163 ; Dalz. & Gibs. Suppl. p. 70 ; Wight, Icon. t. 872 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 & Gard. in Ind. ed. 5, p. 416.

Thunbergia alata, Boj. ex Sims, Bot. Mag. t. 2591. A twiner very similar in general appearance to *Thunbergia fragrans*, a native of Tropical Africa, but commonly grown in gardens and becoming naturalized. It has orange-yellow, pale-yellow, or sometimes milk-white flowers ; the throat of the corolla is hairy and purple-black or deep claret-colored inside. From the dark-colored eye at the base of the corolla-limb the plant is often called "*Black-eyed Susan*" by Anglo-Indians. Fl. B. I. v. 4, p. 391 ; Dalz. & Gibs. Suppl. p. 71 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354 & Gard. in Ind. ed. 5, p. 417.

Thunbergia erecta, T. Anders. in Journ. Linn. Soc. v. 7 (1864) p. 18. A hardy shrub about 6 ft. high, thriving in bright sunshine, a native of Tropical Africa. It has ovate, acuminate leaves with usually a blunt tooth on each margin towards the upper part. Calyx-teeth 5—9, linear. Corolla purple or white, with a tube 1½ in. long. *Meyenia erecta*, Benth. in Hook. Niger Flor. (1849) p. 476 ; Woodr. Gard. in Ind. ed. 5, p. 415.

2. **MEYENIA**, Nees.

A climber. Leaves opposite. Flowers axillary, large, usually solitary, pedicellate ; bracteoles large, leaf-like, ovate-oblong. Calyx small, 5-lobed (sometimes obscurely so). Corolla infundibuliform, the throat gradually enlarged, often closed with a ring of hairs. Stamens 4, didynamous ; anthers bearded at the apex, the anther-cells

of the longer pair of stamens unequal, more or less divaricate, one cell almost abortive, long and narrow, glabrous, the other cell hirsute and spurred at the base ; anther-cells of the shorter pair of filaments subequal, not spurred at the base ; pollen cog-wheel-shaped (*Kammradpollen*, Lindau, in Engl. & Prantl, Pflanzenf.). Ovary 2-celled ; stigma 2-lobed. Capsule swollen at the base, conical, attenuated upwards, 2-celled and 4-seeded at the base ; dissepiment persistent, adnate to the valves.—DISTRIB. East Indies ; species 1.

1. **Meyenia Hawtayneana,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 78. Scandent, smooth, glaucous ; stem slender, angular. Leaves opposite, sessile, coriaceous, 2—3 by 1—1½ in., ovate, acute, entire, glabrous, smooth and shining above, pale beneath, reticulately veined, base cordate. Flowers in opposite axils ; pedicels ¼—1¼ in. long, with a tuft of dirty-white hairs at the base ; bracteoles 1—1⅛ in. long, ovate-oblong, reticulately veined, apiculate. Calyx about $\frac{1}{10}$ in. long, glabrous ; lobes obscure. Corolla bluish-purple, yellow within the tube, 1½—1¾ in. long, glabrous ; lobes rounded, subequal. Stamens 4, didynamous ; filaments hairy at the base and in the upper part below the anthers ; anthers bearded at the apex, the anther-cells of the longer pair of stamens unequal, one cell almost abortive, narrow, ⅛ in. long, glabrous, the other cell shorter, broader, hirsute, spurred at base ; anther-cells of the shorter pair of filaments subequal, glabrous except at the apex, not spurred at the base. Stigma ⅛ in. long, deeply 2-lobed, each lobe subfunnel-shaped, again divided. Capsules 1—1¼ in. long, swollen at the base, acutely conical above, glabrous ; the valves woody, retrorsely curved. Seeds subhemispheric, excavate at the base. Wight, Icon. t. 1487 ; DC. Prodr. v. 11, p. 60. *Thunbergia Hawtayneana*, Wall. Tent. Flor. Nap. (1826) p. 49 in Obs. : C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 391 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 354.

Rare. S. M. COUNTRY : Dharwar, *Law* !, *Woodrow*. KANARA : *Law* !—DISTRIB. India (W. Peninsula).

3. **TUBIFLORA,** J. F. Gmel. in Linn. Syst. Nat. ed. 13, v. 2 (1791) p. 27.

ELYTRARIA, Michaux, Fl. Bor. Am. v. 1 (1803) p. 8 ; Benth. & Hook. f. Gen. Pl. v. 2, p. 1073.

Herbs ; stems short or almost 0. Leaves alternate, crowded, subradical. Flowers in close rigid simple or divided spikes. Scapes covered by spirally imbricate (not opposite) bracts ; bracteoles smaller than the bracts. Calyx 4-partite ; segments unequal, the largest sometimes 2-fid. Corolla small, white or bluish, 2-lipped ; tube linear ; lobes 5, oblong, imbricate in bud. Stamens 2, perfect, inserted in the corolla-throat ; anthers elliptic, acute, the cells 2, parallel, with or without a minute spur at the base. Disk small. Ovary 2-celled ; ovules 6—10 in each cell, superposed ; style short ; stigma shortly 2-lobed. Capsule ovoid, acute. Seeds minute, ovoid, reticulate, minutely papillose, not supported on retinacula.—DISTRIB.

Species about 3, of which 1 is widely spread in Tropical Africa and Asia.

Though the term *Tubiflora*, a word which is invariably used as an adjective and not a substantive, is objectionable when employed to denote a genus, still the fact remains that this name is 12 years prior to that of *Elytraria*, and its adoption therefore necessary. It has been adopted by Lindau in Engl. & Prantl, Pflanzenf.

1. **Tubiflora acaulis,** *O. Kuntze, Revis. Gen.* v. 1 (1891) p. 500. Stem 0 or scarcely any. Leaves radical, 4—8 by 1¾—3 in., spathulate or oblanceolate, obtuse, more or less crenate, glabrous or nearly so except on the nerves beneath, which are usually more or less hairy, base tapering, running down into a short or long hairy petiole. Scapes several, usually exceeding the leaves, 4—12 in. long, clothed throughout their length with small rigid bracts. Flowers in harsh simple or branched (often 3-branched) spikes ½—4 in. long ; bracts ¼ in. long, ovate, acuminate, sometimes spinous-pointed, glabrous outside, pubescent inside and with ciliate margins ; bracteoles ⅙ in. long, narrowly linear or linear-lanceolate, penicillate at the apex and with scarious ciliate margins. Calyx ⅕ in. long, divided to the base or nearly so ; sepals penicillate at the apex, 3 of them narrowly-lanceolate, the fourth of equal length but twice as broad, sometimes 2-fid at the apex, all with scarious margins. Corolla ¼—⅓ in. long, pale-blue or white ; tube scarcely ⅛ in. long. Anthers not spurred at the base. Capsules ⅕ in. long, ovoid, acute ; valves recurved. Seeds ovoid. Lindau, in Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 289. *Elytraria crenata*, Vahl, Enum. v. 1 (1805) p. 106 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 394 ; Dalz. & Gibs. p. 183 ; Trim. Fl. Ceyl. v. 3, p. 289 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355.—Flowers : Oct. VERN. *Dasmori.*

Not common. GUJARAT : Kundiana (Broach Collectorate), *Dalzell* ! ; Ankleshwar, 4 miles south of the Narbada river, *Kanitkar* ! ; Ahmedabad, *Stocks*, 250 !—DISTRIB. India (W. Peninsula, extending north to Delhi and the E. Himalaya) ; Ceylon, Tropical and S. Africa, Tropical and N. America.

4. NELSONIA, R. Br.

A diffuse softly hairy herb. Leaves opposite, subequal. Flowers small, in dense short spikes ; bracts herbaceous, closely imbricate, alternate or spiral (not opposite). Calyx small, 4-partite ; sepals unequal, lanceolate, the larger often 2-fid. Corolla small, purplish, rose or white ; tube slender ; limb 2-lipped, the lobes obtuse. Stamens 2, inserted above the middle of the tube, subincluded ; anthers 2-celled, the cells elliptic, somewhat divergent, distinct, muticous or minutely spurred. Ovary 2-celled ; ovules 8—10 in each cell, arranged vertically in 2 rows on the double placental line ; style slender ; stigma shortly 2-lobed. Capsule ovoid-conic with 8—16 seeds in the basal half, barren above. Seeds ellipsoid or subglobose, granular, not supported on retinacula.—DISTRIB. S.E. Asia, Africa, America, Australia ; species 1.

1. **Nelsonia campestris,** *R. Br. Prodr.* (1810) p. 481. A diffuse softly villous herb ; stems short ; branches decumbent, spreading. Leaves opposite, elliptic-oblong, obtuse, entire, the lower large

(4—8 in. long) with long petioles (sometimes 2 in. long), the upper leaves shortly petiolate or subsessile, ½—2 in. long, pubescent or canescent. Flowers in ovate or cylindric spikes ½—2 in. long ; bracts ⅛—¼ in. long, broadly ovate, subobtuse, herbaceous, silky-pubescent ; bracteoles represented by 2 opposite tufts of silky hairs below the calyx. Calyx ⅛ in. long, 4-partite ; sepals unequal, lanceolate, very acute, with strong parallel nerves. Corolla ¼ in. long, purplish. Capsules ⅛ in. long, ovoid-conic, glabrous, the valves recurved at the apex. Seeds broadly ellipsoid, brown, granular. Fl. B. I. v. 4, p. 394 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Nelsonia tomentosa*, Dietr. Sp. Pl. v. 1 (1831) p. 419 ; Dalz. & Gibs. p. 183. *N. brunelloides*, O. Kuntze, Revis. Gen. Pl. (1891) p. 493 ; Lindau, in Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 289. *Justicia brunnelloides*, Lam. Tab. Encyc. v. 1 (1791) p. 40.—Flowers : Jan.

KONKAN : *Stocks* ! ; 23 miles east of Ratnagiri, *Kanitkar* ! ; Wari jungles, common, *Dalzell & Gibson*. GUJARAT : Panchmahâls, *Nairne*. KANARA : Kâla naddi, *Ritchie*, 1892 !—DISTRIB. Throughout India (except in the western desert tracts) ; S.E. Asia, Australia, Africa, America.

5. **STAUROGYNE,** Wall.

Herbs (rarely undershrubs). Leaves opposite (rarely alternate). Flowers in terminal or pseudo-axillary simple or compound lax or dense racemes or spikes ; bracts usually foliaceous ; bracteoles 2 beneath the calyx, shorter than the bracts. Calyx divided nearly to the base ; segments 5, oblong or linear, subequal or one larger than the others. Corolla 2-lipped ; tube long or short, cylindric or slightly infundibuliform ; lobes 5, short, spreading. Stamens 4, didynamous, usually included ; filaments usually hairy ; anthers with 2 ovoid separate muticous cells. Disk inconspicuous. Ovary 2-celled ; ovules numerous ; style linear ; stigma of 2 narrow lobes, the lower lobe sometimes again 2-lobed. Capsule small, oblong, seed-bearing throughout. Seeds 15—30 in each cell, small, globose or cuboid, glandular when immature, ultimately nearly smooth or with obscure shallow pits ; retinacula 0.—DISTRIB. S.E. Asia, Malaya, Australia, Brazil ; species about 40.

Stem 12—15 in. high, viscous-pubescent ; branches not trailing	1. *S. glauca*.
Stem short, not viscous-pubescent ; branches trailing	2. *S. zeylanica*.

1. **Staurogyne glauca,** *O. Kuntze, Revis. Gen.* v. 1 (1891) p. 497. Stem erect, 12—15 in. high, viscous-pubescent upwards. Leaves 1½—2 by ½—⅝ in., the lower opposite, the upper alternate, or sometimes nearly all alternate, spathulate, obtuse, slightly viscous-pubescent or glabrous, base attenuated, running down into the petiole ; petioles ¼—½ in. long. Spikes 2—6 in. long ; bracts at the base of the spike similar to the stem-leaves, gradually becoming smaller upwards ; bracteoles 2, beneath the calyx, ¼ in. long, linear-oblong or slightly spathulate, obtuse, pubescent, with a strong mid-nerve. Calyx divided to the base or nearly so ; sepals glandular-hairy, the larger ⅓ in. long, linear-oblong, subobtuse, much broader than the other 4, which are ¼ in. long and linear-subulate. Corolla

$\frac{1}{3}$—$\frac{1}{2}$ in. long, straight ; tube cylindric ; lobes 5, rounded, $\frac{1}{10}$ in. long. Filaments pubescent ; anther-cells muticous or very slightly apiculate at the base. Stigma of 2 unequal acute lobes, the lower one reflexed, sometimes 2-fid. Capsules membranous, $\frac{1}{2}$ in. long, oblong, obtuse, shortly apiculate, glabrous, bearing seeds from the base nearly to the apex. Seeds minute, globose. *Ebermaiera glauca*, Nees, in DC. Prodr. v. 11 (1847) p. 73 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 395 ; Dalz. & Gibs. p. 184 ; Wight, Icon. t. 1488 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355.

Not common. KONKAN : *Stocks* ! S. Konkan, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula, Bengal, Tenasserim).

2. **Staurogyne zeylanica,** *O. Kuntze, Revis. Gen.* v. 1 (1891) p. 497. Stem short, erect, usually with long procumbent trailing pubescent branches. Leaves often red beneath (*Dalzell & Gibson*), those of the main stem 1$\frac{1}{2}$—3 by $\frac{3}{4}$—1$\frac{1}{8}$ in., with long petioles, those of the branches $\frac{1}{2}$—1$\frac{1}{2}$ by $\frac{1}{3}$—$\frac{5}{8}$ in., with short petioles or subsessile, elliptic or slightly obovate, subobtuse, more or less pubescent, pale beneath, base of the stem-leaves much attenuated into the petiole. Flowers in dense spikes 1—2 in. long ; bracts foliaceous, hairy and ciliate, $\frac{3}{8}$ by $\frac{1}{8}$ in., obovate, apiculate, with strong mid- and marginal-nerves ; bracteoles $\frac{1}{3}$ in. long, linear-oblong, bristly. Calyx densely bristly, divided to the base or nearly so, the large sepal $\frac{1}{3}$ by $\frac{1}{16}$ in., linear-oblong, subobtuse with a strong mid-nerve, the other 4 sepals slightly shorter and much narrower, linear-subulate. Corolla $\frac{3}{8}$ in. long ; lobes about $\frac{1}{12}$ in. long, oblong, rounded. Filaments hairy. Stigma of 2 unequal acute lobes, the lower lobe sometimes 2-fid. Capsules $\frac{1}{3}$ in. long, narrowly oblong, obtuse, apiculate. Seeds subglobose or ellipsoid, distantly pitted. *Ebermaiera zeylanica*, Nees, in DC. Prodr. v. 11 (1847) p. 74 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 397 ; Trim. Fl. Ceyl. v. 3, p. 290 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Erythracanthus elongatus*, Dalz. & Gibs. p. 184 (*not* of Nees).

Not common. KONKAN : *Stocks* !, *Dalzell* ! ; Wari jungles, *Dalzell & Gibson*. KANARA : Supa on the Kála naddi, *Ritchie*, 1212 !—DISTRIB. India (W. Peninsula) ; Ceylon.

6. **CARDANTHERA,** Buch.-Ham. ex Voigt, Hort. Suburb. Calc. (1845) p. 482.

Aromatic often viscid herbs. Leaves opposite, the upper toothed (rarely entire) the lower often pinnatifid or, if submerged, pectinate. Flowers in spikes or whorls or 1—3 together in opposite axils ; bracts or bracteoles often suppressed. Calyx divided almost to the base ; sepals 5, narrow, often unequal. Corolla 2-lipped ; tube nearly straight, shorter than the calyx ; limb long, the lobes twisted to the left ; throat with a transversely plaited palate. Stamens 4, didynamous ; anthers of the upper pair often smaller, the cells parallel. Ovary narrow, 2-celled ; ovules many. Capsule sessile, narrow, seed-bearing throughout. Seeds 40—100, small, ovoid, somewhat compressed, glandular-puberulous or glabrous ; retinacula minute, conical, soft, straight.—DISTRIB. Species 10, of which 2 are African, the others Indian.

Lindau (Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 295) has adopted for this genus the name *Synnema*, under, it would appear, the erroneous impression that it was the older name. The genus *Synnema* is due to Bentham (DC. Prodr. v. 10 (1846) p. 538). *Cardanthera* appears in DC. Prodr. (v. 11 (1847) p. 67), and were this its first publication it would have been subsequent to *Synnema*. It had, however, been previously (1845) published by Voigt (l. c.) as due to Buchanan.

1. **Cardanthera pinnatifida,** *Benth. in Gen. Pl.* v. 2 (1876) pp. 1074—75, ex *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4, p. 405. A slender glandular-pubescent herb 1—2 ft. high; stem obtusely 4-gonous, glandular-pubescent, swollen at the nodes. Leaves 2—4 by ½—1 in., oblong-lanceolate, subobtuse, glandular-pubescent, deeply pinnatifid; lobes numerous, oblique, linear-oblong, obtuse, entire or serrulate. Flowers usually solitary in opposite axils (sometimes in lax spikes); bracts ¼—⅓ in. long, elliptic-oblong, glandular-pubescent, often with a serrate tooth near the apex; bracteoles ¼ in. long, oblong, obtuse, glandular-hairy, sometimes suppressed. Calyx rather more than ¼ in. long, divided to the base or nearly so; sepals narrow (1/50 - 1/10 in. wide), linear-subspathulate, sometimes with small scattered teeth on the margin, ciliate. Corolla purple, ½ in. long, 2-lipped; tube enlarged below the limb; upper lip with 2 oblong obtuse lobes; lower lip equally 3-lobed, bullate. Stamens 4 fertile; filaments glabrous; anther-cells parallel, equal, muticous at the base. Capsules ¾ in. long, narrowly oblong, pointed, glabrous. Seeds small, supported on minute conical (not curved) soft retinacula. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Nomaphila pinnatifida*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 38; Dalz. & Gibs. p. 184; Hook. Icon. t. 843. *Adenosma pinnatifida*, T. Anders. in Journ. Linn. Soc. v. 9, p. 455; Bedd. Icon. Pl. Ind. Or. t. 246.—Flowers: Jan.—Mar.

KONKAN: river-banks of the S. Konkan, *Dalzell & Gibson*; near running streams at the foot of the Ghâts, *Dalzell*! DECCAN: *Stocks*! S. M. COUNTRY: Mulas, *Ritchie*, 1932! KANARA: Devimani Ghât (N. Kanara), *Woodrow*!—DISTRIB. India (W. Peninsula).

7. **BLEPHARIS,** Juss.

Undershrubs often spinous or with spinous-toothed leaves. Leaves opposite or 4-nately whorled. Flowers in terminal spikes or on suppressed lateral branches, strobilate, tetrastichous or capitate and few-flowered, or axillary and 1-flowered, bracteolate. Calyx 4-partite nearly to the base; segments unequal, in opposite pairs, one of the larger pair emarginate or 2-lobed, the 2 inner segments much shorter and narrower. Corolla 2-lipped; tube rigid; upper lip subobsolete; lower lip spreading, nearly flat, obovate or oblong, with 3—5 rounded lobes, purple, blue or white. Stamens 4, didynamous; filaments thick, rigid, those of the lower stamens produced beyond the attachment of the anthers; anthers with 1 large cell with densely bearded margins, the other cell small or obsolete. Disk annular. Ovary 2-celled, ovules 2 in each cell; style linear; stigma shortly 2-fid. Capsule oblong, scarcely contracted at the base, 2—4-seeded. Seeds compressed, orbicular, echinate, supported on rigid retinacula.—DISTRIB. Mostly African; a few species in India; species 50.

Leaves in opposite pairs ..... 1. *B. asperrima*
Leaves 4 in a whorl.
Herbs; flowers solitary or 2—3 together.
Leaves petiolate, thin, acute ..... 2. *B. boerhaviæfolia.*
Leaves subsessile, thick and fleshy, obtuse ..... 3. *B. molluginifolia.*
A small shrub; flowers in strobilate spikes ..... 4. *B. sindica.*

1. **Blepharis asperrima,** *Nees, in DC. Prodr.* v. 11 (1847) p. 267. Stems 8—24 in. long, suberect or prostrate and rooting at the nodes, pale, striate, glabrous or nearly so, usually with a few hairs at the nodes. Leaves opposite, 2—3 by ¾—1¾ in., ovate-lanceolate, acute or acuminate, finely apiculate, entire or spinous-dentate, rough on both surfaces with sharp bulbous-based hairs, base tapering; main nerves 4—6 pairs; petioles ⅛—½ in. long, hairy. Flowers solitary, sessile in the upper axils, or in terminal short spikes; bracteoles in 3 opposite pairs, the outer ⅓—¾ by ¼ (but somewhat variable in length), ovate-lanceolate, acute, apiculate, hairy, the second pair rather more than ½ in. long, cuneiform, with 3 lanceolate spinescent teeth at the apex, the middle tooth the shortest, the innermost pair ¾ in. long, linear-subspathulate, apiculate, all green in the upper, membranous and white with green veins in the lower part. Calyx divided to the base or nearly so, the two longer segments 1 in. long, oblong-spathulate, one of them acutely 2-lobed, the other subacute at the apex, green in the upper, white with green veins in the lower part, the other 2 segments ½ in. long, lanceolate, acute, white with a green midrib. Corolla 1 in. long, blue with darker veins or white; upper lip 0; lower lip oblong, 3-fid, hairy above and with yellow hairs in the throat; lobes ⅛ in. long, oblong, rounded. Capsules less than ½ in. long, oblong, apiculate, 2-seeded. Seeds ⅛ in. long, ovoid, compressed, closely echinate with soft obtuse spines. Fl. B. I. v. 4, p. 478; Dalz. & Gibs. p. 192; Wight, Icon. t. 1534; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers: Oct.—Dec. VERN. *Dikna*: *Akada.*

Common on the Konkan and Deccan hills. KONKAN: *Stocks*!, *Law*!, *Kanitkar*!; Revadanda, *Woodrow*. DECCAN: Sinhagad, *Bhiva*!; Igatpuri, *Edgeworth*!; Mahableshwar, *Cooke*! KANARA: Kála naddi, *Ritchie*, 597!—DISTRIB. India (W. Peninsula), apparently endemic.

2. **Blepharis boerhaviæfolia,** *Pers. Syn.* v. 2 (1807) p. 180. Stems prostrate, 6—20 in. long, wiry, rooting at the nodes, much divaricately branched, pubescent. Leaves in a whorl of 4, unequal, 1—2¼ by ½—1¼ in., thinly membranous, elliptic or slightly obovate, acute, finely apiculate, entire or with a few coarse distant serratures on the margin, ciliate, appressedly pubescent above, paler and glabrous (except on the nerves) beneath; petioles ½ in. long. Flowers axillary, solitary or 2 or 3 together; bracteoles 8 in opposite pairs becoming larger upwards, the outermost pair ⅛ in. long, the second pair ⅛ in., the third pair ¼—⅜ in. long, all 3 pairs cuneiform below, broadly spathulate and rounded above, strongly 3-nerved, furnished on the upper margin with stiff acute, retrorsely hairy bristles $\frac{1}{16}$—⅛ in. long, the fourth (innermost) pair of bracts unlike the others, rather more than ¼ in. long, linear with a flat rounded apex, strongly 3-nerved, and furnished on the apical margin with retrorsely hairy acute

bristles as the 3 outer pairs, all 4 pairs of bracteoles white with green veins. Calyx-segments lanceolate, acute; the largest ½ in. long, pubescent and ciliate, 3-nerved from the base; the opposite segment ⅜ in. long, acutely and shortly 2-toothed, pubescent and ciliate, 2-nerved, one nerve running into each tooth; the 2 lateral segments ¼ in. long with a strong midnerve, ciliate. Corolla ½—⅝ in. long, pubescent, pale blue with a yellow spot on the lower lip. Capsules ¼—⅓ in. long, ovoid, usually 2-seeded. Seeds echinate with obtuse spines. Fl. B. I. v. 4, p. 478; Grah. Cat. p. 160; Dalz. & Gibs. p. 192; Wight, Icon. t. 458; Trim. Fl. Ceyl. v. 3, p. 316; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers: Oct.—Dec.

KONKAN: *Stocks*! S. M. COUNTRY: Belgaum, *Ritchie*, 1842! GUJARAT: Ahmedabad, *Cooke*!; Sidpur near Ahmedabad, *Stocks*, 242!; Surat, *Woodrow*; Rajkot (Kathiawar), *Woodrow*.—DISTRIB. India (W. Peninsula, Pegu, Behar, Chota-Nagpur, Orissa); Ceylon, Ava, Tropical and S. Africa.

3. **Blepharis molluginifolia,** *Pers. Syn.* v. 2 (1807) p. 180. Stems prostrate, wiry, slender, more or less hispid. Leaves subsessile in a whorl of 4, unequal, fleshy, ⅓—1 by ⅛—⅓ in., oblong-obovate, usually obtuse, mucronate, entire, more or less hairy or minutely scabrous, pale beneath. Flowers sessile, solitary, axillary; bracteoles 10 in opposite pairs; those of the first (outermost) pair 1/10 in., of the second pair ⅛ in., of the third ⅙ in., and of the fourth ¼ in. long, all broadly obovate concave, strongly 3-nerved, furnished on the rounded apical margins with a row of long, gland-tipped, shortly retrorsely-hairy bristles, the fifth (innermost) pair of bracteoles unlike the others, ⅜ in. long (including the apical mucro), oblolng or oblong-spathulate with a long spinulose mucro about 1/10 in. long in the centre of the apex, sometimes with 1 or 2 shorter ones by its side. Calyx divided nearly to the base; segments linear-lanceolate, acute, with membranous margins, one segment exceeding ⅜ in. long, acuminate, strongly 3-nerved, the opposite segment very little shorter, acutely 2-toothed at the apex, 2-nerved (a nerve running into each tooth), the lateral segments ⅓ in. long, 1-nerved. Corolla blue, ⅜ in. long; tube 1/10 in. long; lower lip pubescent on both sides, the lobes 1/10 in. long, obtuse, the mid-lobe the narrowest. Capsules ¼ in. long, ellipsoid, compressed, glabrous, completely enclosed in the persistent sepals, 2-seeded. Seeds ⅛ in. long, broadly ellipsoid, compressed, with hairs which when moistened are much longer than the nucleus. Fl. B. I. v. 4, p. 479; Grah. Cat. p. 160; Dalz. & Gibs. p. 192; Trim. Fl. Ceyl. v. 3, p. 316; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers: Sept.—Oct. VERN. *Kántemaka.*

KONKAN: growing freely near the sea, *Nairne;* Bassein, *Dalzell & Gibson.* DECCAN: Poona, *Woodrow*! S. M. COUNTRY: Belgaum, *Ritchie*, 1949!; Badami, *Woodrow*. GUJARAT: Ahmedabad, *Cooke*!; Kernali, *Kanitkar*!—DISTRIB. India (W. Peninsula, Chota-Nagpur, Delhi); Ceylon, Tropical and S. Africa.

In this, as in the 2 preceding species, I have called the bracts immediately beneath the calyx *"bracteoles,"* which, considering their position relatively to the calyx, seems to me a better name than *bracts.* There appears to be much diversity of opinion among authors as to the most suitable term to employ for them, some authors considering the inner pair only to be *bracteoles,* while one author describes the flowers of *B. molluginifolia* as bracteolate in one publication, ebracteolate in another.

4. **Blepharis sindica,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 500. A small dichotomously branched shrub ; stem usually very short, sometimes almost 0 ; branches ash-colored, slender, subterete, clothed with very short hairs. Leaves sessile in a whorl of 4, unequal, 1—2½ by $\frac{1}{16}$—$\frac{1}{8}$ in., linear, acute, sometimes with a few small spinous teeth near the base, finely apiculate, rough with short stiff hairs, margins recurved, midrib strong beneath. Flowers in strobilate subsessile hairy spikes 1—3 in. long, in the forks of the branches, solitary or few or many together on the top of a very short stout woody peduncle, usually numerous in the lowest fork, solitary in the upper ; bracts quadrifarious, ½—1 by ⅓—½ in., the lowest the smallest, hairy on both sides, ovate, suddenly acuminate, spinous-pointed, 5-nerved, more or less recurved above, the upper part of each armed with long, distant, usually recurved sharp slender spines ; bracteoles 2 beneath the calyx, rather less than ½ in. long, lanceolate, acute, hairy and ciliate, reticulately veined and with a strong midnerve. Calyx divided almost to the base, softly hairy on both surfaces ; the larger segment ½ by ¼ in., ovate, shortly and bluntly acuminate, truncate at the apex, 7-nerved, the 3 midnerves parallel and continued beyond the truncate densely ciliate apex into 3 bristly teeth ; the opposite calyx-segment ⅜ by ⅛ in., of similar shape, the 3 parallel nerves less strong, not produced into teeth at the truncate or slightly emarginate ciliate apex ; lateral segments ⅛ in. long, ovate, acute, 1-nerved. Corolla ⅓—½ in. long ; middle lobe of lower lip quadrate, truncate, twice as long and twice as broad as the rounded lateral ones ; tube ⅛ in. long, constricted below the limb. Capsules ⅓ by ⅛ in., ellipsoid, compressed, narrowed at both ends, glabrous, shining. Seeds ⅛ in. long, ovoid, compressed, densely clothed with thick hairs which are longer than the nucleus. Fl. B. I. v. 4, p. 479 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Acanthodium grossum*, Wight, Icon. tt. 1535 & 1536 (middle lobe of the lower lip of the corolla not well shewn), *not* of Nees.—Flowers : Aug.—Sept. VERN. *Jasad.*

Tolerably common in Sind, also found at Deesa. GUJARAT : Deesa, *Stocks*! SIND : *Stocks*!, *Dalzell*, 29!, *Woodrow*!, *Bhola Puran*! ; Karachi, *Cooke*! ; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Panjáb).

Very near to *Blepharis linariæfolia* (Pers. Syn. v. 2 (1807) p. 180), a Tropical African plant, from which, however, I consider it distinct. The corolla differs from that of the African plant. T. Anderson in Journ. Linn. Soc. v. 7, p. 36, and in several manuscript notes which I have seen, is most emphatic in his opinion as to the non-identity of the 2 species.

EXCLUDED SPECIES.

BLEPHARIS EDULIS, Pers. Syn. v. 2 (1807) p. 180. This plant, which is said to occur in Sind, has not been hitherto found in that Province. The specimens in Herb. Kew. collected by Stocks are all from Beluchistan. The plant is widely distributed, occurring in Abyssinia, Nubia, Egypt, Arabia Petræa and Arabia Felix, and Persia.

8. ACANTHUS, Linn.

Erect or twining herbs or shrubs. Leaves pinnatifid, toothed, spinous or rarely entire. Flowers in terminal densely strobilate or

interrupted spikes ; bracts large, ovate, spinescent or small ; bracteoles large, lanceolate, rarely 0. Calyx divided almost to the base ; segments 4, in 2 opposite pairs, the outer the larger. Corolla 2-lipped ; upper lip subobsolete, the lower lip blue or white, elongate, obovate, shortly obtusely 3-lobed. Stamens 4, didynamous, shorter than the lower lip ; filaments stout, narrowed, curved below the anther, not produced at the apex ; anthers oblong, 1-celled, bearded. Disk 0. Ovary 2-celled ; ovules 2 in each cell ; style acute at the tip ; stigma shortly 2-fid. Capsule ellipsoid, compressed, shining, brown, 4-seeded. Seeds compressed, orbicular, glabrous ; testa lax.—DISTRIB. Species about 10, extending from S. Europe and Africa to Malaya, Australia, and Polynesia.

1. **Acanthus ilicifolius,** *Linn. Sp. Pl.* (1753) p. 639. Stems several, erect, scarcely branched, cylindric, stout, glabrous. Leaves like those of the holly, 3—6 by 2—2½ in., oblong or elliptic, usually pinnatifid or toothed, rigid, acute or truncate at the apex, with sharp spinous teeth on the margin terminating the lateral nerves and the midrib ; nerves strong and conspicuous ; petioles ¼ in. long, each with 2 stipule-like spines at the base. Flowers sessile in opposite pairs, in terminal crowded or interrupted spikes varying much in length (4—15 in.) ; bracts ½—⅝ in. long, ovate, acute, glabrous ; bracteoles similar, ¼—⅓ in. long. Calyx glabrous ; outer segments ⅝ in. long, elliptic-oblong, obtuse, mucronulate ; inner segments ½ in. long, oblong, rounded and ciliate at the apex, slightly apiculate. Corolla 1¼—1¾ in. long, blue ; lower lip obovate, nearly 1 in. broad, hairy on the upper surface, very shortly 3-lobed, the lobes rounded, the middle one much narrower than the lateral. Filaments thick, glabrous, slightly striate ; anthers densely bearded. Style glabrous. Capsules 1 in. long, oblong, obtuse, apiculate, brown, smooth and shining. Seeds ¼ in. in diam., broadly ovoid or suborbicular, much compressed ; testa very lax. Fl. B. I. v. 4, p. 481 ; Grah. Cat. p. 159 ; Trim. Fl. Ceyl. v. 3, p. 317 ; Talb. Trees, Bomb. ed. 2, p. 264 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356 ; Watt, Dict. Econ. Prod. v. 1, p. 66. *Dilivaria ilicifolia,* Juss. Gen. (1789) p. 103 ; Wight, Icon. t. 459 ; Dalz. & Gibs. p. 192.—Flowers : Apr.—May. VERN. *Márándi.*

Common along the coast in tidal swamps and along the banks of creeks and tidal rivers.—It is often called the *Sea Holly.*—DISTRIB. Sea-coast of India ; Ceylon, Malaya, Philippines, Australia, Tropical and S. Africa.

9. ASTERACANTHA, Nees.

A stout herb growing in wet places ; stems numerous, fasciculate, spinous at the nodes. Leaves narrow, lanceolate, in whorls of 6, the 2 outer leaves of the whorl the larger. Flowers in sessile axillary verticels surrounded by rigid spines ; bracts leaf-like ; bracteoles linear-lanceolate. Calyx 4-partite to the base or nearly so, the upper sepal the broader. Corolla deeply bilabiate, the upper lip 2-lobed, the lower 3-lobed and with 2 callosities on the palate. Stamens 4, didynamous ; anthers 2-celled, equal, the cells parallel, glabrous, muticous. Ovary 2-celled ; ovules 4 in each cell ; style

pubescent ; stigma simple, acuminate. Capsule 2-celled, compressed, 4—8-seeded at the base. Seeds hygroscopically white-hairy, supported on hard retinacula.—DISTRIB. Tropical and Subtropical Asia and Africa ; species 1.

I have followed Lindau (Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 297) in separating this from *Hygrophila* and restoring it to its pristine rank as a distinct genus.

1. **Asteracantha longifolia,** *Nees, in Wall. Pl. As. Rar.* **v. 3** (1832) p. 90. A stout herb with numerous fasciculate usually unbranched subquadrangular erect stems 2—5 ft. high, thickened at the nodes, more or less hispid with long hairs, especially below each node. Leaves sparsely hispid on both sides, tapering at the base, sessile (or at least without clearly defined petioles), in verticels of 6 at a node, the 2 outer leaves of the whorl large, reaching 7 by ½—1¼ in., oblong-lanceolate or oblanceolate, the 4 inner leaves reaching about 1½ in. long, each of the 6 leaves with a nearly straight sharp yellow spine, 1—1¾ in. long, in its axil. Flowers in a whorl of 8 (in 4 pairs) at each node ; bracts about 1 in. long, like the leaves, lanceolate, hairy and ciliate ; bracteoles ¾ in. long, linear-lanceolate, with hyaline margins in the lower part, hairy and ciliate with long white hairs. Calyx 4-partite ; upper sepal ⅝—¾ in. long, broader than the other 3, which are ½ in. long, all linear-lanceolate, coarsely hairy on the back, and with hyaline ciliate margins. Corolla purple-blue, reaching 1¼ in. long, widely 2-lipped ; tube ⅝ in. long, abruptly swollen at the top ; lips subequal, ⅝ in. long, the upper lip 2-fid with oblong truncate lobes, the lower lip with 2 entire crest-like longitudinal folds or callosities on the palate, deeply 3-lobed, the lobes oblong or slightly obovate, rounded or truncate. Filaments quite glabrous, one short and one long filament of each pair united at the base. Style slightly pubescent, filiform. Capsules ½ in. long, linear-oblong, pointed, 4—8-seeded. DC. Prodr. v. 11 (1847) p. 247 ; Wight, Icon. t. 449 ; Dalz. & Gibs. p. 189 ; Lindau, in Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 297. *Barleria longifolia,* Linn. Amœn. Acad. v. 4, p. 320 ; Grah. Cat. p. 161. *Hygrophila spinosa,* T. Anders. in Thw. Enum. (1860) p. 225 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 408 ; Trim. Fl. Ceyl. v. 3, p. 293 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 ; Watt, Dict. Econ. Prodr. v. 4, p. 316.—Flowers : June—Jan. VERN. *Kolshindá* (plant); *Tálimkhána* (seeds).

Common throughout the Presidency in swampy places. KONKAN : *Stocks* ! ; Bombay, *Law* ! ; Neral, *Cooke* ! DECCAN : widely, *Woodrow* ; Poona, *Cooke* !, *Woodrow* !—DISTRIB. Throughout India ; Ceylon, Tropical and S. Africa.

The whole plant, as well as its root and seeds, is used medicinally. The seeds are an article of commerce in Indian markets. See Watt, Dict. Econ. Prod. l. c.

10. HYGROPHILA, R. Br.

Herbs, occasionally spinescent. Leaves opposite, lanceolate or obovate, entire. Flowers sessile in terminal heads or axillary whorls ; bracts elliptic or lanceolate ; bracteoles linear or lanceolate. Calyx tubular, 5-fid ; teeth lanceolate or linear. Corolla bluish-purple,

2-lipped ; tube swollen at top ; lobes twisted to the left in bud. Stamens 4, didynamous, the upper pair similar to the lower or smaller, or sometimes rudimentary ; filaments glabrous ; anthers oblong, the cells equal, divaricate or connate at the base. Ovary 2-celled, oblong, with a hairy tip ; ovules 4—many in each cell (rarely 2) ; style long, hairy ; stigma simple, linear. Capsule linear or narrowly oblong, bearing seeds from the base. Seeds few, ovoid, compressed, hygroscopically white-hairy ; retinacula hardened, acute, curved.—DISTRIB. Tropical and subtropical regions ; species exceeding 20.

Flowers in terminal spikes.	
Stamens 2 fertile, the upper pair reduced to teeth; seeds 20 or more	1. *H. polysperma.*
Stamens 4 fertile, the anthers of the upper pair ½ as long as those of the lower; seeds 8—10	2. *H. Serpyllum.*
Flowers in axillary whorls. Stamens 4; anthers subequal; seeds 20—28	3. *H. angustifolia.*

1. **Hygrophila polysperma,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 456. A small procumbent herb 6—12 in., much-branched, the branches often rooting near the base. Leaves subsessile, variable, ½—1½ by ⅛—½ in., from narrowly oblong to ovate, subobtuse, entire or nearly so, mostly glabrous, base usually tapering. Flowers in terminal dense oblong spikes 1—4 in. long ; bracts ¼—⅓ by ⅛ in., elliptic-oblong, obtuse, pubescent on both sides and with a strong midnerve ; bracteoles ¼ in. long, linear (less than 1/20 in. broad). Calyx tubular, ⅕ in. long, pubescent, divided rather more than ½-way down ; teeth 5, narrowly linear, hairy, with scarious ciliate margins. Corolla ⅓ in. long, pale-blue, 2-lipped, pubescent. Stamens 2 fertile, the upper stamens reduced to teeth ; filaments filiform ; anther-cells parallel, equal, muticous. Capsules ⅜ by 1/16 in., narrowly oblong, very shortly apiculate, glabrous ; valves recurved after dehiscence. Seeds 20—32, orbicular, on hard slender curved retinacula. Fl. B. I. v. 4, p. 406 ; Aitch. Pb. & Sind Pl. p. 111 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Hemiadelphis polysperma,* Nees, in Wall. Pl. As. Rar. v. 3, p. 80 ; Wight, Icon. t. 1492.—Flowers : Sept.—Oct.

S. M. COUNTRY : north of Dharwar, *Ritchie,* 1152! KANARA : Hangal, *Bhiva* ! GUJARAT : Veráwal (Kathiawar), *Woodrow* ! ; Rajkot (Kathiawar), *Woodrow* ! SIND : *Stocks* !—DISTRIB. Throughout India in wet places ; Afghanistan.

2. **Hygrophila Serpyllum,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 456. A procumbent herb ; rootstock woody ; stem 4—15 in. long, glabrous or sparsely hairy. Leaves ⅜—1¼ by ¼—⅝ in., elliptic or sometimes suborbicular, entire, more or less hairy on both sides ; petioles ⅛ in. long (sometimes in some of the basal leaves ½—1 in. long). Flowers in terminal dense or lax spikes ; bracts ¼ in. long, elliptic, subacute, hairy ; bracteoles ¼ in. long, oblong or oblong-lanceolate, subacute, hairy. Calyx ⅕—¼ in. long ; sepals narrowly linear, densely ciliate. Corolla ½ in. long ; limb about ⅛ in. long, conspicuously 2-lipped, the upper lip shorter than the lower, with 2 short oblong obtuse lobes, the lower lip bullate, shortly

3-lobed, the mid-lobe slightly larger than the lateral ones; tube ventricose upwards. Filaments glabrous; anthers of the lower stamens the larger, $\frac{1}{12}$ by $\frac{1}{30}$ in., those of the upper stamens $\frac{1}{25}$ by $\frac{1}{40}$ in. Style pubescent. Capsules $\frac{1}{2}$ in. long, linear-oblong, pointed, glabrous; valves grooved on the back. Seeds 8—10, orbicular-ovoid. Fl. B. I. v. 4, p. 406; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Physichilus Serpyllum,* Nees, in Hook. Comp. Bot. Mag. v. 2, p. 311; Dalz. & Gibs. p. 184; Wight, Icon. t. 1493.—Flowers: Sept.—Jan. VERN. *Rán-tewan.*

KONKAN: *Law,* 148!, *Stocks*!, *Dalzell*!; island of Bombay, *Dalzell & Gibson*; Panvel, *Kanitkar*! DECCAN: *Stocks*!; Khandala, *Cooke*!; Mahableshwar, *Cooke*!; Poona, *Woodrow*!—DISTRIB. India (W. Peninsula).

VAR. *Hookeriana,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 407. A larger plant. Leaves orbicular, obtuse, often 1 in. in diam.; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long, with minute white bristly hairs.

KONKAN: *Stocks*!, *Law*!

3. **Hygrophila angustifolia,** *R. Br. Prodr.* (1810) p. 479. Herbaceous, erect, often much-branched, 1—3 ft. high; stems obtusely subquadrangular, glabrous or with finely appressed pubescence. Leaves glabrous, usually entire, variable, $\frac{3}{4}$—3 by $\frac{1}{4}$—$\frac{5}{8}$ in.; lower sometimes obovate or oblong; upper lanceolate; petioles 0—$\frac{1}{4}$ in. long. Flowers sessile, in dense opposite axillary clusters forming rather distant whorls; bracts $\frac{1}{6}$ in. long, oblong, subobtuse, hairy; bracteoles $\frac{1}{8}$ in. long, lanceolate, acute, hairy. Calyx tubular, divided $\frac{1}{2}$-way down in flower; teeth linear from a broad base, acute, hairy. Corolla hairy outside, pale purplish-blue, $\frac{1}{2}$—$\frac{3}{8}$ in. long; tube much and abruptly swollen above, hairy within at and below the insertion of the stamens; limb conspicuously 2-lipped, the upper lip ovate-oblong, shortly 2-lobed, the lower lip $\frac{1}{8}$—$\frac{1}{4}$ in. long, oblong, hairy inside and with 3 short subequal rounded lobes. Stamens didynamous; filaments hairy at the base. Style pubescent. Capsules $\frac{1}{2}$—$\frac{2}{3}$ in. long, narrow, subquadrangular. Seeds 20—28, orbicular. *Hygrophila salicifolia,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 81; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 407; Wight, Icon. t. 1490; Dalz & Gibs. p. 184; Trim. Fl. Ceyl. v. 3, p. 293; Watt, Dict. Econ. Prod. v. 4, p. 315.—Flowers: Dec.

KONKAN: *Stocks*!; wet places in S. Konkan, *Dalzell & Gibson.* KANARA: Supa, inundated banks of the Kála naddi, *Ritchie,* 1209!—DISTRIB. More or less throughout India; Ceylon.

EXCLUDED SPECIES.

HYGROPHILA STOCKSII, T. Anders. MS. ex C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 407. The specimens on the single sheet in Herb. Kew. (*Physichilus* no. 4 in Herb. Hook. & Thoms.) are clearly nothing more than luxuriant forms of *H. Serpyllum.* The anthers are the same as in that species, giving the same measurements. The sheet bears in one corner *in pencil* the words *Hygrophila Stocksii,* T. Anderson, but there is no evidence to shew when this was written. It might have been subsequent to or have been prior to the publication of Anderson's Indian Acanthaceæ in v. 9 of the Journal of the Linnean Society (1867). Dr. Anderson died in 1870. In the publication referred to, however (p. 456), T. Anderson makes the

following remarks (quoted below *in extenso*) regarding these very same specimens :—

"This is evidently a variable plant and is much influenced by the nature of the soil in which it is found. Some luxuriant forms of it were distributed in the Indian Herbarium of Drs. Hooker & Thomson under the numbers *Physichilus* sp. 2, 3, and 4."

11. **RUELLIA,** Linn.

Herbs or undershrubs. Leaves opposite, subentire. Flowers sessile or subsessile, solitary or in clusters or racemes ; bracts 0 ; bracteoles large, usually exceeding the calyx. Calyx 5-partite or 5-fid ; segments subequal, narrow, acute. Corolla oblique ; tube ventricose ; lobes subequal, rounded, twisted to the left in bud, spreading in flower. Stamens 4, didynamous ; filaments glabrous or sometimes hairy at the base ; anthers subequal, 2-celled, the cells oblong, muticous, glabrous ; pollen globose, reticulate or honeycombed. Ovary 2-celled ; ovules 3—10 in each cell ; style linear, hairy ; stigma with one oblong-linear branch, the other suppressed or nearly so. Capsule clavate, cylindric, seed-bearing upwards, solid at the base below. Seeds large, thin, discoid, margined, hygroscopically hairy ; retinacula large, strong, hooked.—DISTRIB. All warm regions ; species about 200.

The generic character is narrowed to the section *Dipteracanthus* (genus, *Nees*), to which the Indian species all belong.

Leaves ovate or elliptic.	
Prostrate or climbing; leaves sparsely hairy, acute; ovary and capsule pubescent	1. *R. prostrata,* var. *dejecta.*
Suberect; leaves closely pubescent on both sides, obtuse; ovary and capsule glabrous	2. *R. patula.*
Leaves linear, hoary; ovary and capsule pubescent	3. *R. longifolia.*

1. **Ruellia prostrata,** *Poir. Encyc. Méthod.* v. 6 (1804) p. 349, VAR. **dejecta,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1884) p. 412. Stems 6—18 in. long, straggling or climbing among bushes, much-branched, terete with long internodes, thickened and purple at the nodes, more or less pubescent. Leaves ¾—3 by ½—1¾ in., ovate or elliptic, acute, sparsely hairy, margins entire, base acute ; petioles ¼—¾ in. long. Flowers nearly sessile, axillary, solitary or few together ; bracteoles like the leaves but smaller, ⅛—⅞ in. long (including the stalk). Calyx ⅓ in. long, divided about ¾ the way down ; segments linear-subulate, very acute, hairy. Corolla pale mauve-violet, 1¼ in. long, pubescent outside ; tube narrowly cylindric below, infundibuliform above ; lobes ¼—⅜ in. long, obovate-oblong, rounded at the apex. Filaments glabrous. Ovary pubescent ; style pubescent. Capsules ¾ in. long, slightly pubescent, clavate, pointed. Seeds 16—20, orbicular, ⅛ in. in diam., almost glabrous on the faces, with a dense fringe of hygroscopic hairs on the margin. Watt, Dict. Econ. Prod. v. 6, part 1, p. 590. *Ruellia ringens,* Roxb. Fl. Ind. v. 3, p. 44 (*doubtfully* of Linn.) ; Grah. Cat. p. 162 ; Trim. Fl. Ceyl. v. 3, p. 295. *Ruellia deccanensis,* Grah. Cat. Bo. Pl. (1839) p. 162. *Dipteracanthus dejectus* (sp.), Nees, in Wall. Pl. As. Rar. v. 3

(1832) p. 82 ; Dalz. & Gibs. p. 185 (exclud. syn.).—Flowers : Sept.—Oct.

KONKAN : *Stocks* !, *Nimmo* ex *Graham, Dalzell & Gibson.* DECCAN : *Gibson* ex *Graham.* S. M. COUNTRY : Nesri hills 20 miles west of Belgaum, *Ritchie,* 1151 !—DISTRIB. Throughout India; Ceylon, East Africa.

2. **Ruellia patula,** *Jacq. Misc. Bot.* v. 2 (1781) p. 358. A small usually hoary pubescent suberect shrub ; stems long, straggling, much-branched, terete or subquadrangular, densely softly pubescent. Leaves ½—1½ by ¼—1 in., ovate or elliptic, obtuse, often apiculate, closely pubescent on both sides, base rounded or sometimes shortly and abruptly narrowed ; petioles ¼—¾ in. long. Flowers axillary, solitary or 2—3 together, nearly sessile ; bracteoles nearly ½ in. long (including a flat stalk $\frac{1}{16}$—$\frac{1}{12}$ in. long), foliaceous, elliptic, obtuse, densely pubescent and strongly ciliate. Calyx ¼ in. long, divided rather more than ⅔ the way down, densely pubescent ; segments linear-lanceolate, very acute. Corolla purplish-blue, 1—1¼ in. long, pubescent outside ; tube in the lower part narrowly cylindric, in the upper part campanulate-infundibuliform ; lobes of the limb ¼ in. long, broadly elliptic or suborbicular, rounded at the apex. Filaments glabrous. Ovary glabrous ; style pubescent. Capsules ½—¾ in. long, clavate, glabrous. Seeds suborbicular, nearly glabrous on the faces, margined with hygroscopic white hairs. Fl. B. I. v. 4, p. 412 ; Grah. Cat. p. 162 ; Lindau, in Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 310, fig. 124 E—F ; Trim. Fl. Ceyl. v. 3, p. 296 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Dipteracanthus patulus,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 82 ; Wight, Icon. t. 1505. *Petalidium patulum,* Dalz. & Gibs. p. 185.—Flowers : June—Nov. VERN. *Katmora.*

DECCAN : *Woodrow* ; Dongergaon near Ahmednagar, *Cooke* ! ; Poona, *Cooke* ! ; Soos (near Poona), *Krishna* ! S. M. COUNTRY : Gokak, *Bhiva* ! ; Padshapur, *Ritchie,* 1200 ! SIND : *Stocks* !, *Dalzell* !, *Bhola Puran* ! ; Jemadar ka Landa near Karachi, *Stocks,* 68 !—DISTRIB. India (W. Peninsula, Rajputana, Bandelkand) ; Ceylon, Arabia, Tropical Africa, Ava.

3. **Ruellia longifolia,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 460. An undershrub about 1 ft. high, clothed all over with glandular hoary pubescence ; stems numerous, ascending, terete, woolly at the base. Leaves 1½—3 by ⅛—¼ in. (rarely broader), linear, acute, entire ; petioles continuous with the attenuated leaf-blade. Flowers usually solitary, axillary, very shortly pedicellate ; bracteoles ¾ by $\frac{1}{10}$ in., linear, acute, hairy. Calyx ¼—⅓ in. long, densely strigose ; segments lanceolate-subulate. Corolla ¾ in. long, pubescent outside, dusky lilac (*Stocks*) ; tube infundibuliform, the throat marked externally by longitudinal furrows caused by plaits which project into it (*Stocks*) ; lobes short, obtuse. Filaments glabrous. Ovary pubescent ; style pubescent. Capsules pubescent, ⅝—¾ by ⅛ in., clavate, pointed. Seeds broadly ellipsoid, much compressed, clothed all over (very densely on the margin) with glistening white hygroscopic hairs, when dry appearing mucronate by the hairs converging at the apex. Fl. B. I. v. 4, p. 412 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 ; Aitch. Pb. & Sind Pl. p. 111 ; Watt,

Dict. Econ. Prod. v. 6, part 1, p. 589. *Dipteracanthus longifolius*, Stocks, in Kew Journ. Bot. v. 4 (1852) p. 177.

SIND: *Dalzell*, 301, *Stocks*!, *Woodrow*.—DISTRIB. Beluchistan.

Ruellia Baikiei, Woodr. Gard. in Ind. ed. 5 (1889) p. 417. An undershrub, a native of Brazil, producing racemes of trumpet-shaped scarlet flowers from September to April, grown in gardens. *Siphonacanthus repens*, Nees, in Mart. Fl. Bras. v. 9 (1847) p. 47. *Stephanophysum Baikiei*, Hook. Bot. Mag. (1859) t. 5111. *Stephanophysum repens*, T. Anders. in Journ. Linn. Soc. v. 7 (1864) p. 25.

As there is already a *Ruellia repens*, Linn. Mantiss. p. 89, the specific name given by Nees cannot be adopted.

12. **HEMIGRAPHIS**, Nees.

Herbs or shrubs. Leaves opposite, toothed or subentire. Flowers sessile, in heads or spikes terminal or pseudo-axillary on shortened branchlets, rarely paniculate or solitary; bracts large, imbricate, each 1-flowered; bracteoles small, narrow or 0. Calyx 5-partite nearly to the base; segments unequal, lanceolate or linear. Corolla elongate; tube cylindric below, infundibuliform or ventricose above; lobes 5, rounded, subequal, twisted to the left in bud. Stamens 4, didynamous, included or nearly so; anthers oblong, 2-celled, muticous, sometimes triangular, the bases acute. Ovary 2-celled; ovules 3—8 in each cell; style long; stigma 2-lobed, one lobe linear, the other very short. Capsule linear or linear-oblong, seed-bearing almost from the base. Seeds 6—20, compressed, discoid, brown with a white margin.—DISTRIB. Species 20, mostly Indian and Malayan, 3 in Africa.

Upper part of longer filaments glabrous; capsule glabrous.
A densely bristly (almost prickly) herb ..... 1. *H. dura.*
Upper part of longer filaments bearded; capsule minutely pubescent.
Bracts of inner flowers not longer than the calyx; seeds 6 ..... 2. *H. latebrosa.*
Bracts of inner flowers longer than the calyx; seeds 8—10 ..... 3. *H. elegans*, var. *crenata.*

1. **Hemigraphis dura**, *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 461 (exclud. syn. *Ruellia crispa*). A procumbent or diffuse branched densely bristly herb (almost prickly from the strong sharp bristles); stems 1—2 ft. long. Leaves 1—1½ by ⅜—½ in., oblong, obtuse, subcrenate, hispid with long hairs, attenuated into a short petiole. Flowers in dense many-flowered heads densely clothed with white and yellowish-brown hair; bracts ¾—1 long, oblong or spathulate, subacute, densely clothed and ciliate with jointed white and yellowish-brown hairs; bracteoles 0. Calyx ½ in. long, divided almost to the base; segments linear, acute, densely hairy and ciliate with long jointed hairs, the hairs near the apex yellowish-brown and stiffer than the white marginal ones. Corolla blue, 1 in. long; tube slender, the cylindric part about as long as the ventricose portion; lobes

obovate, rounded, nearly $\frac{1}{3}$ in. long. Stamens scarcely exserted beyond the corolla-tube ; filaments glabrous. Ovary glabrous ; style pubescent. Capsules $\frac{1}{2}$ in. long, linear-oblong, pointed, grooved, glabrous. Seeds 6—8, broadly ellipsoid or suborbicular, $\frac{1}{16}$ in. in diam., yellowish-brown. Fl. B. I. v. 4, p. 422 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Ruellia dura,* Nees, in DC. Prodr. v. 11, p. 146 ; Dalz. & Gibs. p. 186.—Flowers : Jan.—Feb. VERN. *Gantelbu.*

KONKAN : *Gibson* ! S. M. COUNTRY : Belgaum, *Ritchie,* 1196 ! GUJARAT : Surat, *Dalzell* !, *Kanitkar* !, *Bhiva* ! SIND : *Cooke* !—DISTRIB. India (Central India, W. Peninsula).

2. **Hemigraphis latebrosa,** *Nees, in DC. Prodr.* v. 11 (1847) p. 723. A diffuse weak herb ; stems slender, obtusely subquadrangular, clothed with soft white hairs. Leaves 1—3 by $\frac{3}{4}$—$1\frac{1}{4}$ in., ovate, acuminate, coarsely crenate-serrate, sparsely hairy on both sides with short often bulbous-based hairs (the leaves on the secondary flowering branches smaller), base cuneate ; petioles $\frac{1}{2}$—$1\frac{1}{2}$ in. long. Flowers in axillary and terminal heads (reduced spikes) ; bracts elliptic, acute, those of the outer flowers much longer than the calyx, those of the inner flowers scarcely longer than the calyx, all hairy and with densely ciliate margins ; bracteoles 0. Calyx $\frac{1}{3}$ in. long, divided nearly to the base, one of the segments longer than the other 4, all linear, acute, whitish below, green at the tip, hairy and ciliate. Corolla $\frac{1}{2}$—$\frac{5}{8}$ in. long, narrowly tubular, nearly straight ; tube whitish, slightly enlarged upwards ; limb blue, with obovate obtuse lobes $\frac{1}{8}$ in. long. Longer filaments of the stamens densely bearded in the upper part with long white hairs, the shorter filaments glabrous. Ovary minutely pubescent at the apex. Capsules $\frac{1}{4}$ in. long, minutely pubescent, 6-seeded. Seeds $\frac{1}{16}$ in. in diam., broadly ellipsoid or suborbicular, yellowish-brown, clothed with white hairs. Fl. B. I. v. 4, p. 423 ; Wight, Icon. t. 1504 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Ruellia elegans,* Bot. Mag. (1835) t. 3389 ; Grah. Cat. p. 162 ; Dalz. & Gibs. p. 186.—Flowers : Dec.

KONKAN : *Stocks* !, *Law* ! ; Kanheri, *Dalzell* ! ; Revadanda, *Woodrow* ; Marmagão, *Kanitkar* ! DECCAN : hills about Pár, *Stocks* ! ; Khandala, *Cooke* !, *Woodrow* ! KANARA : Kála naddi, *Ritchie,* 586 !—DISTRIB. India (W. Peninsula).

VAR. 1. *rupestris,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 424. More rigid and pubescent, often viscidly so ; heads denser.

KONKAN : *Law* !, *Stocks* !, *Ritchie* !

VAR. 2. *ebracteata.* Leaves smaller, $\frac{3}{4}$—$1\frac{1}{2}$ by $\frac{1}{2}$—1 in., broadly ovate, acute or subobtuse ; hairs stiff, almost bristly, especially on the nerves beneath. Capsules $\frac{1}{4}$—$\frac{1}{3}$ in. long, pubescent, 6-seeded (*C. B. Clarke*). *Hemigraphis ebracteolata* (sp.), C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 424. *Ruellia ebracteata* (not *ebracteolata* as cited in Fl. B. I. l. c.), Dalzell, in Kew Journ. Bot. v. 2 (1850) p. 342. *Ruellia latebrosa,* Dalz. & Gibs. Bo. Fl. (1861) p. 186.—Flowers : cold season. Dalzell, who in 1850 (Kew Journ. Bot. l. c.) made this a species distinct from *H. latebrosa,* combined it with that species in 1861 (Bo. Fl. l. c.).

KONKAN : *Stocks* !, *Dalzell* !

3. **Hemigraphis elegans,** *Nees, in DC. Prodr,* v. 11 (1847) p. 722, VAR. **crenata,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1884) p. 425. Diffuse ; stems subquadrangular, viscidly pubescent. Leaves 1—1¾ by ¾—1¼ in., ovate or elliptic, subobtuse, crenate, hairy, base shortly cuneate ; petioles ¼—½ in. long. Flowers in glandular-hairy heads ; bracts elliptic-oblong, subobtuse, those of the inner flowers longer than the calyx, glandular-hairy and strongly ciliate ; bracteoles 0. Calyx to top of longest segment reaching $\frac{7}{16}$ in. long, divided nearly to the base, one of the segments longer than the other 4 ; segments linear, subobtuse, glandular-hairy and ciliate. Corolla ¾ in. long ; tube whitish ; limb blue, with obovate rounded lobes ⅛ in. long. Longer filaments of the stamens bearded in the upper part. Capsules ⅓ in. long, pubescent, 8—10-seeded. Seeds $\frac{1}{16}$ in. in diam., densely clothed with hygroscopic white hairs. *Ruellia crenata,* Benth. ex Hohenhack. in Flora, v. 32 (1849) p. 558.—Flowers : Dec.

KONKAN : *Law* !, *Stocks* ! S. M. COUNTRY : Belgaum, *Ritchie,* 586 ! KANARA : *Hohenhacker,* 737 !—DISTRIB. India (W. Peninsula).

13. PETALIDIUM, Nees.

Undershrubs. Leaves usually entire. Flowers shortly pedicellate, in contracted cymes sometimes reduced to single flowers, often crowded on shortened lateral branches ; bracts small, narrow or 0 ; bracteoles 2, large, ovate, concave, reticulately veined, ultimately more or less scarious. Calyx divided into 5 unequal narrow-lanceolate segments. Corolla straight or curved ; tube dilated in the upper half or infundibuliform only at the very top ; lobes 5, subequal, twisted to the left in bud. Stamens 4, didynamous ; anthers subsimilar, 2-celled, the cells parallel, shortly spurred or muticous at the base ; pollen ellipsoid, few-ribbed, stopples 3 with (nearly always) 1 tubercle above and 1 below each stopple. Ovary 2-celled ; ovules 2 in each cell ; style long ; stigma with 2 unequal lobes. Capsule clavate, compressed. Seeds 2 or 4, discoid, hygroscopically hairy, on placentas that separate elastically from the bottom of the capsule carrying the seeds with them.—DISTRIB. Species 18, of which 1 is in India, the rest in Africa and the Mascarene Islands.

1. **Petalidium barlerioides,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 82. Shrubby, 2—4 ft. high ; stems numerous, subterete, glabrous. Leaves on the main stems 2—4 by 1½—2½ in., broadly ovate, acuminate, crenate-serrate, glabrous or nearly so except on the nerves beneath, base usually rounded ; main nerves 6—8 pairs, prominent, with reticulate veins between them ; petioles ⅜—¾ in. long : leaves on the short flower-bearing branches smaller, ½—1½ in. long. Flowers solitary, usually crowded on abbreviated lateral branches ; bracteoles ¾—1 in. long, foliaceous, ovate, acuminate, strongly nerved and reticulately veined, green at first, becoming pale-brown and scarious in age, ciliolate ; pedicels ¼—½ in. long. Calyx glandular-hairy, reaching ⅝ in. long to top of longest segment ; tube $\frac{1}{10}$ in. long ; segments lanceolate-subulate, one of them longer than the others. Corolla white, reaching 1½ in. long, pubescent outside, strongly nerved, the palate with long deflexed hairs within ; tube

ventricose upwards ; lobes ½ in. long, obovate, obtuse, with irregularly crenate margins. Filaments hairy at the base ; anthers ⅛ in. long, oblong, slightly pubescent, the cells with spurs $\frac{1}{16}$—$\frac{1}{8}$ in. long at the base. Ovary glabrous ; style pubescent. Capsules ½—⅝ in. long, glabrous, clavate, pointed. Seeds usually 2, orbicular, reaching ⅛ in. in diam., softly villous, especially on the margin. Fl. B. I. v. 4, p. 416 ; Dalz. & Gibs. p. 185 ; Lindau, in Engl. & Prantl. Pflanzenf. v. 4, 3 B, p. 299, fig. 120 J ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Ruellia bracteata*, Roxb. Fl. Ind. v. 3 (1832) p. 47 ; Grah. Cat. p. 162.—Flowers : Feb.—Apr.

KONKAN : *Law* ! ; Ghâts, *Stocks* ! ; hills near Panvel, *Nimmo* ex *Graham*. KANARA : north of Haliyal, *Ritchie*, 1935 ! GUJARAT : Dangs, *Woodrow*.—DISTRIB. More or less throughout India.

14. **MICRANTHUS,** Wendl. Bot. Beob. (1798) p. 38.

PHAYLOPSIS, Willd. Sp. Pl. v. 3 (1800) p. 342.

Perennial prostrate or diffuse herbs. Leaves opposite, membranous, petiolate, entire or obscurely crenate. Flowers in dense terminal 1-sided spikes ; bracts orbicular, closely imbricate, each usually 3-flowered ; bracteoles 0. Sepals 5, one large like the bracts, ovate, nerved, the others linear-subulate. Corolla small ; tube slender, cylindric ; lobes slightly unequal, rounded, contorted in bud, spreading in flower. Stamens 4, didynamous ; anthers subsimilar, 2-celled, the cells parallel, shortly oblong, minutely mucronate at the base. Ovary 2-celled ; ovules 2 in each cell ; style long, hairy ; stigma of 2 subulate lobes, the upper lobe much the smaller or almost wanting. Capsule clavate, compressed parallel to the septum. Seeds 4 (rarely fewer), discoid, compressed, on placentas separating elastically from the base of the capsule and raising the seeds with them.—DISTRIB. India, Africa, Mascarene Islands ; species 15.

There can be no question as to the priority of the genus *Micranthus* ; indeed Willdenow admits its priority, but gives no reason why that genus should be set aside and his own genus *Phaylopsis* substituted for it. Unfortunately Ecklon [Top. Verz. (1827) p. 43] has given the name *Micranthus* to a genus of *Iridaceæ*, for which, however, O. Kuntze has found another name. The genus above was founded by Wendland on *Micranthus oppositifolius*, the only *Indian* species of the genus.

1. **Micranthus oppositifolius,** *Wendl. Bot. Beob.* (1798) p. 39. A perennial herb 1—2 ft. ; stems diffuse, slender, often prostrate, much divaricately branched, thickened at the nodes and sometimes rooting at the lower ones. Leaves very variable in size, on the same stem varying from ½—3 by ⅜—1½ in., the leaves of each pair usually very unequal, ovate, acuminate, more or less pubescent, entire or subcrenate, base tapering and often unequal-sided ; petioles ½—1¼ in. long. Flowers sessile, in softly pubescent spikes 1—1½ in. long, usually in threes enclosed by a large bract ; bracts cordate, reniform or orbicular, ⅛ in. long, usually broader than long (often ½ in. wide), softly glandular-hairy and strongly ciliate, veined, green at first, turning white in age. Calyx glandular-hairy, divided nearly to the base ; segments 5, one of them large and leaf-like, ⅛ by ⅛ in., broadly ovate, obtuse, densely pubescent and strongly ciliate, the other 4

segments linear-subulate, ¼ in. long. Corolla ½—⅝ in. long, white, glabrous; tube slightly contracted about the middle; lobes 1/16 in. long, oblong, rounded. Filaments glabrous. Ovary pubescent at the apex; style faintly pubescent; upper lobe of stigma distinct but small. Capsules ⅜—½ in. long, clavate, pointed, pubescent at the apex, with hard backs and scarious sides. Seeds orbicular, 1/16 in. in diam., dark brown, slightly hairy on the faces, densely so on the margin. *Phaylopsis parviflora,* Willd. Sp. Pl. v. 3 (1800) p. 342; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 417; Trim. Fl. Ceyl. v. 3, p. 296; Woodr. in Journ. Bomb. Nat v. 12 (1899) p. 355. *Ætheilema reniforme,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 94; Wight, Icon. t. 1533; Dalz & Gibs. p. 192. *Ruellia imbricata,* Vahl, Symb. v. 2, p. 73; Grah. Cat. p. 162.—Flowers: Nov.—Jan. VERN. *Waiti.*

KONKAN: *Stocks!*; Banda in the Wari country, *Dalzell & Gibson.* DECCAN: Ravines about Pár, *Graham*; Mahableshwar, *Graham, H. M. Birdwood, Cooke!* S. M. COUNTRY: Badami, *Woodrow*; Belgaum, *Dalzell!* KANARA: Kála naddi, *Ritchie,* 1194!—DISTRIB. Throughout India (except the N.W.); Ceylon, Madagascar, Tropical Africa.

15. **DYSCHORISTE,** Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 75.

CALOPHANES, D. Don, in Sweet, Brit. Flow. Gard. Ser. 2 (1833) t. 181.

Perennial herbs. Leaves opposite, petiolate. Flowers in axillary clusters or short cymes; bracteoles small, narrow. Calyx tubular; lobes 5, subequal, lanceolate or subulate. Corolla tubular, obscurely 2-lipped; lobes 5, obtuse, twisted to the left in bud, spreading in flower. Stamens 4 perfect, didynamous; filaments glabrous or hairy; anthers similar, 2-celled, the cells oblong, parallel, minutely mucronate or spurred at the base; pollen globose, ribbed. Ovary 2-celled, glabrous; ovules 2 in each cell; style linear, hairy; stigma linear, recurved, the upper lobe minute, or dentiform or suppressed. Capsule oblong, contracted below into a solid base. Seeds 4, orbicular, much compressed, with hygroscopic white hairs; retinacula strong, curved.—DISTRIB. Warm parts of both hemispheres; species 60.

Corolla not or scarcely exceeding the calyx	1.	*D. depressa.*
Corolla much longer than the calyx.		
Corolla ¾—1 in. long; anthers-cells with long spurs at the base	2.	*D. vagans.*
Corolla 1—1⅛ in. long; anther-cells with minute spurs or almost spurless at the base	3.	*D. Dalzellii.*

1. **Dyschoriste depressa,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 81. A perennial herb often woody at the base, or almost a small shrub; stems numerous, usually glabrous, subquadrangular, with many divaricate usually glabrous subquadrangular branches often prostrate and rooting at the nodes. Leaves ¾—1½ (rarely reaching 2 in. long) by ½—1 in., broadly elliptic or sometimes obovate, obtuse, entire, glabrous or slightly pubescent, base tapering into the petiole; petioles ¼—½ in. long. Flowers subsessile, 1—4 in axillary clusters, bracts 0; bracteoles 1/16 in. long, narrowly linear. Calyx ¼—⅜ in. long, divided about ⅔ the way down in flower, hairy; segments

lanceolate-subulate, the lower part of each segment with membranous margins, the upper part finely subulate. Corolla pale violet-pink, scarcely exceeding the calyx; lobes oblong, rounded-truncate, spreading. Stamens didynamous, one short and one long filament of each pair united at the base, the connate portion flattened and pubescent; anther-cells distinctly spurred at the base. Capsules $\frac{3}{8}$ in. long, bluntly pointed, glabrous. Seeds 4, large, broadly elliptic, densely clothed with hygroscopic hairs; retinacula hard, sharp. C. B. Clarke, in Dyer, Fl. Trop. Afr. v. 5 (1900) p. 72. *Dyschoriste erecta*, O. Kuntze, Revis. Gen. v. 1 (1891) p. 485. *Ruellia erecta*, Burm. Fl. Ind. (1768) p. 135, t. 41, fig. 3. *Calophanes Nagchana*, Nees, in DC. Prodr. v. 11 (1847) p. 109; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 410; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355.—Flowers: Apr.

Not very common. KONKAN: *Stocks*! DECCAN: Nasik, *Wadthekar*! S. M. COUNTRY: 4 miles N. of Belgaum, *Ritchie*, 599! KANARA: banks of the Kála naddi, *Ritchie*, 1151! GUJARAT: Dangs, *Woodrow*.—DISTRIB. India (Behar, W. Peninsula); Ceylon.

2. **Dyschoriste vagans,** *O. Kuntze, Revis. Gen.* v. 1 (1891) p. 486. Shrubby, diffuse, sometimes climbing among bushes (*Wight*), glandular-pubescent; stems many from the root, obtusely quadrangular. Leaves $1\frac{1}{2}$—$2\frac{1}{2}$ by $\frac{3}{4}$—$1\frac{1}{4}$ in., ovate, acute, often with subcrenate margins, more or less pubescent on both sides, base usually tapering; main nerves 6—8 pairs, prominent beneath; petioles $\frac{1}{4}$ in. long. Flowers fetid (*Ritchie*), axillary, solitary or in 2—6-flowered shortly pedunculate cymes; bracteoles $\frac{1}{8}$ in. long, lanceolate, broader than the calyx-teeth. Calyx $\frac{1}{2}$—$\frac{5}{8}$ in. long, glandular-hairy, divided about $\frac{2}{3}$ the way down in flower, afterwards divided to the base; segments lanceolate-subulate, finely aristate. Corolla $\frac{3}{4}$—1 in. long, bluish, pubescent outside; lobes of the upper lip $\frac{1}{8}$ in. long, oblong, rounded; lobes of the lower lip $\frac{1}{6}$ in. long, oblong, rounded. Stamens didynamous, one of each pair of filaments united at the base, the connate portion flattened and pubescent; anther-cells with capillary white spurs about $\frac{1}{16}$ in. long, often divaricate. Style pubescent. Capsules $\frac{1}{2}$ in. long, oblong, pointed, glabrous. Seeds broadly ellipsoid, densely clothed with glistening hygroscope hairs. *Calophanes vagans*, Wight, Icon. (1850) t. 1526; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 411.—Flowers: Sept—Dec.

Not common in the Bombay Presidency. Without locality, *Dalzell* in Herb. Kew.! KONKAN: *Stocks*! S. M. COUNTRY: Belgaum hills, *Ritchie*, 603!—DISTRIB. India (W. Peninsula).

3. **Dyschoriste Dalzellii,** *O. Kuntze, Revis. Gen.* v. 1 (1891) p. 486. Shrubby, all parts except the capsules glandular-pubescent; stems many from the root, 1—15 in. long, obtusely subquadrangular. Leaves 1—2 by $\frac{1}{2}$—$1\frac{1}{4}$ in., ovate, acute, submembranous, often with subcrenate margins, base rounded or subacute; main nerves 6—8 pairs, prominent beneath; petioles $\frac{1}{4}$—$\frac{1}{3}$ in. long. Flowers pedicellate, solitary or in few (often 3) -flowered cymes on short axillary peduncles; bracteoles $\frac{1}{4}$ in. long, broader than the calyx-teeth, lanceolate, glandular-hairy, caducous; pedicels $\frac{1}{12}$—$\frac{1}{6}$ in. long. Calyx divided about $\frac{2}{3}$ the way down in flower, afterwards divided to the

base, strigose with glandular hairs; segments lanceolate-subulate, finely aristate. Corolla bluish, 1—1⅛ in. long, pubescent outside; tube ventricose upwards; upper lip 2-fid, the lobes ⅛ in. long, oblong, rounded; lower lip 3-lobed, the lobes ¼ in. long, oblong, rounded. Stamens didynamous, one of each pair of filaments united at the base, the connate portion flattened and pubescent; anther-cells minutely spurred at the base (sometimes almost spurless). Style filiform, pubescent. Capsules ½—⅝ in. long, oblong, pointed, glabrous. Seeds broadly ellipsoid, densely clothed with glistening hygroscopic hairs. *Calophanes Dalzellii*, T. Anders. ex Bedd. Icon. Pl. Ind. Or. v. 1 (1874) p. 60, t. 248; C. B. Clarke, in Hook, f. Fl. B. I. v. 4, p. 411; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355.—Flowers: Aug.—Nov.

KONKAN: *Stocks*! DECCAN: Chattersinghi hill near Poona, *Kanitkar*!; Deva Ghát near Poona, *Dalzell*!; S.W. of Poona, *Dalzell*!; rocky hills near Poona, *Beddome*. S. M. COUNTRY: Belgaum, *Ritchie*!—DISTRIB. India (W. Peninsula).

Very close to *D. vagans*, from which the short or sometimes only microscopically visible spurs of the anther-cells serve to separate it.

16. DÆDALACANTHUS, T. Anders.

Perennial herbs or shrubs. Leaves opposite, petiolate, entire or obscurely toothed, lineolate from imbedded cystoliths. Flowers in linear distant or close spikes or heads; bracts usually large; bracteoles linear-lanceolate, shorter than the calyx. Calyx 5-lobed; lobes narrow, often scarious. Corolla slender; tube long, narrow, widened at the mouth or in some species from the middle; lobes obovate, twisted to the left in bud, spreading in flower. Stamens 2, glabrous; anthers narrowly oblong, 2-celled, muticous, exserted or subincluded. Ovary glabrous, 2-celled; ovules 2 in each cell; style long, sparsely pubescent or glabrous; stigma simple, linear. Capsule clavate, with solid cylindric base. Seeds normally 4, compressed, discoid, hygroscopically hairy; retinacula acute.—DISTRIB. India and Malaya; species about 18.

Bracts white with green veins, obovate, obtuse, with a short reflexed mucro	1. *D. roseus*.
Bracts green, ovate, acuminate.	
Flowers in dense, usually solitary, uninterrupted spikes; bracts exceeding ¾ in. long	2. *D. purpurascens*.
Flowers in interrupted usually paniculate spikes; bracts less than ¼ in. long	3. *D. montanus*, var. *concanensis*.

1. **Dædalacanthus roseus,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 487. Stems 2—6 ft. high. Leaves 5—8 by 1½—3 in., oblong-lanceolate, acuminate, lineolate on both sides, entire or obscurely crenulate, base tapering, often decurrent into the petiole; main nerves about 10 pairs, prominent below; petioles ½—1¼ in. long. Inflorescence with a strong sickly odor; flowers in linear subinterrupted lax axillary and terminal spikes often 6 in. long, solitary or occasionally 2 or 3 together forming a terminal panicle; peduncles quadrangular; bracts ⅝ in. long, obovate, with a reflexed mucro, white with very prominent raised green nerves, densely hairy on the midrib

and ciliate on the margins with long hairs ; bracteoles as long as or slightly longer than the calyx, narrowly linear, acute, densely clothed on the back and ciliate with long white hairs. Calyx ⅛ in. long, scarious, white-pubescent, divided about ½-way down ; lobes lanceolate, very acute, with a strong midnerve from base of calyx to the apex of each lobe. Corolla always blue in the Bombay Presidency, fading to purple or red, 1—1½ in. long, slightly pubescent outside ; tube slender, slightly enlarged and funnel-shaped to about ⅛ in. below the limb ; lobes ⅜ in. long, oblong-obovate, rounded or truncate at the apex. Stamens exserted beyond the corolla-tube ; filaments glabrous. Ovary glabrous ; style glabrous or nearly so. Capsules ½ in. long, clavate, pointed, glabrous. Seeds ⅛—⅙ in. in diam., hygroscopically hairy, very densely so on the margin.—Fl. B. I. v. 4, p. 419 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Watt, Dict. Econ. Prod. v. 3, p. 3. *Eranthemum roseum*, R. Br. Prodr. (1810) p. 477 ; Dalz. & Gibs. p. 195.—Flowers : Nov.—Jan. VERN. *Dasamuli.*

KONKAN : *Stocks* !, *Law* !, *Woodrow* ! ; Ghâts, *Dalzell* ! ; Revadanda, *Kanitkar* ! ; Matheran, *Cooke* ! DECCAN : Khandala, *Cooke*. S. M. COUNTRY : Belgaum, *Ritchie*, 583 ! KANARA : N. Kanara, *Kanitkar* ! ; Yellapur (N. Kanara), *Talbot*, 278 ! ; Kâla naddi, *Ritchie*, 583 !—DISTRIB. India (W. Peninsula).

The root boiled in milk has some repute in native medicine.

2. **Dædalacanthus purpurascens,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 488. Stems 2—4 ft. high, leafy. Leaves 2—8 by 1—3½ in., ovate, acuminate, lineolate on both surfaces, the lower leaves usually decurrent into the petiole, which is variable in length owing to the decurrent leaf-blade, the upper leaves often rounded or cordate at the base and shortly petiolate ; main nerves 7—9 pairs, prominent beneath. Flowers in dense spikes 1—3 in. long, usually solitary, but sometimes 1—3 forming a terminal panicle ; bracts ⅞—1 in. long, ovate-lanceolate, long-acuminate, pale green (often becoming whitish in age), with darker green raised nerves, reticulately veined between the nerves, more or less glandular-pubescent, ciliate on the margins with long white hairs ; bracteoles ⅓—½ in. long, linear-lanceolate, scarious, glandular-pubescent. Calyx scarious, ⅛ in. long, divided about ½-way down, minutely white-pubescent on both sides ; lobes linear-lanceolate, very acute. Corolla pubescent outside, blue, 1¼ in. long ; tube slightly enlarged and funnel-shaped for a short distance below the limb ; lobes ⅛ in. long, obovate, rounded or truncate at the apex. Stamens slightly exserted beyond the corolla-tube ; filaments glabrous. Ovary glabrous ; style glabrous or nearly so. Capsules ½ in. long, clavate-oblong, pointed, glabrous. Seeds broadly ellipsoid, ⅛ in. long, densely hygroscopically hairy. Fl. B. I. v. 4, p. 420 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 ; Watt, Dict. Econ. Prod. v. 3, p. 2. *Eranthemum pulchellum*, Roxb. Fl. Ind. v. 1, p. 111 (*not* of Andr.) ; Grah. Cat. p. 163. *Eranthemum nervosum*, Dalz. & Gibs. p. 195 (*not* of T. Anders.).—Flowers : Nov.—Jan. VERN. *Gulsham.*

KONKAN : *Stocks* !, *Dalzell* !, *Woodrow* ; Matheran, *H. M. Birdwood*, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie*, 1195 ! KANARA : Kâla naddi, *Ritchie*, 1195 ! —DISTRIB. India (Central India, Behar, W. Peninsula, Assam).

3. **Dædalacanthus montanus,** *T. Anders. in Thw. Enum.* (1860) p. 229, VAR. **concanensis,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4, p. 421. A leafy herb 2—3 ft. high. Leaves 2½—5 by 1—2 in., elliptic-lanceolate, acuminate, glabrous, base usually attenuated into the petiole, but sometimes rounded ; main nerves 6—8 pairs, conspicuous beneath ; petioles ½—1½ in. long. Flowers in interrupted spikes 1½—2 in. long forming a compound terminal panicle ; rhachis of the spike quadrangular, viscous-hairy ; bracts ⅓ by ⅛ in., ovate, obtusely acuminate, glandular-hairy, with a strong midnerve, the other nerves somewhat obscure ; bracteoles ⅛ by $\frac{1}{16}$ in., ovate, acute, glandular-hairy. Calyx green, ⅛—⅓ in. long, glandular-hairy, divided ½-way down ; lobes lanceolate, acute. Corolla reaching 1¾ in. long, pale-blue ; lobes ⅓ in. long, obovate-oblong, rounded at the apex. Filaments glabrous, 2 abortive ones between the other 2 ; anthers slightly exserted from the corolla-tube. Ovary glabrous ; style pubescent. Capsules ⅝—¾ in. long or more, clavate, pointed, much narrowed at the long solid base, with a few minute widely scattered hairs on the capsule and a ring of minute glandular hairs at its point. Seeds $\frac{1}{16}$ in. in diam. *Dædalacanthus concanensis* (sp.), T. Anders. M.S. *Dædalacanthus montanus*, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 (*not* of T. Anders.). *Eranthemum montanum*, Dalz. & Gibs. p. 195.—Flowers : Oct.-Jan.

Rare. KONKAN : *Stocks* !, *Law* !, *Dalzell* ! S. M. COUNTRY : Dharwar, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula).

Dædalacanthus nervosus, T. Anders. in Journ. Linn. Soc. v. 9 (1867) p. 487. A shrub 2—5 ft. high, a native of N. Bengal and Tirhut, commonly planted in gardens, sometimes found as an escape. It has white, concave, ovate, acuminate bracts with green nerves and veins and blue flowers in uninterrupted spikes often forming a terminal panicle.—Flowers : Nov.-Jan. Fl. B. I. v. 4, p. 418 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355 and Gard. in Ind. ed. 5, p. 415.

Dædalacanthus purpurascens, a common plant on the Ghâts, is often mistaken for *D. nervosus*.

17. STROBILANTHES, Blume.

Shrubs or herbs. Leaves opposite, often unequal, toothed or subentire, often lineolate with cystoliths. Flowers capitate or in strobilate or interrupted spikes, or paniculate, sessile or sometimes pedicellate ; bracts and bracteoles large or small or 0, persistent or caducous. Calyx (in Bombay species) deeply and subequally 5-divided. Corolla straight or curved ; tube usually ventricose above ; lobes 5, ovate or rotund, subequal, twisted to the left in bud. Stamens (in Bombay species except *S. reticulatus*) 4, didynamous ; anthers oblong, 2-celled, muticous. Disk small, or elongate as a stalk to the ovary. Ovary 2-celled ; ovules 2 in each cell ; style linear ; stigma of one long linear branch, the other branch obsolete.

Capsule 4- or 2-seeded. Seeds much compressed, glabrous or hairy; retinacula strong, curved; placentas in a few species separating elastically from the base, carrying the seeds with them.—DISTRIB. Mostly Asiatic; species nearly 200.

Stamens 2; pollen ellipsoid, longitudinally ribbed (Sect. *Endopogon*)	1. *S. reticulatus.*
Stamens 6; pollen ellipsoid, longitudinally ribbed (Sect. *Eustrobilanthes*).	
Flowers ebracteolate.	
Bracts hairy.	
Leaves sessile; bracts bristly with jointed hairs; corolla 1¼ in. long	2. *S. sessilis*, var. *Ritchici.*
Leaves petiolate; bracts softly glandular-hairy; corolla ¾—1 in. long	3. *S. lupulinus.*
Bracts glabrous.	
Corolla ½—¾ in. long; bracts white	4. *S. Heyneanus.*
Corolla 1½ in. long; bracts green with a pink tinge	5. *S. callosus.*
Flowers bracteolate.	
Stems usually winged; bracteoles longer than the calyx	6. *S. barbatus.*
Stems not winged; bracteoles shorter than the calyx.	
Bracts glabrous; peduncles long and slender, jointed and deflexed above the middle	7. *S. ciliatus.*
Bracts glandular-hairy.	
Capsule 4-seeded.	
Flowers in short subsessile spikes on the naked branches	8. *S. scrobiculatus.*
Flowers in pedunculate axillary spikes.	
Seeds glabrous	9. *S. warreensis.*
Seeds hairy	10. *S. asper.*
Capsule 2-seeded; petioles winged, the wings auricled at the base; spikes viscous-hairy, strong-smelling	11. *S. perfoliatus.*
Stamens 4; pollen globose, echinate or tuberculate (Genus *Acanthopale* C. B. Clarke); petioles not winged nor auricled; spikes viscidly pubescent; capsule usually 2-seeded; seeds hygroscopically hairy	12. *S. ixiocephalus.*

1. **Strobilanthes reticulatus,** *Stapf, in Kew Bull.* (1894) p. 347. A small shrub; stem shortly strigose and subquadrangular in the upper part. Leaves up to 3 by 1½ in., ovate, acute, subentire, dark green, densely lineolate and with short stiff hairs on the upper surface, paler and strigose on the nerves and veins beneath, base rounded or subcordate; main nerves 6—8 pairs, prominent with conspicuous reticulate venation between; petioles ⅓ the length of the leaf-blade, often narrowly winged. Flowers in ovate shortly pedunculate spikes ¾ in. long, from the axils of the upper leaves; bracts reaching ½ in. long, ovate, glabrous or subglabrous outside, more or less villous inside; bracteoles 0. Calyx ⅓ in. long, deeply divided; tube $\frac{1}{10}$ in. long; segments linear-subulate, ciliate with long white hairs. Corolla 1 in. long; narrow part of tube shorter than the campanulately ventricose portion; lobes rotund-ovate. Stamens 2, included; filaments hairy; staminodes 2, minute, dentiform. Ovules 2 in each cell. Capsules not seen.—Flowers: Oct.

DECCAN: Mahableshwar in the jungle near Kate's Point, *Cooke*!
There is but one specimen in Herb. Kew., which was collected by me in October 1892. Further specimens from the locality would be desirable.

2. **Strobilanthes sessilis,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 85, VAR. **Ritchiei,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1884) p. 452. A small undershrub; stems 12—18 in. long, numerous, erect, quadrangular, usually hairy. Leaves sessile or nearly so, ¾—1¼ in. long, nearly as broad as long, ovate, acute, lineolate and hairy above, nearly glabrous except on the nerves (which are bristly) beneath, rounded or often cordate at the base. Flowers in strobiliform axillary and terminal pedunculate or subsessile spikes 1—3 in. long, often 3 together at the tops of the branches; peduncles of variable length, hairy; bracts ¾ in. long, ovate, long-acuminate, tinged with purple, bristly and ciliate with long, often jointed, hairs; bracteoles 0. Calyx divided to the base, ½ in. long; sepals lanceolate, densely ciliate, subequal. Corolla purple, 1¼ in. long, hairy outside, slightly hairy inside, but densely so at the insertion of the stamens; cylindric part of the tube shorter than the campanulately ventricose upper portion; lobes ovate. Stamens included; longer filaments clothed with long hairs to the top, the shorter glabrous above their insertion or rarely with 2 or 3 hairs. Style hairy, slightly swollen below the stigma. Capsules ⅝ in. long, linear-oblong, acute, glabrous or with a few minute glandular hairs at the tip. Seeds $\frac{1}{10}$ in. in diam., suborbicular, hygroscopically hairy all over, brown. Talb. Trees, Bomb. ed. 2, p. 263. *Strobilanthes sessiloides*, Dalz. & Gibs. Bo. Fl. p. 187 (*not* of Wight). *S. sessilis* var. *sessiloides*, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356 (*not* of C. B. Clarke).—Flowers: Sept.—Oct., once in about 7 years (*Talbot*).

Mr. Talbot (*l. c.*) says that a general flowering took place near the Rámghát in Sept. 1889. Separate flowering clumps are, he says, found in Sept. and Oct. of years other than those of general flowering.—VER. *Bukra*.

KONKAN: Amboli Ghát, *Kanitkar*! DECCAN: Phunda Ghát, abundant, *Dalzell & Gibson*. S. M. COUNTRY: Párvá Ghát, *Ritchie*, 1207!; Rámghát, *Talbot*. KANARA: common in the Supa, Sirsi and Siddapur talukas of N. Kanara, *Talbot*!—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Strobilanthes lupulinus,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 85. An erect shrub; stems and branches woody, the older glabrous and warted, the younger hairy. Leaves 4½—6 by 2½—3½ in., broadly elliptic, acuminate, crenate-serrate, densely lineolate, usually rough above with stiff short hairs, base cuneate; main nerves about 8 pairs, prominent; petioles 1—1¾ in. long. Flowers in axillary and terminal simple or umbellately branched spikes 1½ in. long; bracts ⅜ in. long, elliptic-obovate, rounded at the apex, narrowed at the base, glandular-hairy, veined, concave; bracteoles 0. Calyx ⅓ in. long, divided nearly to the base; segments linear-oblong, obtuse, scarious, hairy at the tip. Corolla ¾—1 in. long, straight, glabrous outside, hairy inside; tube very narrow at the base, gradually and slightly enlarged upwards. Filaments of the longer stamens hairy. Ovary glabrous; style glabrous or nearly so. Capsules ⅝ in. long, oblong-clavate, 4-seeded, glabrous. Seeds ⅛ in. long, broadly elliptic or

suborbicular, very thin, flat, glabrous, yellowish. Fl. B. I. v. 4, p. 443; Talb. Trees, Bomb. ed. 2, p. 261; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355.—Flowers: Oct.—Jan.

Rare. KONKAN: *Stocks!*, *Dalzell!* S. M. COUNTRY: Rámghát, *Ritchie*, 1939!, *Woodrow*. KANARA: moist forests at Yellapur, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

4. **Strobilanthes Heyneanus,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 85. A small shrub; stems hirsute upwards. Leaves drying green, 3—6 by 1½—2¾ in., acuminate, closely crenate-serrate, hairy above with short stiff bulbous-based hairs, softly hairy on the nerves beneath, lineolate on both surfaces (very strongly so on the upper), base tapering (sometimes rounded in the upper leaves); main nerves about 7 pairs; petioles 1—2½ in. long. Flowers in axillary simple or branched glabrous spikes; peduncles usually short; bracts rather more than ½ in. long by ⅜ in. wide, white, membranous, broadly elliptic, rounded at the apex, glabrous, finely reticulately veined, very concave; bracteoles 0. Calyx ⅓ in. long, divided nearly to the base, glabrous; segments subequal, linear-lanceolate, obtuse. Corolla ½—¾ in. long, pale-blue, the narrow portion of the tube much shorter than the ventricose. Filaments of the longer stamens bearded. Ovary glabrous; style slightly pubescent. Capsules ⅓ in. long, oblong, subacute, 4-seeded. Seeds ovoid, flattened, glabrous, ⅛ in. long. Fl. B. I. v. 4, p. 443; Dalz. & Gibs. p. 187; Talb. Trees, Bomb. ed. 2, p. 261; Woodr. in Journ. Bomb. Nat. v. 12 (1833) p. 355. *Strobilanthes rugosus*, Wight, Icon. t. 1619.—Flowers: Oct.—Dec., apparently annually (*Talbot*). VERN. *A'kra*; *Itari*.

KONKAN: *Law!*, *Stocks!*; Matheran, *Cooke!* S. M. COUNTRY: Rámghát, *Ritchie*, [illegible]!; Chorla Ghát, *Dalzell!*; Castlerock, *Cooke!*, *Bhiva!*, *Woodrow*. KANARA: common in the evergreen forests between the Nilkund and Gairsoppa Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

5. **Strobilanthes callosus,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 85. A shrub 6—20 ft. high; stems rigid, rough and warted, glabrate. Leaves 4—9 by 1½—3 in., one of each pair often smaller than the opposite one, elliptic-lanceolate, acute or acuminate, the margins crenate and ciliate (the crenatures sometimes with a blunt tooth), strongly lineolate on the upper surface with cystoliths (which in dried specimens are usually stellately arranged with a stiff short bristle above the centre of each cluster), dark green above, paler and more or less hairy on the nerves beneath, base tapering wing-like into the petiole; main nerves 10—14 pairs, slender, prominent; petioles variable in length, sometimes reaching (in the large leaves) 3 in. long. Flowers axiliary, in simple or branched ovoid, pedunculate, subtetragonal spikes with rounded edges, 1—3½ in. long; peduncles often with one or two pairs of orbicular sessile bracts below the spike; bracts ½—¾ in. long, often as broad as long, broadly elliptic or obovate, rounded at the apex, concave, glabrous, covered with a viscous secretion with a balsamic but not agreeable odor, green with a pink tinge; bracteoles 0. Disk bright orange. Calyx ½ in. long in flower, much enlarged in fruit, divided nearly to the base; segments leathery, elliptic-lanceolate, ⅛—¼ in. broad, obtuse, slightly penicillate at the apex, softly pubescent, nerved. Corolla

1½ in. long or more, with a white tube and purple limb, glabrous outside, with yellow hairs in the mouth inside ; cylindric base of the tube narrow, shorter than the ventricose portion ; lobes ½ in. long, rounded, much crumpled in æstivation. Filaments of the longer stamens bearded. Capsules ¾ by ¼ in., obovoid, acute, apiculate, narrow at the base, 2-seeded. Seeds ½ by ⅜ in., broadly ovate, acute, densely clothed (except the oblong nucleus) with white appressed hairs. Fl. B. I. v. 4, p. 451 ; Dalz. & Gibs. p. 188 ; Talb. Trees, Bomb. ed. 2, p. 262 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Strobilanthes Grahamianus*, Wight, Icon. t. 1520 ; Dalz. & Gibs. p. 187. *S. ciliata?*, Grah. Cat. p. 162 (not *S. ciliatus* of Nees).—Flowers : Sept.—Nov., at intervals of 7 or 8 (many natives say 10) years. Mr. Talbot says that a general flowering took place in N. Kanara in 1887. VERN. *Kárvi.*

Very common on the Ghâts. Covers large areas on the Konkan and N. Kanara Ghâts, forming the undergrowth in many deciduous moist forests (*Talbot*). The stems which, if kept regularly cut down, grow to the thickness of a walking-stick, are used by the natives for making mud walls, the stems being placed close together and covered with a plaster of mud and cowdung. KONKAN : *Stocks* !, *Law* ! ; Matheran, below Chowk Point, *H. M. Birdwood.* DECCAN : Purandhar, *A. G. Cane* ! ; Mahableshwar, *Cooke* ! KANARA : Anmod (N. Kanara), *Talbot*, 1616 !—DISTRIB. India (W. Peninsula, Central India).

6. **Strobilanthes barbatus,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 85. A large shrub 8—12 ft. high, subscandent (*Dalzell*), with numerous exposed roots from the lower part of the stem (*Beddome*); stems and branches quadrangular, often broadly winged (sometimes wingless). Leaves coriaceous, 4—10 by 2—4 in., elliptic-lanceolate, acuminate, crenulate or subentire, glabrous, shining above, densely lineolate especially on the upper side, base tapering, often running down wing-like into the petiole ; main nerves 7—9 pairs, conspicuous on both sides ; petioles about 1 in. long, frequently obscure owing to the decurrence of the leaf-blade, often winged, the wings sometimes running into the wings on the stem or branch. Flowers in axillary and terminal dense heads or spikes 1—2 in. long ; bracts ¾ in. long, densely imbricate, rhomboid-cuneate, cuspidately mucronate, ciliate and, as well as the bracteoles, becoming viscous-hairy in fruit (*Talbot*) ; bracteoles ½—⅝ in. long, lanceolate, cuspidate, ciliate. Calyx ⅓ in. long, divided more than ½-way down ; segments lanceolate, acuminate, ciliate. Corolla white, ⅞ in. long, hairy inside, often with a few scattered hairs on the outside of the limb ; lower half of the tube narrow-cylindric, the upper portion suddenly campanulately enlarged ; lobes ¼ in. long, oblong, obtuse, ciliate. Stamens 4, exserted ; longer filaments bearded, the shorter hairy at the base only ; rudimentary 5th stamen sometimes present. Style glabrous. Capsules ½—⅝ in. long, clavate, glabrous, 2-seeded. Seeds ¼ in. long, broadly elliptic, subacute at the apex, very thin, yellow, without areoles, glabrous. Fl. B. I. v. 4, p. 437 ; Bedd. Icon. Pl. Ind. Or. p. 49, t. 212 ; Talb. Trees, Bomb. ed. 2, p. 261 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Strobilanthes tetrapterus*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 342 ; Dalz. & Gibs. p. 187.—Flowers : Oct.—Dec., septennially (*Beddome, Talbot*).

KONKAN: *Stocks*!, *Hooker*!; Wari country, *Dalzell*! KANARA: *Bhiva*!; common in the Yellapur taluka, *Talbot*; Mulas, *Ritchie*, 1938!—DISTRIB. India (W. Peninsula).

7. **Strobilanthes ciliatus,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 85. A small shrub; stems and branches terete or subquadrangular, often fimbriate at the nodes. Leaves 4—7 by 1—2 in., lanceolate, acuminate, lineolate (densely so above), glabrous or nearly so, serrate, base attenuated into the petiole; main nerves 6—7 pairs; petioles ½—1½ in. long, sometimes obscure. Flowers in axillary slender glabrous spikes 1—3 in. long; peduncles long, slender, glabrous, jointed and bracteate below the middle and there deflexed; bracts ¼ in. long, ovate, subacute, glabrous, lineolate, the margins often obscurely toothed; bracteoles ⅛ in. long, shorter than the calyx, linear, subobtuse, mucronulate, lineolate, glabrous. Calyx ¼ in. long, glabrous or nearly so; tube about $\frac{1}{20}$ in. long; segments subequal, linear, subobtuse. Corolla white, ½—⅝ in. long; tube narrow in the lower part, campanulately swollen in the upper half; lobes ⅛ in. long, oblong, rounded at the apex, spotted with lilac at the base (*Beddome*). Stamens 4, exserted; filaments of the longer stamens bearded; anthers purple. Ovary glabrous; style glabrous. Capsules not seen. Fl. B. I. v. 4, p. 439; Bedd. Icon. Pl. Ind. Or. p. 49, t. 211; Talb. Trees, Bomb. ed. 2, p. 261; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355; Watt, Dict. Econ. Prod. v. 6, part 3, p. 375.—Flowers: Oct.-Nov., probably annually (*Beddome*).

KONKAN: *Stocks*!, *Dalzell*!; Savantvádi, *Cooke*!, *Woodrow*. KANARA: evergreen forests of the Yellapur taluka of N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

The plant has a strong aromatic odor, and is used medicinally by the natives in the regions where it grows (*Watt*).

8. **Strobilanthes scrobiculatus,** *Dalz. ex C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1884) p. 445. A small branched shrub; older branches glabrous, terete, ashy-white. Leaves 2—3 by ¾—1 in., almost all falling off before flowering-time except a few at the tops of the branches, elliptic-lanceolate, acuminate, densely lineolate, especially on the upper side, otherwise nearly glabrous; base tapering, unequal-sided; main nerves 6—7 pairs; petioles ½ in. long. Flowers in numerous subsessile spikes, elongating in fruit, on the naked branches from the axils of fallen leaves; bracts ⅓ in. long, obovate-oblong, hairy with gland-tipped hairs; bracteoles ⅓ in. long, linear, obtuse, glandular-hairy. Calyx ⅓ in. long in flower (enlarged to ⅝ in. in fruit), glandular-hairy; tube $\frac{1}{16}$ in. long; segments linear, subobtuse, densely glandular-ciliate. Corolla 1 in. long with whitish tube and limb of a beautiful blue, glabrous outside, hairy inside; lower contracted part of the tube much shorter than the narrowly ventricose portion; lobes ⅛—⅓ in. long, oblong, rounded or truncate and with slightly crenulate margins. Stamens 4, included; filaments glabrous; anthers apiculate, obtuse at the base. Capsules rather less than ½ in. long, lanceolate, acute, 4-seeded. Seeds $\frac{1}{10}$—⅛ in. long, ovoid, subacute, hygroscopically hairy and with a dense fringe on the margin, which is drawn into a point at the apex, giving the dry

seed the appearance of having a long slender acumen. Tall. Trees, Bomb. ed. 2, p. 262.—Flowers: Nov., with intervals of some years.

West coast of Peninsula, *Dalzell*! DECCAN: Mahableshwar, *Ralph*!, *Cooke*! KANARA: common on the summit of Dursingudda in the Supa taluka of N. Kanara, 3400 ft. elevation, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

A very beautiful species when in full flower. It is very common, occupying extensive patches in some of the ravines at Mahableshwar, but I have only seen it in flower once (in 1888), when the sides of the ravines where it grew appeared, from a short distance, to be quite a sheet of blue. The leaves of the branches fall before the plant flowers, only a few small ones remaining at the tips. The measurements of leaves given above only apply to these latter, and do not represent the size of the actual stem leaves.

9. **Strobilanthes warreensis,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 341. Shrubby, erect, 5—6 ft. high; stem obtusely quadrangular or subterete. Leaves 4½—6 by 1½—2 in., lanceolate, long-acuminate, crenate or subserrate, glabrous, densely lineolate above, base tapering and decurrent into the petiole; main nerves 7 pairs, conspicuous on both sides; petioles ½—1¼ in. long, often indistinct owing to the decurrent leaf-blade. Flowers in axillary pedunculate spikes 1—3 in. long; peduncles hairy; bracts (in flower) ¼—⅓ in. long, elliptic-oblong, concave, densely clothed, as are the bracteoles and calyx, with gland-tipped hairs; bracteoles ¼ in. long, shorter than the calyx, linear, obtuse. Calyx much enlarged in fruit, in flower ⅓ in. long, divided nearly to the base; segments linear, subacute, one of them a little longer than the other 4. Corolla ⅜—½ in. long, white, glabrous outside and with a few hairs inside; tube narrowly cylindric in the lower, campanulately inflated in the upper half; lobes ¼ in. long, oblong, rounded at the apex, spotted with purple at the base. Stamens 4, exserted; filaments of the longer stamens bearded. Ovary glabrous; style glabrous. Capsules ½—¾ in. long, oblong, subacute, minutely pubescent, 4-seeded. Seeds elliptic-oblong, rounded at the apex, glabrous, flat, striate, yellow. Fl. B. I. v. 4, p. 439; Dalz. & Gibs. p. 187; Talb. Trees, Bomb. ed. 2, p. 261; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 355. *Strobilanthes parviflorus*, Bedd. Icon. Pl. Ind. Or. (1874) p. 45, t. 197.—Flowers: Oct.—Dec.

KONKAN: Wari country, *Dalzell*! KANARA: Mulas, *Ritchie*, 1937!; Nilkund Ghát, *Talbot*, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

10. **Strobilanthes asper,** *Wight, Icon.* (1850) t. 1518 (*not* of Dene.). A shrub 2—4 ft. high; stems with swollen nodes, the young ones obtusely subquadrangular, glandular-hairy. Leaves 2½—5 by 1¼—2¼ in., elliptic, acuminate, crenate, dark green, densely lineolate and rough with short stiff hairs above, paler and hairy on the nerves and veins beneath, base tapering or shortly cuneate; main nerves 6—8 pairs; petioles ¾—1¾ in. long. Flowers in solitary or branched (often ternately) pedunculate oblong spikes 1—1½ in. long in flower (elongating to 2 to 3 in. in fruit); peduncles glandular-hairy; bracts ⅓ by ⅛ in., glandular hairy, irregularly ovate, obliquely and bluntly acuminate and with ciliate often curled margins; bracteoles shorter than the calyx, ⅛ in. long, linear, obtuse, ciliate. Calyx ⅓ in long;

segments linear, subobtuse, hairy and ciliate. Corolla $\frac{5}{8}$—$\frac{3}{4}$ in. long, glabrous or nearly so outside, hairy inside, densely so below the stamens, the narrow cylindric basal rather shorter than the ventricose portion; lobes short, rounded, sometimes slightly crenulate. Filaments of the longer stamens slightly hairy. Ovary glabrous; style pubescent. Capsules $\frac{1}{2}$ in. long, oblong, acute, 4-seeded. Seeds $\frac{1}{8}$ in. long, ovate, flat, hygroscopically hairy. Fl. B. I. v. 4, p. 452; Talb. Trees, Bomb. ed. 2, p. 263; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers: Aug.—Oct.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*!; Matheran, near little Chowk Point, *H. M. Birdwood*. KANARA: Santaveri, *Woodrow*.—DISTRIB. India (W. Peninsula).

11. **Strobilanthes perfoliatus,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 471. A much-branched shrub 3—4 ft. high, nearly glabrous except the inflorescence; stems terete. Leaves 4—8 by $1\frac{1}{4}$—$2\frac{1}{2}$ in. (sometimes, in exceptional cases, attaining 15 in. in length), elliptic-lanceolate, much-acuminate, sparingly toothed or entire, green lineolate and glabrous above, steel-grey beneath, base tapering, decurrent into the petiole, forming a wing along it to its lower insertion and there auriculate (not perfoliate); main nerves 6—10 pairs. Flowers in axillary and terminal simple or compound strong-smelling spikes 2—5 in. long, close together along the rhachis or often with internodes of variable length; rhachis tetragonal, viscous-hairy; peduncles usually short; bracts $\frac{5}{8}$—$\frac{3}{4}$ by $\frac{1}{10}$—$\frac{1}{8}$ in., linear-lanceolate, subacute and, as well as the bracteoles and calyx, glandular-hairy; bracteoles $\frac{3}{8}$ in. long, shorter than the calyx, linear, subacute. Calyx $\frac{1}{2}$ in. long, divided nearly to the base; segments linear, subacute, one longer than the other 4, which are somewhat unequal. Corolla blue, blabrous outside, hairy inside, $1\frac{1}{2}$ in. long or more, tubular-infundibuliform; narrow portion of the tube shorter than the ventricose; lobes $\frac{1}{3}$ in. long, equal, rounded. Stamens 4, included; filaments of the longer stamens bearded with long hairs almost to the apex (not glabrous, as erroneously stated in Fl. B. I.). Style slightly hairy. Capsules $\frac{1}{2}$ by $\frac{1}{3}$ in., obovoid, compressed, mucronate, glabrous, 2-seeded. Seeds $\frac{1}{8}$ in. long, ovoid, shaggy; areoles small. Fl. B. I. v. 4, p. 458; Talb. Trees, Bomb. ed. 2, p. 263; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Leptacanthus alatus*, Wight, Icon. t. 1527. *Endopogon integrifolius*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 342; Dalz. & Gibs. p. 185.—Flowers: Dec.—Mar. [about once in 7 years (*Talbot*); triennially (*H. M. Birdwood*, Cat. Fl. Matheran & Mahableshwar, p. 25)]. Mr. Talbot (*l. c.*) says that a general flowering took place near Ainshi (N. Kanara) in 1887. VERN. *Waiti*.

KONKAN: *Stocks*!, *Law*!; in old forests in all the elevated parts of the Konkan, *Dalzell*!; Matheran, *Cooke*!, *H. M. Birdwood*; hills near Panvel, *Dalzell & Gibson*. KANARA: evergreen forests from Ainshi southwards, gregarious, *Talbot*; Kadgal, *Woodrow*.—DISTRIB. India (W. Peninsula), apparently endemic.

12. **Strobilanthes ixiocephalus,** *Benth. in Flora*, v. 33 (1849) p. 557. A small straggling shrub; branches terete, the older

glabrous. Leaves 2½—7 by 1½—2½ in., one of each pair usually smaller than the other, elliptic-lanceolate, acuminate, crenate, densely lineolate on both sides, the upper side and the nerves beneath rough with short stiff hairs, base cuneate, often unequal-sided ; main nerves 8—10 pairs, slender, prominent ; petioles ¾—2 in. long. Flowers in pedunculate ovoid viscid spikes ½—1½ in. long, with a balsamic odor, solitary and axillary, or in branched (often ternate) cymes which are axillary or terminally clustered ; bracts ½ by ¼—⅓ in., ovate, usually bluntly acuminate, viscous-hairy ; bracteoles ¼—⅓ in. long, linear-spathulate, viscous-hairy. Calyx ⅜—½ in. long, enlarged in fruit, divided almost to the base, viscous-hairy ; segments linear, obtuse. Corolla white, ¾—1¼ in. long, slightly pubescent outside, hairy inside ; narrow portion of the tube about equalling the ventricose portion ; lobes ¼ in. long, ovate-oblong. Stamens included, hairy at the base, the longer filaments slightly hairy upwards ; pollen globose, echinate or tuberculate. Style faintly pubescent. Capsules ½ in. long, obovoid, narrowed at the base, compressed, mucronate, usually 2-seeded, glabrlous. Seeds ⅛ in. long, ovoid, subacute, flattened, hygroscopically hairy, very densely so on the margin. Fl. B. I. v. 4, p. 444 ; Bedd. Icon. Pl. Ind. Or. p. 47, t. 203 ; Talb. Trees, Bomb. ed. 2, p. 262 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Strobilanthes Neesiana*, Wight, Icon. t. 1523 ; Dalz. & Gibs. p. 188. *S. glutinosa*, Grah. Cat. Bo. Pl. p. 162 (*not* of Nees).—Flowers : Nov.—Jan., septennially (*H. M. Birdwood*) or annually (*Talbot*). It flowered abundantly at Mahableshwar in November 1896 (*H. M. Birdwood*, Cat. Fl. Matheran & Mahableshwar, p. 24). VERN. *Dármori* ; *Kárva*.

KONKAN : *Stocks* !, *Law* ! ; Salsette and Konkan hills, *Dalzell & Gibson* ; Vingorla, *Kanitkar* ! DECCAN : Panchgani, *Woodrow* ! Mahableshwar (near the lake), *Cooke* ! S. M. COUNTRY : Rámghát, *Dalzell* ! KANARA : common in N. Kanara from the coast inland in both evergreen and deciduous forests, often on laterite, *Talbot* ; Supa and Kála naddi, *Ritchie*, 1216 ! ; Kumbarváda, *Talbot*, 1829 !—DISTRIB. India (W. Peninsula), apparently endemic.

SPECIES NOT SEEN.

STROBILANTHES MINOR, Talb. Trees, Shrubs, Bomb. ed. 2 (1902) p. 262. A small shrub 1—2 ft. high. Leaves small, ovate, bluntly acuminate, 1½—3 by ¾—1¾ in., petioles ¼—1 in. long. Flowers ⅛ in. long, in dense small subglobose heads; bracts green, ovate, ciliate, ¼ in. across; bracteoles ciliate. Corolla blue, very hairy within. Stamens 4; filaments hairy downwards. Style hairy. Banks of the Kála naddi near Supa, N. Kanara.

STROBILANTHES MEMBRANACEUS, Talb. Trees, Shrubs, Bomb. ed. 2 (1902) p. 261. A stout gregarious shrub. Leaves broadly ovate, long-acuminate, narrowed into the petiole, deeply crenate-serrate, membranous, rugose, hispidulous, 2—7 by 1—4 in. ; petiole ¼—3 in. long. Heads ovoid, 1—1½ in. long, densely viscous-hairy; hairs mostly jointed. Seeds $\frac{1}{10}$ in., exareolate, quite glabrous.

Distinguished from other Bombay species of *Strobilanthes* by its rugose hispidulous softly membranous leaves. Common in the jungles near the Tinai Ghát, N. Kanara (*Talbot*).

18. **CALACANTHUS,** T. Anders.

An erect shrub, glabrous except the inflorescence. Leaves large, entire. Flowers large, solitary and sessile in the axils of bracts, arranged in long lax spikes terminal and from the upper axils ; bracts and bracteoles herbaceous. Calyx sub-5-partite ; segments unequal, the upper and two lower lanceolate, the two lateral innermost, linear. Corolla purple, deeply 2-lipped ; upper lip narrow, shortly 2-fid ; lower lip large, convex, shortly 3-fid ; lobes contorted in bud. Stamens 4, didynamous, inserted above the middle of the tube ; filaments connate at the base, in pairs connected by a transverse line or membrane ; anthers subequal, oblong, 2-celled, ciliate. Disk not prominent. Ovary 2-celled ; ovules 2 in each cell ; style long, filiform, hairy ; stigma simple, linear. Capsule obovoid, compressed, acute at both ends, 2-seeded. Seeds compressed, hairy, supported on retinacula.—DISTRIB. Western Peninsula of India ; species 1.

1. **Calacanthus Dalzelliana,** *T. Anders. ex Benth. & Hook. f. Gen. Pl.* v. 2 (1876) p. 1088. A leafy gregarious shrub 5—6 ft. high, black when dry ; stem erect, quadrangular, glabrous, except for a few hairs at the nodes. Leaves 5—8 by 2—3½ in., the upper subsessile, the lower petiolate, elliptic, acuminate, entire, slightly ciliate, glabrous or nearly so, minutely lineolate on both surfaces, base tapering ; main nerves 10—12 pairs, arcuate, prominent ; petioles 0—1½ in. long. Spikes of flowers terminal and from the upper axils, 1—6 in. long, simple or branched ; bracts ¾—1¼ by ⅓ in., elliptic-lanceolate, penninerved, and, as well as the bracteoles and calyx-segments, hirsute and densely ciliate with long white hairs ; bracteoles ¾ by ⅛ in., oblong-lanceolate. Calyx ¾ in. to top of longest segment, divided nearly to the base, the longest segment ⅛—½ in. wide, lanceolate, 5-nerved, 2 other segments narrower, lanceolate, 3-nerved, the 2 lateral segments linear-subulate, shorter than the others. Corolla bluish-purple, 1½ in. long or more, hairy outside ; upper lip 2-fid ; lower lip 3-lobed, convex, transversely plicate and with 2 rows of bright yellow hairs down its centre ; narrow portion of tube short. Stamens 4, didynamous ; filaments glabrous ; anthers ciliate, subsagittate at the base. Ovary and style hairy. Capsules ¾—⅞ by ⅓ in., obovoid, compressed, narrowed at the base and acute at the apex, pubescent. Seeds ⅓ in. in diam., hairy, yellowish. Fl. B. I. v. 4, p. 478 ; Talb. Trees, Bomb. ed. 2, p. 264 ; Woodr. in Journ. Bomb. Nat v. 12 (1899) p. 356. *Lepidagathis grandiflora,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 138 ; Dalz. & Gibs. p. 190 ; Bedd. Icon. Pl. Ind. Or. p. 54, t. 226.—Flowers : Oct.—Dec.

KONKAN : Ghâts, *Dalzell* ! ; Matheran (just before reaching the summit below the Chauki), *Cooke* !, *Woodrow*. S. M. COUNTRY : Párvá Ghát, *Ritchie*, 1201 ; KANARA : Supa Ghâts of N. Kanara, *Talbot*.—DISTRIB. India (W. Peninsula), apparently endemic.

19. **ANDROGRAPHIS,** Wall.

Annual erect or procumbent herbs or small shrubs. Leaves entire. Flowers in lax panicles, or dense and subcapitate axillary and terminal racemes often unilateral ; bracts small ; bracteoles minute or

0. Calyx 5-partite ; segments narrow. Corolla small, tubular, 2-lipped, pubescent. Stamens 2 ; filaments ciliate or setulose ; anthers 2-celled, exserted, the cells oblong, parallel, subequal, muticous, bearded at the base. Ovary 2-celled ; ovules 3—6 in each cell ; style slender ; stigma shortly 2-lobed. Capsule linear-oblong or elliptic, compressed contrary to the septum. Seeds hard, subquadrate or oblong, rugosely pitted, glabrous ; retinacula lanceolate.—DISTRIB. India, Ceylon ; species 17.

Leaves acute, glabrous; racemes laxly panicled; capsule glabrous	1. *A. paniculata.*
Leaves obtuse, hairy; racemes axillary, not panicled; capsule hairy	2. *A. echioides.*

1. **Andrographis paniculata,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 116. An erect branched annual 1—3 ft. high ; branches sharply quadrangular, often narrowly winged in the upper part. Leaves 2—3 by ½—1 in., lanceolate, acute, glabrous, slightly undulate, pale beneath ; base tapering ; main nerves 4—6 pairs, slender : petioles 0—¼ in. long. Flowers small, solitary, distant, in lax spreading axillary and terminal racemes or panicles, the whole forming a large pyramidal paniculate inflorescence ; bracts $\frac{1}{10}$ in. long, lanceolate ; bracteoles similar or 0 ; pedicels $\frac{1}{10}$—⅛ in. long, glandular-pubescent. Calyx ⅛ in. long ; sepals equal, linear-lanceolate, glandular-pubescent. Corolla rose-colored, ⅜ in. long, hairy outside, 2-lipped rather more than ½-way down ; tube ¼ in. long, slightly enlarged below the limb ; upper lip ⅛ in. long, oblong, 2-toothed at the apex ; lower lip equal in length, deeply 3-lobed, the lobes $\frac{1}{10}$ in. long, linear-oblong, subobtuse. Filaments flattened, hairy in the upper part ; anthers bearded at the base. Ovary glabrous ; style slightly pubescent. Capsules ¾ by ⅛ in., linear-oblong, acute at both ends. Seeds numerous, subquadrate, osseous, rugosely pitted, glabrous, yellowish-brown. Fl. B. I. v. 4, p. 501 ; Dalz. & Gibs. p. 198 ; Wight, Icon. t. 518 ; Trim. Fl. Ceyl. v. 3, p. 326 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357 ; Watt, Dict. Econ. Prod. v. 1, p. 240. *Justicia paniculata,* Burm. Fl. Ind. p. 9 ; Grah. Cat. p. 164.—Flowers : Dec. VERN. *Kreát* ; *Kalpa* ; *Kála-meti* ; *Mahátiti.*

KONKAN : *Stocks* ! ; Sewri, *Woodrow* ! ; Island of Bombay, *Kanitkar* ! KANARA : Honavar, *Woodrow.*—DISTRIB. Throughout India, sometimes cultivated ; Ceylon.

The plant is famous as a bitter tonic and febrifuge and is sold in the Indian markets. The broken stems and leaves are infused in cold water and the bitter infusion taken. See Watt, Dict. Econ. Prod. l. c.

2. **Andrographis echioides,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 117. Herbaceous, erect, 6—18 in. high ; stem quadrangular, grooved, with a few spreading branches from near the base often not branched, clothed with spreading hairs. Leaves 1½—3 by ⅜—1 in., sessile, oblong, obtuse, more or less sparsely hairy, ciliate on the margins, base cuneate ; main nerves 4—6 pairs. Flowers numerous, placed along the upper side of a slender glandular-hairy rhachis, in axillary racemes shorter than the leaves ; bracts $\frac{1}{12}$ in. long, lanceolate ; bracteoles minute, $\frac{1}{10}$ in. long, subulate. Calyx ⅛—¼ in. long, glandular-hairy, divided almost to the base ; sepals narrowly linear

(scarcely $\frac{1}{30}$ in. wide), acute, ciliate, elongating in fruit. Corolla densely pubescent outside, pink or white, $\frac{3}{8}$—$\frac{5}{8}$ in. long, 2-lipped a little less than $\frac{1}{2}$-way down ; upper lip obovate-oblong, rounded ; lower lip 3-lobed about $\frac{1}{2}$-way, blotched with purple, the lobes oblong, obtuse, the middle lobe slightly larger than the lateral ones. Filaments flat, sparsely hairy ; anthers bearded. Ovary hairy ; style pubescent. Capsules $\frac{3}{8}$—$\frac{1}{2}$ in. long, half as broad as long, elliptic-lanceolate (in horizontal section), compressed, acute at both ends, hairy. Seeds $\frac{1}{10}$ by $\frac{1}{20}$ in., oblong, not compressed, rugosely pitted, glabrous. Fl. B. I. v. 4, p. 505 ; Dalz. & Gibs. p. 198 ; Trim. Fl. Ceyl. v. 3, p. 327 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Justicia echioides*, Linn. Sp. Pl. (1753) p. 16 ; Grah. Cat. p. 164.—Flowers : Aug.—Sept.

DECCAN : sides of ravines, not very common, *Dalzell & Gibson* ; S. of Ahmednagar, rare, *Gibson* ex *Graham* ; Hotgi, *Bhiva* ! ; Mahableshwar, *Cooke* ! ; Poona, banks of the Mula river, *Woodrow* ! S. M. COUNTRY : Badami, *Woodrow* ! GUJARAT : *Stocks* ! ; Karnáli *Kanitkar* !—DISTRIB. Tropical India in the drier districts ; Ceylon.

20. **HAPLANTHUS,** Nees.

Erect herbs. Leaves entire. Flowers axillary, pseudo-verticillate, surrounded by numerous abortive branchlets reduced to spine-like cladodes terminated by 2—3 minute spinous or subspinous points (reduced leaves) ; bracts and bracteoles small. Calyx 5-partite ; segments linear lanceolate, subequal. Corolla small, tubular ; tube slightly enlarged above ; limb 2-lipped, the upper lip 2-fid, the lower obtusely 3-lobed. Stamens 2, shorter than the corolla, inserted below the throat ; filaments flattened ; anthers connivent, subcoherent, 2-celled, dorsifixed, the cells ovate, more or less unequal, muticous, one usually bearded on the back. Disk thick, prominent. Ovary 2-celled ; ovules 3—8 in each cell ; style acute or obliquely truncate at the apex. Capsule linear-oblong, compressed contrary to the septum, 6—16-seeded from the base. Seeds oblong-ellipsoid, slightly or not compressed, densely shortly hairy when wetted.—DISTRIB. Species 3, endemic in India.

Bracteoles longer than the calyx; axillary spines exceeding 1 in. long; capsule glabrous.....	1. *H. verticillaris.*
Bracteoles shorter than the calyx; axillary spines not exceeding 1 in. long; capsule pubescent.....	2. *H. tentaculatus.*

1. **Haplanthus verticillaris,** *Nees, in DC. Prodr.* v. 11 (1847) p. 513. Herbaceous, 1½—2½ ft. high ; stem glabrous at the base, more or less pubescent upwards. Leaves 2½—4 by 1½—2 in., ovate, acuminate, or acute, or subobtuse, pubescent above and on the nerves beneath ; base shortly cuneate ; main nerves 8—10 pairs, slender, prominent beneath ; petioles 1—2 in. long. Axillary spines (*cladodes*) 1—1½ in. long, quadrangular, usually with 2 sharp naked spinous teeth at the apex, clothed with short glandular and long spreading hairs or sometimes nearly glabrous. Flowers in the midst of the spines, sessile ; bracteoles subulate, finely pointed, longer than the calyx. Calyx $\frac{1}{8}$ in. long, divided almost to the base ; sepals glandular-

pubescent, lanceolate with a subulate point. Corolla $\frac{5}{8}$ in. long, slightly pubescent outside, tubular, 2-lipped about $\frac{1}{4}$-way down ; limb dark-lilac, marked with darker lines, greenish-white inside the throat. Capsules $\frac{3}{8}$—$\frac{1}{2}$ in. long, narrowly oblong, acute, grooved, glabrous, white. Seeds $\frac{1}{10}$—$\frac{1}{8}$ by $\frac{1}{20}$ in., oblong, compressed, yellowish-brown, densely hairy when wetted. Fl. B. I. v. 4, p. 506 ; Dalz. & Gibs. p. 197 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Justicia verticillata,* Roxb. Fl. Ind. v. 1, p. 135 ; Grah. Cat. p. 165.—Flowers : Dec. VERN. *Jakára* ; *Kateri.*

Dalzell, without locality in Herb. Kew.! KONKAN : *Law*!; Konkan hills, *Woodrow,* 20!; Matheran, *Cooke*! DECCAN : Khandala, *Cooke*!, *Graham*; Mahableshwar, *Cooke*!; Sinhagad, *Gangaram*! S. M. COUNTRY : near Belgaum, *Ritchie,* 577!—DISTRIB. India (W. Peninsula).

2. **Haplanthus tentaculatus,** *Nees, in DC. Prodr.* v. 11 (1847) p. 513. A slender herb ; stems quadrangular in the upper part, glandular-pubescent throughout. Leaves 2—4 by 1¼—2 in., ovate, acuminate, more or less pubescent, decurrent into the petiole which is therefore often obscure ; main nerves 8—10 pairs, slender ; petioles obscure owing to the decurrent leaf-blade. Axillary spines (cladodes) slender, ¼—¾ in. long, shortly densely and softly villous and also with long hairs, with 2 or 3 more or less flattened villous (hardly spinous) teeth (reduced leaves) at the apex. Flowers sessile in the midst of the cladodes ; bracteoles subulate, shorter than the calyx. Calyx ⅛ in. long, divided almost to the base ; sepals linear-subulate, densely hairy. Corolla ½ in. long, blue or lilac, 2-lipped about ¼-way down. Capsules ⅓ in. long, oblong, pointed, pubescent. Fl. B. I. v. 4, p. 507 ; Dalz. & Gibs. p. 197 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Dec.

KONKAN : Marmagão, *Woodrow.* DECCAN : Nasik, *Bhiva*!; Khandala, *Cooke*!, *Woodrow*! GUJARAT : Surat, *Woodrow.*—DISTRIB. India (W. Peninsula, Central India).

21. GYMNOSTACHYUM, Nees.

Herbs or undershrubs. Leaves cauline or subradical, entire, sinuate, crenulate or toothed. Flowers subsessile or shortly pedicellate, in axillary cymes or in a terminal panicle, often spicate or racemose ; bracts and bracteoles usually minute. Calyx deeply divided ; lobes equal, linear-lanceolate. Corolla 2-lipped ; tube narrow, cylindric ; lobes subequal, oblong-elliptic, imbricate. Stamens 2, nearly equalling the corolla, rarely exserted beyond it ; filaments often hairy near the base ; anthers 2-celled, the cells subequal, oblong or ovate, hairy or glabrous. Ovary 2-celled ; ovules numerous in each cell ; style slender ; stigma subentire. Capsule linear, pubescent or glabrous, 16—24-seeded. Seeds broadly ovoid, compressed, hairy.—DISTRIB. India and Malaya ; species 15.

Flowers in axillary racemes or panicles; stamens exserted beyond the corolla; capsule glabrous.....	1. *G. latifolium.*
Flowers in terminal spikes or racemes; stamens not exserted beyond the corolla; capsule glandular-pubescent	2. *G. glabrum.*

1. **Gymnostachyum latifolium,** *T. Anders. in Journ. Linn. Soc.* v. 2 (1867) p. 505. A glabrous undershrub 3 ft. high ; stem erect, quadrangular, rough with small tubercles. Leaves large, 3½—8 by 2¾—6 in., broadly ovate, acute, glabrous, base rounded or truncate, sometimes (more rarely) acute ; main nerves 10—14 pairs, prominent ; petioles reaching 6 in. long. Flowers in axillary racemes or panicles often from the axils of fallen leaves ; bracteoles ½ in. long, lanceolate ; pedicels very short. Calyx ¼ in. long, glabrous, 5-partite ; segments ¼ in. long, linear, acute. Corolla 1 in. long, 2-lipped ; upper lip ⅜ in. long, oblong, with 2 rounded short lobes ⅛ in. long at the apex ; lower lip 3-partite to the base, the lobes oblong, obtuse. Stamens exserted beyond the corolla ; filaments flattened, glabrous ; anthers glabrous ; ovary and style glabrous. Capsules ⅞ by ⅛ in., linear, bluntly pointed, striate, glabrous, 24-seeded. Seeds $\frac{1}{16}$ in. in diam., suborbicular, much compressed, hairy when wetted. Fl. B. I. v. 4, p. 509 ; Bedd. Icon. Pl. Ind. Or. p. 61, t. 253 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Cryptophragmium latifolium,* Dalzell, in Kew Journ. Bot. v. 2 (1850) p. 137 ; Dalz. & Gibs. p. 185. —Flowers : Nov.—Dec.

S. M. COUNTRY : Chorla Ghát, *Dalzell* ! ; Castlerock, *Kanitkar* !, *Bhiva* !— DISTRIB. India (W. Peninsula).

2. **Gymnostachyum glabrum,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 506. An undershrub, nearly glabrous except the inflorescence ; stems obtusely subquadrangular, more or less lenticellate. Leaves 4½—7 by 2—2¾ in., elliptic-lanceolate, acuminate, glabrous or nearly so, with undulate crenate or toothed margins, base tapering, often decurrent into the petiole ; main nerves 10—12 pairs, prominent ; petioles ¾ in. long, sometimes obscure. Flowers sessile or subsessile, in terminal branched spikes or racemes 6—10 in. long, in rather distant clusters along a glandular-pubescent rhachis ; bracts ⅛ in. long, lanceolate, acute. Calyx glandular hairy, ⅛ in. long, 5-partite ; segments ⅙ in. long, linear-lanceolate, acute, ciliate with glandular hairs. Corolla white, spotted inside with purple spots, ⅝ in. long, glandular-pubescent outside, 2-lipped about ½-way down ; upper lip ⅓ by ⅛ in., obovate-oblong, shortly 2-lobed at the apex ; lower lip 3-lobed about ½-way down, the lobes ⅙ by ⅛ in., oblong, obtuse. Stamens nearly reaching but not exserted beyond the top of the corolla ; filaments hairy at their insertion in the corolla-tube, otherwise glabrous ; anthers glabrous. Ovary minutely papillose, not pubescent ; style slightly pubescent. Capsules ⅝ in. long by ⅛ in. in diam., subcylindric, bluntly pointed, glandular-pubescent. Seeds $\frac{1}{16}$ in. in diam., much compressed, finely hairy when wetted. Fl. B. I. v. 4, p. 509 ; Bedd. Icon. Pl. Ind. Or. p. 61, t. 251 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Cryptophragmium glabrum,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 338 ; Dalz. & Gibs. p. 185.— Flowers : Dec.—Feb.

KONKAN : shady woods of S. Konkan, *Dalzell* ; Konkan, *Law* ! ; Ghâts, *Dalzell* ! S. M. COUNTRY : Castlerock, *Cooke* !, *Kanitkar* !—DISTRIB. India (W. Peninsula).

VAR. *denticulata*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 509, cannot stand as a variety. The leaves are not more denticulate than many of the leaves of the type. Dalzell & Gibson, Bo. Fl. p. 185, describe the leaves of the type as denticulate, glabrous, and Dalzell was the first to describe the plant.

DOUBTFUL SPECIES.

GYMNOSTACHYUM LONGIFOLIUM, T. Anders. MS. in Herb. Kew. There is a single sheet in Herb. Kew. named as above by Dr. Anderson, the specimens on which were collected in Kanara by Mr. Law. No further details as to habitat exist, so that there are no means of ascertaining whether the specimens came from N. or S. Kanara, which latter district is outside the limits of the Bombay Presidency. Mr. C. B. Clarke (Hook. f. Fl. B. I. v. 4, p. 509) makes this a variety of *G. canescens*, T. Anders. There are no flowers on the specimens, but the leaves, which are 6—9 by 1—2 in., lanceolate-oblong, acute, glabrous, toothed, and decurrent almost to the base of the petiole, are very different from those of *G. canescens*, while the capsules, which reach 1 in. long are larger than in that plant and are glabrous, those of *G. canescens* being glandular-hairy. From the fragments on the sheet the plant seems to be sufficiently distinct from *G. canescens* to warrant its maintenance as a separate species, but further specimens with flowers are needed and the habitat of the plant has to be determined.

22. **CROSSANDRA,** Salisb.

Undershrubs. Leaves opposite or whorled, entire or undulate, sometimes slightly toothed. Flowers sessile, in strobilate spikes; bracts imbricate; bracteoles linear or lanceolate, as long as the calyx. Calyx 5-partite to the base; the 2 lower sepals oblong, acute, 1-nerved, the upper sepal broader, 2-nerved, often 2-toothed, the 2 innermost sepals lanceolate, smaller than the outer. Corolla orange-yellow or red; tube long, linear, much longer than the limb; limb split down the back and forming a single flattened obtusely 5-lobed lip; lobes subequal, imbricate in bud. Stamens 4, didynamous, included in the corolla-tube; anthers small, 1-celled. Ovary 2-celled; ovules 2 in each cell; stigma 2-fid. Capsule oblong, subacute, usually 4-seeded. Seeds ellipsoid or suborbicular, compressed, clothed with appressed fringed scales formed of many connate hairs.—DISTRIB. India, Africa, Mascarene Islands; species 14.

1. **Crossandra undulæfolia,** *Salisb. Parad. Lond.* (1805) t. 12. An undershrub 2—3 ft. high (in cultivation often higher); branches terete, glabrous or nearly so. Leaves 4 in a whorl (decussate pairs inserted close to one another), 4—6 by 1½—2 in., rather thick, lanceolate, acute, glabrous, shining, base much attenuated into the petiole; main nerves about 8 pairs, slender; petioles ½—1 in. long, often obscure owing to decurrent leaf-blade. Flowers numerous, in axillary often long-pedunculate quadrangular narrow spikes 3—6 in. long; bracts much imbricate, ⅝ by ¼ in., elliptic-lanceolate, mucronate, glandular-pubescent, nerved, ciliate; bracteoles ½ by $\frac{1}{20}$ in., narrowly linear with subulate points, glandular-pubescent. Calyx 5-partite to the base; upper sepal ½ by ⅛ in., 2-nerved, 2-toothed; 2 lower sepals ½ by $\frac{1}{12}$ in., 1-nerved, all three lanceolate, very acute, penicillate at the apex and ciliate with long white jointed fine hairs; inner sepals

⅜ by $\frac{1}{20}$ in., lanceolate-subulate, ciliate towards the tip with fine jointed hairs. Corolla orange-yellow, pubescent outside ; tube ¾ in. long, slender ; limb 1½ in. across. Capsules ⅝ in. long, oblong, subacute, glabrous. Seeds ⅛—⅕ in. in diam., compressed, densely clothed with fringed scales. Fl. B. I. v. 4, p. 492 ; Trim. Fl. Ceyl. v. 3, p. 332 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Crossandra axillaris,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 98 ; Dalz. & Gibs. p. 193 ; Wight, Icon. t. 460. *C. coccinea,* Dalz. & Gibs. Suppl. p. 71. *Raellia infundibuliformis,* Roxb. Fl. Ind. v. 3, p. 41 ; Grah. Cat. p. 161.—Flowers : June—Jan. VERN. *Aboli.*

Very common in gardens and planted about temples, rarely found wild. KONKAN : *Law* ! S. M. COUNTRY : about Dharwar, *Dalzell & Gibson.* KANARA : *Talbot* ; Kumpta, *Woodrow* ; Supa on the Kála naddi, *Ritchie,* 1950 !—DISTRIB. India (W. Peninsula) ; Ceylon ; cultivated in N. India, Bengal, and Malaya.

23. **BARLERIA,** Linn.

Armed or unarmed small shrub or undershrubs. Leaves opposite, entire. Flowers showy, sessile, solitary or in dense or rather lax spikes ; bracts and bracteoles large, small or 0. Calyx divided almost or quite to the base ; sepals 4 in opposite pairs, the outer pair much the larger. Corolla infundibuliform ; tube elongate ; lobes 5, subequal, imbricate in bud. Stamens 2 fertile with oblong 2-celled anthers ; usually 2 staminodes occasionally containing a little pollen also present, and often a rudimentary 5th. Disk large, cupular, half embracing the ovary, often with a toothed margin. Ovary 2-celled ; ovules 2 in each cell ; style long, stigma 2-fid or subentire. Capsule ovoid or oblong with 2 or 4 seeds below the middle. Seeds compressed, ovoid, usually clothed with wavy silky closely appressed hairs.—DISTRIB. Species 120, mostly in Africa and Tropical Asia, a few in Tropical America.

Spinous.	
Capsule 2-seeded ; outer sepals spine-tipped.	
Flowers spicate above ; bracteoles linear-subulate	1. *B. Prionitis.*
Flowers mostly solitary, axillary ; bracteoles 0 or a few-minute bristles	2. *B. cuspidata.*
Capsule with more than 2 seeds ; outer sepals not spine-tipped.	
Corolla exceeding 1 in. long.	
Bracts of simple spines	3. *B. buxifolia.*
Bracts of spinous pinnatifid leaves or flattened pinnatifid spines	4. *B. acanthoides.*
Corolla less than 1 in. long ; bracts small, linear (spines sometimes wanting)	5. *B. Hochstetteri.*
Spineless.	
Seeds hairy.	
Bracteoles longer than or as long as the outer sepals	6. *B. tomentosa.*
Bracteoles shorter than the outer sepals.	
Outer sepals spinous	7. *B. cristata.*
Outer sepals not spinous.	
Corolla 3 in. long and upwards.	
Corolla white	8. *B. Lawii.*
Corolla blue with reddish-purple tube	9. *B. involucrata.* var. *elata.*

Corolla less than 3 in. long.
Inflorescence glabrous; corolla blue; capsule glabrous ..... 10. *B. montana.*
Inflorescence strigosely hairy; corolla blue; capsule glabrous ..... 11. *B. strigosa,* var. *terminalis.*
Inflorescence glandular-hairy; corolla with blue limb and yellow tube; capsule pubescent at the tip..... 12. *B. courtallica.*
Inflorescence softly villous; capsule glabrous ..... 13. *B. sepalosa.*
Seeds glabrous.
Outer sepals exceeding 1½ in. long; capsule 1½ in. long, glandular-pubescent; corolla pure white 14. *B. grandiflora.*
Outer sepals not exceeding 1½ in. long; capsule ⅞ in. long, glabrous; corolla pink..... 15. *B. Gibsoni.*

1. **Barleria Prionitis,** *Linn. Sp. Pl.* (1753) p. 636. A shrub 2—5 ft. high, much-branched, usually prickly ; bark whitish ; stems and branches terete or obsoletely 4-gonous, glabrous. Leaves 3½—7 by 1—2¼ in., elliptic, acuminate, bristle-tipped, entire, lineolate, glabrous above, glabrous or more or less pubescent (especially the young leaves) beneath, base tapering into the petiole ; main nerves about 5 pairs ; petioles 0—¾ in. long, becoming shorter upwards, usually with 3 (sometimes 2 or 4) divaricate acicular spines in the axils. Flowers sessile, often solitary in the lower axils, becoming spicate above ; bracts foliaceous, ⅝ by ⅛—¼ in., oblong or oblong-lanceolate, acute, bristle-tipped, nearly glabrous ; bracteoles ½ in. long, narrowly linear-subulate (almost spinous), bristle-tipped. Calyx divided almost to the base ; one of the two outer sepals rather more than ½ in. long, the opposite sepal rather less than ½ in. long, ⅛—⅙ in. broad, both oblong-lanceolate with a long mucro, the 2 inner sepals 1/16 in. wide and as long as the shorter of the outer ones, linear-lanceolate, mucronate. Corolla 1¼—1¾ in. long, yellow, slightly pubescent outside, glabrous inside, somewhat 2-lipped ; upper lip ¾ in. long or more, deeply 4-lobed, the lobes oblong obovate, rounded ; lower lip oblong-obovate, rounded, entire ; tube ¾—⅞ in. long. Stamens 2 fertile and 2 staminodes ; filaments of the fertile stamens exserted beyond the corolla-tube, those of the staminodes very short. Capsules ¾—1 in. long, ovoid, with a long tapering solid beak, 2-seeded. Seeds ⅛ in. in diam., compressed, clothed with silky appressed hairs. Fl. B. I. v. 4, p. 482 ; Grah. Cat. p. 160 ; Dalz. & Gibs. p. 189 ; Wight, Icon. t. 452 ; Trim. Fl. Ceyl. v. 3, p. 318 ; Aitch. Pb. & Sind Pl. p. 112 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358 ; Watt, Dict. Econ. Prod. v. 1, p. 400.—Flowers : Oct.—Jan. VERN. *Kholeta* ; *Pivala-Koránta.*

Common throughout the Presidency. KONKAN : *Stocks* !, *Law* ! ; Vingorla, *Woodrow* ! ; Matheran, *Cooke* ! ; Bombay (Malabar Hill), *Graham.* DECCAN : widely, *Woodrow* ; Khandala, *Cooke* ! ; Poona, *Cooke* ! GUJARAT : Deesa, *Stocks* ! SIND : *Stocks,* 52 !—DISTRIB. Throughout India; Ceylon, Tropical Asia, Tropical and S. Africa.

Often planted as a fence; the juice of the leaves is used medicinally by the natives and is applied to the soles of the feet to harden them. See Watt, Dict. Econ. Prod. l. c.

2. **Barleria cuspidata,** *Heyne, ex Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 93. A low spiny branched shrub ; stems and branches terete or obscurely 4-gonous, glabrous. Leaves subsessile, 1½—2½ by ¼—½ in., oblong-lanceolate, acute, bristle-tipped, entire, densely lineolate, glabrous, pale beneath, with long divaricate slender spines often reaching 1 in. long in the axils. Flowers solitary in opposite axils, scarcely spicate at the ends of the branches ; bracts ½—¾ by $\frac{1}{10}$—⅛ in.; bracteoles 0 or a few minute bristles. Calyx glabrous, somewhat leathery, divided nearly to the base ; outer sepals lanceolate from a broad base, long-acuminate, spinous-tipped, parallel-nerved inside, the longer of the two sepals ¾ in., the opposite one ⅝ in. long ; lateral sepals linear-lanceolate, acute, ½ in. long. Corolla yellow, 1½ in. long, somewhat 2-lipped ; upper lip of 4 obovate acute lobes ; the lower lip rather shorter than the upper, obovate, acute, entire ; tube ¾ in. long. Fertile stamens exserted beyond the corolla-tube ; filaments flattened, those of the staminodes very short. Capsules ¾ in. long, ovoid, with a solid beak, 2-seeded. Seeds ⅛ in. in diam., compressed, silky with appressed hairs. Fl. B. I. v. 4, p. 483 ; Wight, Icon. t. 451 ; Talb. Trees, Bomb. ed. 2, p. 266.

Dry districts of the Presidency, *Talbot.* KONKAN : *Stocks* !—DISTRIB. India (W. Peninsula).

3. **Barleria buxifolia,** *Linn. Sp. Pl.* (1753) p. 636. A low prickly leafy undershrub ; stems and branches terete, clothed with spreading hairs. Leaves ⅓—¾ by ¼—½ in., subsessile, elliptic or obovate, sometimes almost suborbicular, acute or obtuse, mucronate, hairy, base usually acute ; petioles 0—⅛ in. long. Flowers axillary, solitary ; bracts in the axils of the leaves reduced to sharp slender straight simple spines ½—¾ in. long ; pedicels very variable in length, ½—1½ in. long, slender. Calyx hairy, divided almost to the base ; outer sepals in flower ¼—⅜ by ⅛—$\frac{1}{6}$ in., mucronate (one of them sometimes with 2 or 3 spinous teeth at the apex), elongating in fruit, reticulately veined, ciliate ; inner sepals ⅛—¼ by $\frac{1}{20}$—$\frac{1}{10}$ in., linear-lanceolate, acute. Corolla 1—1¼ in. long, rose-colored or white ; lobes ¼ in. long, broadly obovate, obtuse, veined. Capsules ⅜—¾ in. long, 4-seeded. Seeds $\frac{1}{6}$ in. long, broadly ovoid, silky-hairy. Fl. B. I. v. 4, p. 483 ; Grah. Cat. p. 160.

KONKAN : *Law* !, *Nimmo* ex *Graham.*—DISTRIB. India (W. Peninsula).

4. **Barleria acanthoides,** *Vahl, Symb.* v. 1 (1790) p. 47. A stunted prickly branched undershrub scarcely 1 ft. high ; branches terete, hoary with short velvety pubescence. Leaves dark-green, ⅝—1½ by ⅓—½ in., oblong or obovate, obtuse, mucronate, pubescent, attenuated at the base ; main nerves about 5 pairs ; petioles 0—¼ in. long. Flowers in unilateral condensed racemes often reduced to a single flower ; bracts ½—¾ in. long, membranous, spinous-pointed and spinous-pinnatifid or reduced to flattened pinnatifid spines. Calyx divided almost to the base ; outer sepals subequal, ⅝ by $\frac{7}{16}$ in., broadly ovate, acute, strongly mucronate (one of the pair usually with a stronger mucro than the opposite one), very conspicuously nerved and reticulately veined, soon turning yellowish-brown ; inner sepals ¼ by $\frac{1}{12}$ in., lanceolate. Corolla pubescent outside, pure white,

2½—3½ in. long or even longer, opening at sunset (*Stocks*) ; tube 2¼—3¼ by ⅛—⅛ in., cylindric, slightly enlarged just below the limb ; lobes ¼—⅓ in. long, ovate. Capsules ½ in. long, ellipsoid, attenuated at both ends, glabrous. Seeds ⅛ in. long, broadly ovoid, compressed, silky-hairy. Fl. B. I. v. p. 484 ; Aitch. Pb. & Sind Pl. p. 112 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Oct.

In the Bombay Presidency confined to Sind. SIND : *Dalzell*, 28 !, *Stocks*, 508 !, *Bhola Puran* !, *Woodrow* ; Jemadar ka Landa near Karachi, *Stocks* !— DISTRIB. India (Panjáb) ; Beluchistan, Abyssinia, Nubia, Egypt.

5. **Barleria Hochstetteri,** *Nees, in DC. Prodr.* v. 11 (1847) p. 231. A low rigid much-branched shrub 6—12 in. high, more or less spinescent ; older branches woody, much intricately twisted, the younger ones herbaceous, shortly velvety-canescent. Leaves ¾—1½ by ⅓—½ in., oblong, obtuse, entire, more or less hairy with long appressed hairs, base tapering ; petioles ¼—½ in. long. Flowers pedicelled, usually in threes at the apex of short peduncle-like branchlets ; pedicels ¼—½ in. long, pubescent, those of the lateral flowers often bracteate about the middle with 1 or 2 small linear bracts. Calyx divided to the base ; outer sepals green, pubescent with glandular hairs, the larger of the pair ½ in. long, nearly ⅜ in. broad, ovate, the opposite sepal slightly shorter and narrower, acutely 2-fid at the apex ; inner sepals white, ¼ in. long, ⅒ in. broad, lanceolate, very acute, hairy on the back Corolla ½—⅞ in. long, lilac ; lobes oblong, rounded, emarginate. Ovary hairy. Capsules ⅜ in. long, ovoid with a solid beak, pubescent, 2-seeded near the base. Seeds ⅒ in. in diam., suborbicular, silky-hairy, black. Fl. B. I. v. 4, p. 483 ; Wight, Icon. t. 1528 ; Aitch. Pb. & Sind Pl. p. 112 ; Boiss. Fl. Orient. v. 4, p. 523 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Oct.

SIND : *Dalzell*, 31 !, *Stocks*, 501 !, *Bhola Puran* ! ; Jemadar ka Landa near Karachi, *Stocks* !.—DISTRIB. Beluchistan, Arabia, Nubia, Abyssinia.

6. **Barleria tomentosa,** *Roth, Nov. Pl. Sp.* (1821) p. 314. A small shrub ; branches terete, clothed with glandular and simple hairs. Leaves 1½—3 by ¾—1½ in., ovate, acuminte, more or less fulvous-hairy on both sides, densely so on the nerves beneath, lineolate, base usually rounded ; petioles ¼—½ in. long. Flowers solitary or 2—3 on the top of an axillary peduncle ; bracteoles foliaceous, ½—¾ in. long, lanceolate, clothed with glandular hairs. Calyx scarious, hairy at the base outside, conspicuously veined ; outer sepals with hairy midrib and ciliate margins, the longer ⅝ by ¼ in., obovate-oblong, acute, apiculate, the opposite sepal slightly narrower, acute, apiculate or sometimes 2-fid ; inner sepals ¼—⅓ in. long, ⅒ in. wide, lanceolate, acute. Corolla reaching 2½ in. long ; tube 1¾ in. long, narrow, cylindric below, infundibuliform for ½ in. below the limb ; lobes of the limb ¾ in. long, elliptic-oblong, acute. Capsules ¾ in. long, obovoid, pointed at the apex, narrowed at the base, glabrous, 4-seeded, the 2 lower seeds sometimes suppressed. Seeds ⅛ in. long, appressedly silky-hairy. Fl. B. I. v. 4, p. 485 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Nov.

Rare. *Dalzell* without locality in Herb. Kew. S. M. COUNTRY: Badami, *Woodrow*.—DISTRIB. India (W. Peninsula).

7. **Barleria cristata,** *Linn. Sp. Pl.* (1753) p. 636. Herbaceous; stems more or less appressedly hairy, densely hairy at the nodes. Leaves 2½—4 by 1—1¾ in., elliptic-oblong, acute or acuminate, hairy on both sides, lineolate above, base tapering; main nerves 6—7 pairs; petioles ⅛—⅓ in. long. Flowers in axillary and terminal short ovate dense spikes; bracteoles conspicuous, ½ in. long, linear, acute, membranous, veined, pubescent, with ciliate and often distantly toothed margins. Calyx hairy at the base; outer sepals membranous, whitish, the longer 1 in. long by ⅓ in. broad (within the marginal spines), broadly lanceolate, long-acuminate, mucronate and with subspinous bristle-tipped teeth on the margins, the opposite sepal similar but slightly narrower and ¾ in. long, both with raised conspicuous nerves running out into the marginal spines and with raised conspicuous reticulate venation between the nerves, pubescent; inner sepals ⅓ by 1/12 in., linear-lanceolate, acute, veined. Corolla pubescent outside, blue, 1—1¾ in. long; upper part of the tube widely infundibuliform; lobes ¾ in. long, obovate-oblong, rounded. Capsules ⅝ in. long, ellipsoid, acute at both ends, 4-seeded. Seeds ⅛ in. in diam., orbicular, compressed, silky-hairy. Fl. B. I. v. 4, p. 488; Grah. Cat. p. 160; Dalz. & Gibs. p. 188; Talb. Trees, Bomb. ed. 2, p. 266; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356; Watt, Dict. Econ. Prod. v. 1, p. 399.—Flowers: Dec. VERN. *Gokran.*

KONKAN: *Dalzell & Gibson*; W. Ghâts, *Woodrow*; Bombay (in gardens), *Graham*. DECCAN: hills, *Woodrow*; Kolapur, abundant, *Cooke*! S. M. COUNTRY: *Woodrow*. KANARA: *Talbot*.—DISTRIB. Throughout India, often grown in gardens.

VAR. *dichotoma*, Prain, Beng. Pl. (1903) p. 812. A variety with white flowers, a favorite plant of the Brahmins, often planted near temples and also grown in gardens, but not unmistakably wild in the Presidency. *Barleria dichotoma* (sp.), Roxb. Fl. Ind. v. 3, p. 39; Dalz. & Gibs. p. 188.

8. **Barleria Lawii,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 492. An erect shrub; branches terete, appressedly hairy. Leaves 4—5½ by 1¼—2 in., elliptic, acuminate, glabrous or slightly hairy and lineolate above, hairy on the nerves beneath, base tapering; nerves about 6 pairs; petioles ¼—⅓ in. long. Flowers solitary, axillary, or in short raceme-like cymes often forming a terminal panicle; bracteoles ¼—½ in. long, linear-lanceolate, hairy. Calyx divided almost to the base; outer sepals hairy on both surfaces, ⅜ in. broad, the longer of the pair 1⅓ in. long, elliptic-lanceolate, acute, the opposite sepal 1¼ in. long, shortly and acutely 2-toothed at the apex, all strongly nerved and reticulately veined; inner sepals ⅝—¾ by 1/12 in., lanceolate, acute, hairy, with membranous ciliate margins. Corolla white, parallel-nerved, the nerves showing very strongly in dried flowers, slightly hairy outside, 3—3½ in. long (reaching 4 in. long in one Matheran specimen); tube 2—2¾ in. long, about ⅛ in. broad below, narrowly infundibuliform in the upper part, enlarging to ⅜—½ in. in diam. below the limb; lobes obovate-oblong. Capsules

¾—1 by ½—⅝ in., obovoid, compressed, pointed, narrowed at the base, glabrous. Seeds ⅛—¼ in. long and nearly as broad, obtuse, silky hairy. Fl. B. I. v. 4, p. 486; Talb. Trees, Bomb. ed. 2, p. 266; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Barleria Beddomei*, T. Anders. ex Bedd. Icon. Pl. Ind. Or. p. 62, t. 258.—Flowers: Oct.

Dalzell without locality in Herb. Kew. KONKAN: *Stocks*!; Matheran, *Cooke*! DECCAN: Sinhagad hill near Poona, *Woodrow*!, *Beddome*. KANARA: North Kanara forests, *Talbot*.—DISTRIB. India (W. Peninsula).

9. **Barleria involucrata,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 92, VAR. **elata,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4, p. 486. A shrub 6 ft. high; stems branched, terete, appressedly hairy, swollen at the nodes. Leaves 4—9 by 1½—3 in., elliptic-lanceolate, acuminate, more or less pubescent, base tapering into the petiole; main nerves 8—10 pairs; petioles ½—2½ in. long. Flowers in unilateral raceme-like cymes often forming a large terminal panicle; pedicels short; bracteoles 1—1½ in. long, linear-lanceolate. Calyx appressedly hairy, divided almost to the base; outer sepals lanceolate, acuminate, ⅜ in. wide, many-nerved, the longer of the two 1¾ in. (or more), the shorter reaching 1½ in. long; inner sepals nearly 1 in. long, narrowly linear-lanceolate, very acute, pubescent on the back and with membranous margins. Corolla of a fine blue with a reddish-purple tube (*Dalzell*), 3—3¾ in. long; tube reaching 2 in. long, cylindric below, dilated in the upper part; lobes obovate, obtuse. Ovary pubescent at the apex. Capsules 1 by ⅓ in., narrowed at both ends, pubescent at the apex. Seeds more than ⅜ in. long, nearly as broad as long, broadly ellipsoid, obtuse, silky-hairy. *Barleria elata* (sp.), Dalz. in Kew Journ. Bot. v. 3 (1851) p. 227; Dalz. & Gibs. p. 189; Talb. Trees, Bomb. ed. 2, p. 266. *Barleria involucrata*, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356 (*not* of Nees).—Flowers: Oct.—Nov.

KONKAN: *Stocks*!; Amboli Ghát, *Woodrow*. DECCAN: Phunda Ghát, *Dalzell*!—DISTRIB. India (W. Peninsula).

This handsome species was grown in England in 1890 by Messrs. Veitch & Sons, who introduced it, the Gardener's Chronicle [v. 7 (1890) p. 448] states, from Singapore

10. **Barleria montana,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 92. Suffruticose, erect, 2—3 ft. high; branches glabrous, with distant nodes. Leaves 3—6 by 1½—2¾ in., elliptic, acuminate, glabrous or nearly so, lineolate on the upper side, attenuated at the base; main nerves 5—6 pairs; petioles ¼—1 in. long. Flowers axillary, solitary and running into terminal spikes or racemes; pedicels very short or 0; bracteoles varying from ¼—1 in. long, narrowly linear, acute. Calyx glabrous or nearly so; outer sepals subequal, 1¼—1½ by ¾ in., ovate, acute, with rounded base, strongly nerved and reticulately veined; inner sepals nearly ¾ by ⅛ in., linear-lanceolate, very acute, thick, membranous, glabrous, with a strong midnerve. Corolla blue, reaching 2½ in. long; tube 1½ in. long; lobes obovate-oblong. Staminodes without anthers. Capsules ¾—⅞ in. long, oblong, acuminate, normally 4-seeded, glabrous. Seeds ¼ in. long and as broad, densely clothed with silky hairs. Fl. B. I.

v. 4, p. 487 ; Grah. Cat. p. 161, n. 1182 ; Dalz. & Gibs. p. 189 ; Bedd. Icon. Pl. Ind. Or. p. 62, t. 257 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356 ; Watt, Dict. Econ. Prod. v. 1, p. 400.—Flowers : Sept.—Oct. VERN. *Kolista.*

KONKAN : *Stocks* ! ; Bombay, *Law* ! ; Island of Karanja, *Dalzell* ! ; Cross Island, *Graham, Dalzell & Gibson* ; W. Ghâts, *Woodrow* ; Uran in Bombay Harbour, entrance of northern valley, *Dalzell* ! KANARA : *Talbot.*—DISTRIB. India (W. Peninsula).

11. **Barleria strigosa,** *Willd. Sp. Pl.* v. 3 (1800) p. 379, VAR. **terminalis,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4, p. 490. A shrub 3—4 ft. high ; stems more or less sparsely strigose. Leaves 4½—6 by 1½—2½ in., elliptic-lanceolate, acuminate, lineolate on the upper side, sparsely strigosely hairy above, more densely so on the nerves and veins beneath with long, often bulbous-based hairs, margins ciliate, base decurrent wing-like into the petiole ; main nerves 6—8 pairs ; petioles ½—1 in. long, often obscure from the decurrent leaf-blade. Flowers in terminal strigosely hairy spikes often crowded at the tops of the branches ; bracteoles ⅜—½ in. long, lanceolate, hairy on the back and with ciliate margins. Calyx densely strigosely hairy ; outer sepals herbaceous, subequal, ¾—1 by ⅓ in., elliptic-lanceolate, subacute, strigose with long stout hairs and with ciliate margins ; inner sepals $\frac{7}{16}$ by $\frac{1}{12}$ in., linear, acute, thick, densely clothed with appressed white silky hairs. Corolla blue, the tube paler than the limb, glabrous, reaching 2½ in. long ; tube infundibuliform in the upper part ; lobes ¾ in. long, obovate-oblong, obtuse. Filaments of the stamens and staminodes hairy at the very base. Capsules ¾ in. long, oblong-ellipsoid, acute, glabrous, 4-seeded. Seeds ¼ by ⅙ in., ellipsoid, compressed, silky-hairy. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Barleria terminalis* (sp.), Nees, in DC. Prodr. v. 11 (1847) p. 225 ; Dalz. & Gibs. p. 188. *B. cœrulea*, Grah. Cat. p. 161.—Flowers : Nov.—Dec.

KONKAN : Vingorla, *Woodrow* ; Marmagão, *Woodrow* ; Matheran, *H. M. Birdwood, Cooke* ! DECCAN : Fitzgerald Ghát, below Mahableshwar, *Cooke* !, *H. M. Birdwood.* S. M. COUNTRY : Belgaum, *Ritchie* !—DISTRIB. India (W. Peninsula).

VAR. *polystachya*, C. B. Clarke, in Hook. f. Fl. B. I. l. c. Leaves very large, fulvous-hirsute above, somewhat glaucescent beneath ; spikes densely agglomerated, yellow-hirsute. *Barleria polystachya* (sp.), Nees, in DC. Prodr. v. 11, p. 226.

KONKAN : *Stocks* !

12. **Barleria courtallica,** *Nees, in DC. Prodr.* v. 11 (1847) p. 226. A shrub 3—4 ft. high ; stems and branches glabrous. Leaves 5—7 by 1¾—2½ in. (in one specimen collected by Ritchie in the S. Konkan the leaves are 10 in. long), elliptic-lanceolate, long-acuminate, glabrous, shining, lineolate on both sides, base acutely tapering into the petiole ; main nerves 6—9 pairs, slender ; petioles ½—1½ in. long. Flowers subsecund, in dense axillary and terminal glandular-hairy narrow spikes 1—4 in. long ; bracts and bacteoles ¼—⅜ in. long, linear-lanceolate, glandular-hairy. Calyx glandular-hairy outside ; outer sepals subequal, ¾—1 by ¼—⅜ in., ovate-lanceolate, bluntly

long-acuminate, 7—9-nerved from the base, densely glandular-hairy outside, appressedly silky-hairy inside, one of the pair very slightly 2-toothed at the apex ; inner sepals $\frac{5}{8}$—$\frac{3}{4}$ by $\frac{1}{10}$ in., linear-subulate, usually spreading outwards and not enclosed with the larger sepals, ciliate. Corolla $1\frac{1}{2}$—2 in. long with a blue limb and yellow tube, glabrous outside ; tube hairy inside at the insertion of the filaments ; lobes $\frac{3}{8}$ in. long, obovate-oblong, rounded. Ovary pubescent at the apex ; style pubescent at the very base. Capsules $\frac{3}{4}$—1 in. long, oblong, pointed, pubescent at the tip, 4-seeded. Seeds $\frac{1}{4}$ in. in diam., broadly ellipsoid, compressed, silky-hairy. Fl. B. I. v. 4, p. 489 ; Dalz. & Gibs. p. 188 ; Wight, Icon. t. 1529 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Feb.

KONKAN : *Stocks* !, *Law* ! ; Baitsi (S. Konkan), *Ritchie*, 1941 ! S. M. COUNTRY : Chorla Ghát, *Dalzell* ! KANARA : *Talbot* ; Arbail Ghát (N. Kanara), *Woodrow*.—DISTRIB. India (W. Peninsula).

13. **Barleria sepalosa,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1884) p. 487. Shrubby ; branches densely villous. Upper leaves (the only ones on the specimens) 3 by $1\frac{1}{4}$ in., elliptic-lanceolate, acute, mucronulate, hairy above with short bulbous-based hairs, shortly fulvous-hairy beneath ; base subacute ; main nerves 6—8 pairs, strong beneath, with close and prominent reticulate venation between; petioles $\frac{3}{8}$ in. long, densely fulvous-hairy. Flowers solitary, or in 2—3-flowered axillary cymes ; pedicels very short, almost 0 ; bracteoles $\frac{3}{4}$—$\frac{7}{8}$ by $\frac{1}{8}$—$\frac{1}{4}$ in., lanceolate, acute, hairy, ciliate. Calyx (in fruit) very large ; outer sepals (in fruit) yellow-villous, somewhat scarious, one very slightly longer than the other, $1\frac{1}{2}$—$1\frac{3}{4}$ by $\frac{3}{4}$—$\frac{7}{8}$ in., ovate-elliptic, acute, apiculate, with rounded base and numerous prominent nerves and reticulate veins, the shorter of the outer pair of segments sometimes (not always) 2-toothed at the apex ; inner pair of sepals $\frac{1}{2}$ by $\frac{1}{10}$ in., linear, acute, densely hairy. Corolla not seen. Capsules $\frac{7}{8}$ in. long, oblong, narrowed at both ends, glabrous. Seeds $\frac{1}{4}$ in. long, as broad as long, broadly ellipsoid, flattened, obtuse, densely silky hairy. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.

KONKAN : *Gibson* in Herb. Kew. !

There is but one sheet in Herb. Kew. with a ticket as above. It contains 2 pieces of the plant, one 10 in. the other 4 in. long, both upper portions of flowering branches furnished with bracteoles, calyx and capsules, but no flowers.

14. **Barleria grandiflora,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 339. Shrubby ; branches terete, quite glabrous except for a few small hairs at the nodes. Leaves 5—7 by $1\frac{1}{2}$—$2\frac{1}{4}$ in., elliptic-lanceolate, acuminate, glabrous, base acutely tapering ; main nerves 8—10 pairs ; petioles $\frac{1}{8}$—$\frac{1}{2}$ in. long. Flowers axillary, solitary ; bracteoles $\frac{1}{2}$ in. long, linear-ligulate. Outer sepals very large, herbaceous, $1\frac{3}{4}$—$2\frac{1}{2}$ by 1—$1\frac{1}{2}$ in., subequal, ovate-oblong, acute or subobtuse, rounded at the base, glabrous outside, pubescent within, one of the sepals with 2 acutely triangular teeth at the apex ; inner sepals $\frac{7}{8}$ in. long, linear, acute, densely hairy. Corolla white, $3\frac{1}{2}$—$4\frac{1}{2}$ in. long, pubescent outside ; tube enlarging towards the top, becoming narrowly infundibuliform ; lobes $1\frac{1}{3}$ in. long, obovate, subacute. Capsules

shorter than the calyx, 1½ in. long, oblong, acuminate, glandular-pubescent. Seeds ⅜ by ¼ in., broadly elliptic, subobtuse, compressed, glabrous. Fl. B. I. v. 4, p. 488 ; Dalz. & Gibs. p. 189 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Nov.

Rare. KONKAN : *Stocks* ! ; Talkat Ghát, *Dalzell* ! ; Mangeli Ghát, *Dalzell & Gibson*. KANARA : Yellapur (N. Kanara), *Talbot*, 282 !—DISTRIB. India (W. Peninsula).

Barleria Lawii, T. Anderson, is often mistaken for this, but the two plants are quite distinct.

15. **Barleria Gibsoni,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 339. Suffruticose, glabrous. Leaves elliptic, acuminate, 4—7 by 2—4 in., glabrous, lineolate above, glaucous beneath, base rounded or subacute ; main nerves 5—8 pairs ; petioles ¼—¾ in. long. Flowers solitary, axillary, and in terminal spikes ; bracts foliaceous, 1 in. long, elliptic-lanceolate, acute, glabrous ; bracteoles ½ in. long, narrowly linear, acute. Calyx glabrous or nearly so ; outer sepals subequal, 1¼ by ¾ in., elliptic-oblong or obovate-oblong, usually rounded at the apex and more or less narowed towards the base, strongly nerved and reticulately veined ; inner sepals ⅝ by ½ in., linear-lanceolate, acute, hairy on both sides, ciliolate, veined. Corolla glabrous, of a fine pink, reaching 3½ in. long ; tube up to 2½ in. long, enlarged upwards ; lobes obovate, rounded. Staminodes without anthers. Capsules ⅞ in. long, oblong, acuminate, glabrous. Seeds ¼ by ⅛ in., ellipsoid, black, quite glabrous. Fl. B. I. v. 4, p. 487 ; Dalz. & Gibs. p. 189 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in. Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Sept.—Nov. VERN. *Gura*.

KONKAN : *Stocks* ! ; Ghâts and Brahminwara range, *Dalzell & Gibson* ; Matheran Ghát, *H. M. Birdwood*. S. M. COUNTRY : hills 4 miles east of Belgaum, *Ritchie*, 1149 ! KANARA : *Talbot*.—DISTRIB. India (W. Peninsula).

Barleria lupulina, Lindl. in Bot. Reg. t. 1483. A small shrub about 2 ft. high, a native of the Mauritius, occasionally grown in gardens. The yellow flowers are in terminal ovoid or oblong spikes with large green bracts forming a head like that of a hop. Fl. B. I. v. 4, p. 482 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.

24. NEURACANTHUS, Nees.

Herbs or undershrubs. Leaves entire. Flowers small, sessile and solitary in the axils of opposite bracts, densely spicate ; spikes axillary (rarely terminal), elongate, strobilate, or densely capitate ; bracts imbricate, strongly nerved ; bracteoles 0 or minute. Calyx 2-partite, the upper segment 3-toothed or 3-lobed, the lower 2-toothed, or 2-lobed, or 2-partite. Corolla tubular-infundibuliform ; tube more or less dilated above ; limb plicate, sub-bilabiate or entire, when 2-lipped the upper lip narrow, shortly 2-lobed or 2-toothed, the lower 3-lobed or 3-angled. Stamens 4, didynamous, inserted on the middle of the tube, included ; anthers of the lower and longer pair perfectly 2-celled, those of the upper pair with one perfect and one imperfect cell. Disk inconspicuous. Ovary 2-celled ; ovules usually 2 in each

cell ; style short, glabrous ; stigma of one oblong lobe. Capsule oblong, glabrous, 4- or 2-seeded. Seeds much compressed, ovoid or suborbicular, hairy.—DISTRIB. India and Tropical Africa ; species 12.

Spikes elongate; corolla 2-lipped..... 1. *N. trinervius.*
Spikes globose; corolla entire..... 2. *N. sphærostachys.*

1. **Neuracanthus trinervius,** *Wight, Icon.* v. 4 (1850) t. 1532. Shrubby, erect, 1—3 ft. high ; stems slender, usually pale, glabrous or nearly so. Leaves sessile, 3½—5 by 1¼—1¾ in., elliptic-lanceolate, acute, lineolate on both sides, otherwise glabrous or nearly so, pale green ; main nerves 7—8 pairs, conspicuous below, the midnerve very strong. Flowers in axillary hairy spikes 1—6 in. long ; bracts ⅛ by ⅛ in., broadly ovate, acute, spinous-pointed, strongly 5—7-nerved, hairy and ciliate with long hairs ; bracteoles 0 or represented by a few bristles. Calyx 2-lipped to the base, the upper and lower lips divided more than ½-way down, the upper into 3, the lower into 2-segments, which are lanceolate, acute, ciliate with slender white hairs, ⅛ in. long. Corolla blue, ⅓—½ in. long, 2-lipped ; upper lip ⅛ in. long with 2 small triangular penicillate teeth at the apex ; lower lip with 3 shallow rounded or subacute lobes, each lobe finely apiculate and penicillate at the tip. Capsules ¼—⅓ by 1/12 in., oblong, acuminate, glabrous. Seeds 1/12—1/10 in. long, broadly ovoid, compressed, silky. Wight's figure shows the calyx-lips reversed, the 3-lobed lip being shown immediately beneath the bract instead of the 2-lobed one. Fl. B. I. v. 4, p. 491 ; Dalz. & Gibs. p. 190 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356.—Flowers : Dec.

KONKAN : *Stocks* !, *Dalzell* ! ; Salsette, *Law* !, *Dalzell* ! ; hills near Alibag, *Dalzell & Gibson.* DECCAN : Khandala, *Cooke* !, *Woodrow* ! KANARA : moist forests of N. Kanara, *Talbot* ; below the fall on the Kála naddi, *Ritchie,* 1210 ! —DISTRIB. India (W. Peninsula).

2. **Neuracanthus sphærostachys,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 140. Stems erect, 1½—2 ft. high, numerous from a perennial root, simple, obtusely quadrangular, more or less scabrous-pubescent. Leaves subsessile, 2½—4 by 1½—2¼ in., elliptic-oblong, obtuse, very shortly acuminate, lineolate on both sides, nearly glabrous, base rounded, truncate or subcordate ; main nerves about 8 pairs. Flowers in globose congested silky-hairy spikes sessile in the opposite axils, much enlarged after flowering, sometimes to 1½ in. in diam. ; bracts ½ by ⅜ in., purplish, broadly elliptic or suborbicular, shortly and abruptly acuminate, hairy on both sides and with ciliate margins, strongly 5—7-nerved from the base, reticulately veined. Calyx ½ in. long, 2-lipped to the base, densely silky-hairy on both sides ; upper lip 3-lobed about ½-way down, the lobes lanceolate, acute, densely ciliate, veined ; lower lip divided almost to the base, the segments lanceolate, acute, ciliate. Corolla ½ in. long with white tube and blue limb ; tube slender, cylindric, as long as the calyx ; limb infundibuliform, plicate, entire, nearly ½ in. across when expanded, with 5 hairy 3-nerved penicillate bands on the outside, two of which are close together, the others distant from one another. Capsules ½ by ⅛ in., ovoid, subacute, shortly attenuated at the base, quite glabrous

Seeds ⅛ in. in diam., orbicular, densely silky. Fl. B. I. v. 4, p. 491 ; Dalz. & Gibs. p. 190 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 356. *Neuracanthus Lawii*, Wight, Icon. t. 1531.—Flowers : Sept.—Oct.

Dalzell (*l. c.*) has a long note on the limb of the corolla of this plant.

KONKAN : *Stocks* !; island of Karanja (Bombay Harbour), *Dalzell & Gibson*; Malabar Hill (Bombay), *Dalzell & Gibson*; Pen. *Woodrow*. DECCAN : Khandala, *Cooke* !, *Woodrow* !; Bahuli near Poona, *Bhiva* !; Karkala, *Kanitkar* !; S. M. COUNTRY : Padshapur jungles, *Ritchie*, 1199!—DISTRIB. India (W. Peninsula), apparently endemic.

25. **ASYSTASIA,** Blume.

Herbs or undershrubs. Leaves opposite, entire. Flowers in lax or dense usually 1-sided simple or compound spikes or racemes ; bracts and bracteoles linear, usually shorter than the calyx. Calyx deeply divided ; segments equal, linear or linear-lanceolate. Corolla-tube inflated above ; lobes subequal (in *A. Lawiana* the lower lobe broader than the other 4), imbricate in bud. Stamens 4, all perfect, didynamous, subequal ; anthers oblong, the cells parallel, approximate, minutely spurred or submuticous at the base. Ovary 2-celled ; ovules 2 in each cell ; style linear ; stigma minutely 2-fid or subcapitate. Capsule elliptic-clavate with contracted solid base, 4-seeded. Seeds compressed, orbicular or irregularly angular, glabrous, rugose or tuberculate.—DISTRIB. Warmer parts of the Old World ; species 35.

Bracts shorter than the calyx; inflorescence secund.	
Bracts ⅛ in. long; corolla white or pale blue.....	1. *A. coromandeliana*
Bracts ¼ in. long; corolla violet with darker lower lobe	2. *A. violacea.*
Bracts longer than the calyx; inflorescence not secund	3. *A. Lawiana.*

1. **Asystasia coromandeliana,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 89. Erect or procumbent, sometimes climbing among bushes. Stems 1-3 ft. long, much-branched, obtusely quadrangular, glabrous. Leaves 1—2¼ by ¾—1½ in., ovate, acute, lineolate, dark green and glabrous above, paler and slightly pubescent on the nerves beneath, base usually rounded or subcordate, rarely acute ; main nerves 5—6 pairs ; petioles ½—1 in. long. Flowers secund, in long lax terminal and axillary spike-like racemes ; pedicels of the lower flowers reaching ⅛ in. long, those of the upper shorter or almost 0 ; bracts and bracteoles below the pedicels 1/10—⅛ in. long, ovate-lanceolate, acute, ciliate. Calyx nearly ¼ in. long, divided to the base or nearly so ; sepals linear-lanceolate, acute, pubescent. Corolla 1½ in. long, pubescent outside, pale-blue with a yellowish tube and usually a purple blotch on the lowest lobe ; tube ¾ in. long, inflated in the upper part for about ⅔ of its length ; lobes of the limb rounded. Ovary hairy ; lower part of style hairy. Capsules 1--1¼ in. long with long solid base, clavate, pointed, pubescent, usually constricted about the middle of the enlarged upper part, 4-seeded. Seeds ⅛ in. in diam., tuberculate, glabrous. Fl. B. I. v. 4, p. 493 ; Dalz. & Gibs. p. 186 ; Trim. Fl. Ceyl. v. 3, p. 323 ; Woodr. in Journ. Bomb. Nat

v. 12 (1899) p. 357. *Asystasia gangetica,* T. Anders. in Thw. Enum. p. 235 ; Lindau, in Engl. & Prantl, Pflanzenf. v. 4, 3 B, p. 326, fig. 131. *Justicia gangetica,* Linn. Amœn. Acad. v. 4, p. 299. *Ruellia zeylanica,* Kœn. ex Roxb. Fl. Ind. v. 3, p. 42 ; Grah. Cat. p. 161.—Flowers : Nov.—Dec.

KONKAN : *Stocks* !, *Law* ! ; W. Ghâts, *Woodrow.* DECCAN : Khandala, *Graham.* S. M. COUNTRY : 4 miles S. of Belgaum, *Ritchie* ! Often cultivated in gardens—DISTRIB. India (W. Peninsula) ; Ceylon, Tropical and S. Africa.

2. **Asystasia violacea,** *Dalz. MS. ex C. B. Clarke, in Hook f. Fl. B. I.* v. 4 (1884) p. 494 (*not* Dalz. in Kew Journ. Bot. v. 2, p. 139). Stems ascending, smooth, jointed, striate, obtusely quadrangular. Leaves 2—6 by 1¼—2½ in., elliptic-lanceolate, acute, glabrous or nearly so, the lower leaves with long petioles, attenuated at the base, the upper leaves with short petioles, often rounded at the base ; main nerves 8—10 pairs, prominent beneath. Flowers secund, in solitary or twin terminal racemes ; pedicels $\frac{1}{10}$—$\frac{1}{8}$ in. long ; bracts ¼ in. long, linear, acute, ciliate with long hairs ; bracteoles ⅛ in. long, ovate-oblong, acute, ciliate. Calyx ⅜ in. long, divided nearly to the base, coarsely hairy ; sepals linear, acute, ciliate with long hairs. Corolla 1¼—1½ in. long, violet, somewhat 2-lipped, the 4 upper lobes reflexed, the lower lobe lip-like, of a much darker violet, projecting (not reflexed). Ovary hairy ; style hairy at the base, glabrous above. Capsules 1—1¼ in. long, clavate, pointed, pubescent, with solid striate base. Seeds ⅛ in. long, obovoid-oblong, glabrous, tuberculate. Dalz. & Gibs. p. 186 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Nov.

Dalzell, in Herb. Kew. without locality. KONKAN : *Stocks* ! ; Bassein, *Woodrow* ; Miradonger near Pen, *Stocks* ! ; Matheran, *Cooke* !, *Woodrow.* DECCAN : Khandala, *Cooke* ! ; Panchgani, *Cooke* ! ; Mahableshwar, *Cooke* !, *H. M. Birdwood.* S. M. COUNTRY : Belgaum, *Ritchie,* 595 !—DISTRIB. India (W. Peninsula), apparently endemic.

3. **Asystasia Lawiana,** *Dalz. in Kew Journ. Bot.* v. 4 (1852) p. 344. Herbaceous, erect, 1—3 ft. high ; stems quadrangular, grooved, nodose, thinly hairy. Leaves 1½—4 by 1—1¾ in., elliptic-oblong, acute, lineolate above, slightly hairy on the nerves on the upper side, more densely so beneath, base acute, sometimes unequal-sided ; main nerves 5—6 pairs with reticulate venation between them ; petioles ¾—1¼ in. long. Flowers (not secund) in terminal substrobiliform spikes 1—2 in. long ; bracts ¾ by ¼ in., lanceolate, very acute, 3-nerved, reticulately veined, hairy and ciliate ; bracteoles similar to the bracts but smaller, ½ by ⅛ in. Calyx ⅕—¼ in. long, divided almost to the base ; sepals linear-subulate, glandular-pubescent. Carolla white, ½—⅝ in. long, sub-bilabiate ; upper lip equally 4-lobed, the lobes obovate-oblong, rounded, ⅛ by $\frac{1}{10}$ in. ; lower lip ⅛ in. long and as broad as long, oblong, rounded. Ovary grandular-puberulous ; style pubescent at the base. Capsules ¾ in. long, glandular-pubescent, clavate, with solid base, the enlarged part constricted in the middle between the seeds, 4-seeded. Seeds obliquely ovoid, flat-compressed, with dentate margins, the faces tuberculate and with hexagonal areolæ round the edges. Fl. B. I. v. 4, p. 496 ; Dalz. &

Gibs. p. 186; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers: Aug.—Sept.

DECCAN: Bhor, *Kanitkar*! S. M. COUNTRY: Belgaum, *Ritchie*, 1148!, *Cooke*!, *Woodrow*; near Dharwar, *Dalzell & Gibson*.—DISTRIB. India (W. Peninsula), apparently endemic.

26. ERANTHEMUM, Linn.

Glabrous shrubs or undershrubs. Leaves usually entire. Flowers subsessile, 1—3 in the axils of opposite bracts, arranged in terminal, dense or interrupted, simple or branched spikes; bracts and bracteoles narrow, small. Calyx 5-fid or 5-partite; segments narrow, subequal. Corolla-tube elongate, narrow-cylindric, rarely widened at the throat; limb 5-partite, the lobes elliptic, spreading, flat, subequal. Stamens 2 fertile, with usually 2 upper small clavate staminodes; anthers ovate or oblong, 2-celled; cells oblong, equal, parallel; connective widened. Disk annular or shortly cupular. Ovary 2-celled, usually glabrous; ovules 2 in each cell; style filiform; stigma entire or minutely 2-lobed. Capsule oblong, 4-seeded at top, contracted below into a long solid stalk. Seeds compressed, orbicular or subquadrate, rugose or smooth, supported on acute retinacula.—DISTRIB. Warmer parts of the world; species 50.

1. **Eranthemum malabaricum,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1884) p. 497. An undershrub 1½—2 ft. high, erect; stems and branches terete, glabrous. Leaves 3—5 by 1¼—2¼ in., ovate or elliptic, acute or acuminate, rather thick, gaintly crenulate, minutely lineolate and shining above, glabrous, base tapering; main nerves 5—7 pairs; petioles ¼—¾ in. long. Flowers in opposite clusters of 1—3 on long, slender, glandular-puberulous interrupted spikes 4-9 in. long; bracts ⅛ in. long, linear-lanceolate; bracteoles similar but smaller, 1/12 in. long. Calyx ⅛ in. long, glandular-puberulous, divided almost to the base; segments linear, acute. Corolla white, 1¾ in. long, glabrous; tube 1¼ in. long, slender, nearly straight, scarcely widened close to the limb; lobes of the limb obovate-oblong, rounded, spreading, the lower a little longer than the others, spotted with purple dots. Ovary glabrous; style filiform, slightly pubescent at the base. Capsules ¾ in. long with narrow cylindric solid base, clavate, pointed, glandular-pubescent, slightly constricted between the seeds. Seeds suborbicular, compressed, reticulato-rugose, glabrous, ⅛ in. long. Trim. Fl. Ceyl. v. 3, p. 325; Talb Trees, Bomb. ed. 2, p. 266; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Eranthemum crenulatum*, Wall. Cat. 2491 (*not* of Lindl.); Dalz. & Gibs. p. 195.—Flowers: Dec.

KONKAN: *Law*!, *Stocks*!; Wari jungles, *Dalzell & Gibson*; Viziadrug, *Kanitkar*!; Marmagão, *Woodrow*! DECCAN: Phunda Ghát, *Ritchie*, 598! KANARA: evergreen forests of N. Kanara, *Talbot*; Mulas, *Ritchie*, 598!—DISTRIB. India (W. Peninsula); Ceylon.

Eranthemum bicolor, Schrank, Pl. Rar. Hort. Monac. (1819) t. 8. A small shrub with dark-green ovate acuminate leaves and white flowers, the lowest lobe of the corolla of which is dotted with purple.

It is a native of the Philippine Islands. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357 & Gard. in Ind. ed. 5, p. 415. *Eranthemum aspersum*, Hook. f. Bot. Mag. (1868) t. 5711.

27. **LEPIDAGATHIS**, Willd.

Herbs or undershrubs often pubescent. Leaves entire or crenate-serrate. Flowers sessile, unusually capitate, sometimes opposite or solitary; heads axillary or terminal, almost always dense, often 1-sided, sometimes fascicled; bracts usually conspicuous; bracteoles usually smaller than the bracts. Calyx-5-lobed, the lobes unequal, the 2 lower often more or less connate, making the calyx 4-partite, the connate segments usually easily separable. Corolla small, 2-lipped; tube narrowly cylindric below, often constricted beneath the throat, suddenly swollen at or above the middle; upper lip erecto-patent, usually notched or 2-fid; lower lip with 3 spreading lobes. Stamens 4, didynamous, attached at the base of the throat, included; anthers 2-celled, 1 of the cells often attached higher up than the other, the cells frequently bearded, somewhat divergent. Disk annular. Ovary 2-celled; ovules 2 (rarely 1) in each cell; style recurved; stigma capitellate, shortly 2-lobed or entire. Capsule ovoid-oblong or lanceolate, compressed. Seeds 2 or 4, compressed, ovoid, oblong or orbicular, hairy.—DISTRIB. Warmer parts of the world, few in America; species 80.

Seeds 2.
- Capsule with scarious back, irregularly rupturing, only ultimately 2-valved; seeds with long, mucilaginous hairs.
  - Calyx 4-partite.
    - Bracts spinous-pointed ..... 1. *L. cristata.*
    - Bracts not spinous-pointed ..... 2. *L. mitis.*
  - Calyx 5-partite.
    - Bracts glabrous, with recurved apical spines; calyx-segments thinly membranous, not spinous-pointed ..... 3. *L. trinervis.*
    - Bracts softly hairy, with straight apical spines; calyx-segments thick, spinous-pointed ..... 4. *L. lutea.*
- Capsule early 2-valved, not scarious on the back; seeds with short, not mucilaginous hairs.
  - Erect; bracts and bracteoles silky-hairy..... 5. *L. clavata.*
  - Prostrate, creeping and rooting; bracts and bracteoles glandular-hairy ..... 6. *L. prostrata.*

Seeds 4.
- Leaves longitudinally folded ..... 7. *L. rigida.*
- Leaves not longitudinally folded.
  - Erect undershrubs.
    - Leaves of the stem exceeding 2 in. long; bracts and calyx-segments thick, glandular-hairy..... 8. *L. cuspidata.*
    - Leaves of the stem less than 1 in. long; bracts and calyx-segments scarious ..... 9. *L. calycina.*
  - Diffuse or prostrate herbs.
    - A prostrate perennial herb; bracts $\frac{1}{16}$ in. broad, scarious; calyx-segments finely spinous..... 10. *L. incurva*, var. *mucronata.*
    - A diffuse weak herb; bracts $\frac{1}{8}$ in. broad, herbaceous; calyx-segments not spinous..... 11. *L. fasciculata.*

1. **Lepidagathis cristata,** *Willd. Sp. Pl.* v. 3 (1800) p. 400. Rootstock perennial ; stem scarcely any ; branches numerous, spreading on all sides close to the ground, sometimes rooting, slender, quadrangular (sometimes almost winged), glabrous or nearly so. Leaves opposite, sessile, ¾—1½ by ⅛—⅜ in., linear-oblong or lanceolate-oblong, lineolate above, hairy on the nerves beneath. Flowers in a subradical globose head (sometimes with 1 or 2 smaller heads added) on the lower part of the leafy branches ; bracts ⅓ in. long, ovate, acuminate, spinous-pointed, hairy ; bracteoles membranous, hairy, spinescent. Calyx ⅓ in. long, 4-partite about ¾ the way down, densely softly hairy on both surfaces ; the 2 larger outer segments ⅛ in. broad, elliptic, acute, the lower segment 2-fid ; the 2 lateral segments $\frac{1}{20}$ in. broad, all ciliate and spinous-pointed. Corolla hairy outside, reaching ½ in. long, white or pale-pink, dotted with brown or purple spots, 2-lipped about ½-way down ; tube narrow, constricted below the limb and then suddenly expanded upwards ; upper lip ⅛ in. long, oblong, obtuse, notched at the apex ; lower lip ¼ in. long, divided nearly to the middle into 3 obovate obtuse slightly crenulate lobes, the middle lobe the broadest. Stamens slightly exserted beyond the corolla-tube ; filaments glabrous ; anthers 2-celled, one of the cells rather higher up than the other. Ovary glabrous ; style slightly pubescent. Capsules ⅓ in. long, ovoid, subacute, glabrous, grooved on the 2 sides, with scarious back, 2-seeded. Seeds large for the size of the capsule, ⅛ in. long, ovoid-oblong, rounded, densely clothed with long hygroscopic mucilaginous hairs. Fl. B. I. v. 4, p. 516 ; Grah. Cat. p. 160 ; Dalz. & Gibs. p. 191 ; Aitch. Pb. & Sind Pl. p. 112 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357 ; Watt, Dict. Econ. Prod. v. 4, p. 625.—Flowers : Oct.—Mar. VERN. *Bhuigend.*

KONKAN : Malabar Hill (Bombay), *Graham.* DECCAN : common, *Woodrow* ; Poona, *Cooke* ! S. M. COUNTRY : Gadag, *Kanitkar* !—DISTRIB. India (W. Peninsula).

2. **Lepidagathis mitis,** *Dalz. in Kew Journ. Bot.* v. 3 (1851) p. 226. Root perennial ; stems short ; branches diffusely spreading, subquadrangular, glabrous, often purple in age. Leaves sessile, 1—1¾ by ¼—½ in., linear-oblong, subacute or obtuse, lineolate above, more or less hairy on the nerves beneath, the margins usually ciliolate, base narrowed. Flowers in a globose head 2—3 in. in diam., at the base of the stem ; bracts chaffy, ⅓ in. long, long-acuminate from a broadly ovate base, without a rigid spinous point, hairy on both surfaces and with densely ciliate margins ; bracteoles as long as the bracts, membranous, lanceolate, acuminate, without a rigid spinous point, with a strong mid-nerve, the upper half of the margin very densely ciliate with long white hairs. Calyx 4-partite, hairy ; the two outer segments exceeding ⅜ in. long ; the lower divided about ½-way down into 2 lanceolate acute lobes ; the inner lateral segments shorter and much narrower, all non-spinescent at the apex, the margins ciliate with long white hairs. Corolla ½—⅝ in. long, hairy, white outside, pale pink inside, copiously dotted with yellowish-brown spots, otherwise as in *L. cristata.* Stamens, ovary, style, and capsules as in *L. cristata.* Fl. B. I. v. 4, p. 516 ; Dalz. & Gibs.

p. 191 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Nov.

KONKAN : *Stocks* ! DECCAN : Phunda Ghát, *Dalzell* ! S. M. COUNTRY : Belgaum in grass-jungles, *Ritchie*, 575 ! DISTRIB. India (W. Peninsula).

3. **Lepidagathis trinervis,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 96. A small suffruticose diffuse plant ; rootstock woody ; branches numerous, 5—10 in. long, slender, quadrangular, with many nodes. Leaves 1—1¾ by ⅛—¼ in., sessile, linear, subacute, entire, glabrous or nearly so, the margins often scabrid, 3-nerved from a slightly tapering base, the midnerve stronger than the lateral ones which are close to the margin. Flowers in axillary sessile ovoid spikes ½—¾ in. long, usually 2 or more closely packed together so as to appear like a single head ; bracts often colored, usually glabrous or nearly so, rather less than ½ in. long, ovate or ovate-elliptic, with a recurved cuspidate spine almost as long as the leafy part ; bracteoles as long as the bracts, oblong-lanceolate, aristate-acuminate, membranous. Calyx membranous, ⅜ in. long, 5-partite (the lower lobes scarcely at all connate above the base) to about 1/16 in. from the base ; the 3 outer segments nearly equal in length, the upper slightly broader, all lanceolate, very acute, not spinous-pointed, densely hairy inside, nearly glabrous outside ; inner lateral segments shorter and narrower, linear, acute, hairy on both sides. Corolla densely hairy in bud with erect white hairs which project much beyond the apex of the bud, white, spotted with yellow, brown and purple, ¼—⅓ in. long ; tube short ; upper lip oblong, rounded at the apex ; lower lip 3-lobed, the lobes obtuse, the lateral narrower than the middle one. Capsules ¼ in. long, ovoid-lanceolate, subacute, compressed, 2-seeded, grooved on the sides, the back scarious, irregularly rupturing. Seeds 1/16—⅛ in. long, oblong, rounded at the apex, clothed with long mucilaginous hygroscopic hairs many times longer than the nucleus. Fl. B. I. v. 4, p. 517 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Nov.—Feb.

KONKAN : *Law* !, *Stocks* ! ; Karanja Island, Bombay Harbour, *Cooke* ! DECCAN : Pál jungles (Khandesh districts), *Kanitkar* ! GUJARAT : Perim Island at the mouth of the Narbada river, *Cooke* ! ; Deesa, *Stocks* ! ; Palanpur, *Raoji* ! ; Kathiawar, *Woodrow*.—DISTRIB. India (Central India, Chota-Nagpur, N. W. Himalaya, W. Peninsula).

VAR. *asperrima,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1885) p. 517. Stem 6 in. high, stout, woody, much branched ; internodes very short. Leaves small, ⅓ by 1/12 in., mucronate, very scabrous. *Lepidagathis asperifolia,* T. Anders. MS. in Herb. Kew.

There is one sheet in Herb. Kew. marked Konkan, *Stocks* ! The plant should perhaps have specific rank accorded to it.

4. **Lepidagathis lutea,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 139. Rootstock woody ; stems numerous, suberect, filiform, quadrangular, pubescent or nearly glabrous. Leaves sessile, usually 1—2 by 1/16—⅛ in. (in a specimen from Marmagão near the sea reaching 4 by ⅓ in.), linear, acute or subobtuse, glabrous or nearly so, 3-nerved, base slightly tapering. Flowers in velvety-pubescent spikes, 1—3 together in many of the axils and also in a subradical congested

globe ; bracts variable in length, ½—1¾ in. long, the outer herbaceous, long-acuminate from a broadly ovate base, softly hairy on both surfaces, 3-nerved, sharply spinous-pointed, ciliate, the inner bracts shorter, membranous, silky-hairy, usually spinous-pointed ; bracteoles nearly ½ in. long, ovate or obovate, silky-hairy on both sides, spinous-pointed. Calyx rather less than ½ in. long, silky-hairy on both sides, 5-partite to about 1/12 in. from the base ; segments thick ; the outer upper segment ⅛ in. broad, slightly longer than the 2 lower, ovate, acuminate, the 3 nerves from the base uniting at the apex and produced into a short spinous point ; the lower segments somewhat oblanceolate, one of them usually broader than the other, both armed with a long spinous point nearly ⅛ in. long ; inner lateral segments very slightly longer than the lower, linear-lanceolate with a long spinous point, very densely silky-hairy. Corolla yellow, ½ in. long ; tube narrowly cylindric for about ⅓ in., then abruptly and truncately expanded, the swollen part crenulate at the base ; limb pubescent outside ; upper lip short, 1/16 in. long, rounded, entire or emarginate ; lower lip ⅛ in. long, reticulately veined, deeply 3-lobed, the lobes obtuse, the middle one crenulate, twice as broad as the lateral ; palate furnished with 2 dense rows of hairs. Filaments very short, glabrous or nearly so ; anther-cells slightly bearded. Ovary glabrous ; style pubescent. Capsules ¼ in. long, ovoid-lanceolate, with scarious backs, 2-seeded. Seeds with very long hygroscopic mucilaginous hairs which are many times longer than the nucleus. Fl. B. I. v. 4, p. 517 ; Dalz. & Gibs. p. 190 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Nov.

KONKAN : Malwán, *Dalzell* ! ; Marmagão, *Woodrow* ! ; near Ratnagiri, *Kanitkar* !—DISTRIB. India (W. Peninsula).

5. **Lepidagathis clavata,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 340. Root woody, perennial ; stems numerous, 6—15 in. high, erect, rarely branched, tetragonal, glabrous, usually naked below, marked with the scars of fallen leaves. Leaves rigid, coriaceous, sessile, ¾—1 by ¼—⅜ in., longitudinally folded (*complicate*), ovate-oblong, acuminate, decussate, more or less recurved at the apex, spinous-pointed, entire, glabrous, base rounded ; main-nerves 4—5 pairs, conspicuous on both sides, very much so on the lower surface. Flowers in terminal, often purplish, 4-sided, hairy, usually simple spikes 1—2½ in. long (radical and axillary spikes rarely present ; when present depauperate, imperfect, and non-floriferous) ; bracts quadrifarious, nearly ¾ in. long by ¼—⅓ in. wide, elliptic or slightly obovate, squarrosely spinous-pointed, softly hairy and ciliate with long white hairs, nerved from the base ; bracteoles nearly ½ in. long by 1/10—⅛ in. broad, linear-lanceolate, densely hairy and ciliate with long silky white hairs. Calyx rather more than ½ in. long, 4-partite to 1/16 in. from the base ; upper outer segment ⅛ in. broad, slightly longer than the lower, oblong-lanceolate, 3-nerved, finely spinous-pointed ; lower segment 2-lobed to about ⅛—⅙ in. from the base, the connate portion easily separable, the lobes equal, 1/10 in. broad, oblong-lanceolate, 3-nerved, finely spinous-pointed ; inner lateral

segments lanceolate-subulate, very acute, finely spinous pointed, 1-nerved. Corolla rose-colored (*Dalzell*), ½—¾ in. long ; upper lip broad, rounded, 2-toothed ; lower lip 3-lobed, the lobes oblong obtuse, subequal, pubescent outside, the throat and palate spotted with yellow, glabrous. Capsules ⅜ in. long, ovoid-lanceolate, acutely pointed, glabrous, 2-valved, 2-seeded, the back not scarious. Seeds ⅛ by ⅛ in., large for the size of the capsule, ovoid, acute, with short hygroscopic hairs. Fl. B. I. v. 4, p. 518 ; Dalz. & Gibs. p. 191 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Jan.

Rare. KONKAN : *Stocks* ! S. M. COUNTRY : Chorla Ghát, *Dalzell* !—DISTRIB. India (W. Peninsula).

6. **Lepidagathis prostrata,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 138. A rigid prostrate undershrub ; stems creeping and rooting near the base, obtusely quadrangular, glabrous, much-branched ; young branches softly tomentose. Leaves small, sessile, rigid, subcomplicate, ¼—⅓ in. wide, rarely reaching 1 in. long, oblong-lanceolate, spinous-pointed, recurved, pubescent on both sides, base somewhat cuneate ; main nerves 4—5 pairs. Flowers in simple, erect, softly pubescent spikes ½—2 in. long, usually terminal on short lateral ascending branches ; bracts ½ in. long, oblong-obovate, glandular-pubescent, spinous-pointed, nerved, often purplish, ciliate ; bracteoles ⅓ in. long, linear-lanceolate, spinous-pointed, glandular-pubescent. Calyx ⅜ in. long, 5-partite to within ⅒ in. of the base, glandular-pubescent inside and outside ; the 3 outer segments of nearly equal length, the upper 5—7-nerved, ovate-lanceolate, twice as broad as either of the other 2, which are lanceolate and 3-nerved, all 3 spinous-pointed and with ciliate margins ; the 2 inner lateral segments much shorter and narrower, linear-lanceolate, acute, ciliate. Corolla ¾ in. long, pubescent outside, rose-colored or yellowish-white, deeply 2-lipped ; upper lip ⅓ in. long, broad, rounded, shortly 2-toothed, marked with dark transverse lines ; lower lip nearly ½ in. long, deeply divided into 3 subequal oblong spreading lobes ; palate glabrous. Capsules ⅜ in. long, ovoid-lanceolate, compressed, glabrous, 2-valved, 2-seeded, the back not scarious. Seeds ⅒ in. long, broadly ovoid, shortly hygroscopically hairy. Fl. B. I. v. 4, p. 518 ; Dalz. & Gibs. p. 190 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Dec.

KONKAN : *Stocks* ! ; Malwán on bare rocks, *Dalzell* ! KANARA : Mundele (N. Kanara), *Ritchie*, 1946 !—DISTRIB. India (subtropical W. Himalaya, W. Peninsula).

7. **Lepidagathis rigida,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 341. An erect undershrub 3—4 ft. high, rigid, little-branched ; stem quadrangular, slender, softly hairy with glandular and simple hairs. Leaves coriaceous, 2½—4½ by ¼—⅜ in., linear-lanceolate, acute, longitudinally folded (*complicate*), glandular-pubescent on both sides, base long-attenuate into an obscure petiole ; main nerves 8—10 pairs, prominent. Flowers in dense glandular-hairy terminal cylindric simple or compound spikes 1—2½ in. long, on short lateral branches ; bracts ⅜—½ by ⅒ in., linear-lanceolate, acute, and, as well as the bracteoles, softly silky with simple and glandular hairs, 3-nerved,

spinous-pointed ; bracteoles $\frac{3}{8}$ by $\frac{1}{16}$ in., linear-lanceolate, 1-nerved. Calyx 4-partite nearly to the base, densely silky with long simple and glandular hairs, rather less than $\frac{1}{2}$ in. long to the top of the longest segment ; upper outer segment $\frac{1}{8}$ in. broad, elliptic-lanceolate, 3—5-nerved and reticulately veined ; lower outer segment 2-lobed to about $\frac{1}{8}$ in. from the base, the lobes $\frac{1}{12}$ in. wide, lanceolate, acute, 1- or sometimes obscurely 3-nerved ; the 2 inner lateral segments scarcely $\frac{1}{20}$ in. wide, shorter than the others, linear-lanceolate, 1-nerved, all the segments finely spinescent. Corolla yellowish-white, spotted with brown or purple, pubescent outside ; upper lip $\frac{1}{8}$ in. long, broad, rounded, notched ; lower lip $\frac{1}{4}$ in. long, 3-lobed, the lobes subequal, oblong, obtuse ; palate glabrous. Filaments glabrous ; anthers bearded. Ovary glabrous ; style pubescent. Capsules $\frac{1}{4}$ in. long, ovoid-lanceolate, glabrous. Seeds $\frac{1}{10}$ in. long, ovoid, subacute, clothed with short hygroscopic hairs. Fl. B. I. v. 4, p. 518 ; Dalz. & Gibs. p. 191 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Dec.—Mar.

KONKAN : *Lambert* !, *Stocks* ! ; W. Ghâts, *Woodrow* ; Talkat Ghât, *Dalzell* ! S. M. COUNTRY : Rámghat, *Dalzell* !, *Ritchie*, 1198 ! SIND : *T. Anderson*.—DISTRIB. India (W. Peninsula).

8. **Lepidagathis cuspidata,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 97. An erect undershrub 1—3 ft. high ; stems and branches quadrangular, glabrous or glandular-pubescent upwards. Leaves of the main stem $2\frac{1}{2}$—$4\frac{1}{2}$ by $\frac{3}{4}$—$1\frac{3}{4}$ in., oblong-lanceolate, acute or acuminate, usually mucronate, glabrous or nearly so, base acute, cuneately tapering and decurrent into the petiole, sometimes nearly to its base ; petioles $\frac{1}{4}$—1 in. long, often obscure ; leaves of the branches $\frac{3}{4}$—1 by $\frac{3}{8}$ in., subsessile, elliptic-lanceolate, usually softly pubescent, spinous-pointed. Flowers in terminal spikes often terminating short axillary branches ; spikes very variable in size, shape, and density, sometimes 1 in. long, dense, sometimes 6 in. long, lax with distant flowers in opposite pairs ; bracts $\frac{3}{8}$—$\frac{1}{2}$ by $\frac{1}{6}$—$\frac{1}{5}$ in., elliptic-oblong or obovate, acute, spinous-pointed, 3-nerved, and, as well as the bracteoles, glandular-hairy ; bracteoles $\frac{1}{4}$—$\frac{3}{8}$ in. long, linear-lanceolate, spinous-pointed, 1-nerved. Calyx $\frac{1}{2}$ in. long to the top of the longest segment, glandular-hairy, almost 5-partite to within $\frac{1}{10}$ in. of the base (the lobes of the lower segment very slightly connate) ; upper outer segments slightly the longest, $\frac{1}{8}$—$\frac{1}{6}$ in. broad, oblong-lanceolate, subacute, spinous-pointed, 3—5-nerved, reticulately veined ; the 2 shorter outer segments $\frac{1}{12}$ in. wide, lanceolate, acute, spinous-pointed, 1—3-nerved, reticulately veined ; inner lateral segments nearly as long as the shorter outer ones, $\frac{1}{20}$ in. broad, linear, very acute. Corolla white with darker lines, $\frac{1}{2}$—$\frac{5}{8}$ in. long, pubescent outside ; upper lip $\frac{1}{10}$—$\frac{1}{8}$ in. long, ovate, acute, entire or notched, and, as well as the throat, marked with dark transverse purplish lines ; lower lip $\frac{1}{6}$—$\frac{1}{4}$ in. long, 3-lobed, the lobes rounded, the middle the broadest ; palate glabrous. Filaments glabrous ; anther-cells bearded. Ovary glabrous ; style pubescent. Capsules $\frac{1}{3}$ in. long, ovoid-lanceolate, acute, glabrous, 2-valved, 4-seeded. Seeds $\frac{1}{10}$ in. long, nearly as broad as long, ovoid, compressed, rounded at the apex, hygroscopi-

cally hairy, especially on the margins, with hairs shorter than the nucleus. A very variable plant as to the size of the parts of the flower as well as the character of the spikes. Fl. B. I. v. 4, p. 519 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers : Mar.

KONKAN : *Law* !, *Dalzell* ! ; Miradonger near Pen, *Stocks* ! ; Matheran. *Cooke* ! DECCAN : Khandala, *Woodrow* ! ; Mahableshwar, *Cooke* ! ; Phunda Ghát, *Ritchie*, 1948 !—DISTRIB. Throughout India.

9. **Lepidagathis calycina,** *Hochst. ex DC. Prodr.* v. 11 (1847) p. 252. A small erect rigid much-branched undershrub ; branches woody, the young ones more or less pubescent. Leaves ½—¾ by ⅛—⅓ in., oblong-lanceolate, acute, glabrous or nearly so, narrowed and often unequal-sided at the base ; petioles ⅛—⅙ in. long. Flowers numerous, in short spikes ½—¾ in. long, racemosely arranged along the branches ; bracts 7/16 by ¼ in., elliptic-obovate, strongly mucronate, 3-nerved and reticulately veined, faintly ciliolate, soon becoming scarious ; bracteoles ⅛—¼ in. long, linear-subulate. Calyx soon becoming scarious, nearly ½ in. long to the top of the longest segment, 4-partite almost to the base ; upper segment slightly the longest, ⅓ in. wide, elliptic-lanceolate, acute, aristate, ciliolate, 3-nerved ; lower segment 2-lobed to a little below the middle, the lobes lanceolate, acute, bristle-pointed, with a strong nerve near the inner margin of each lobe, reticulately veined, ciliolate ; the 2 inner lateral segments linear-subulate, acute, 1-nerved, ciliolate. Corolla dingy-white, rather more than ½ in. long, slightly pubescent outside ; upper lip ⅛ in. long, oblong, obtuse, 2-fid ; lower lip ⅓ in. long, divided about ½-way down into 3 spreading subequal rounded lobes, the middle of the lip marked by purple spots (*Stocks*). Filaments glabrous. Ovary glabrous ; style faintly pubescent. Capsules nearly ⅓ in. long, 4-seeded (fide *C. B. Clarke*). Fl. B. I. v. 4, p. 519 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357 ; Aitch. Pb. & Sind Pl. p. 112. *Lepidagathis strobilifera*, Stocks, in Kew Journ. Bot. v. 4 (1852) p. 177.

SIND : *Stocks* !—DISTRIB. Beluchistan, Abyssinia.

10. **Lepidagathis incurva,** *D. Don, Prodr. Fl. Nep.* (1825) p. 119, VAR. **mucronata,** *C. B. Clarke*. A prostrate perennial herb ; stems 1—2 ft. long, slender, obtusely quadrangular, pale, glabrous or nearly so. Leaves variable in size, 1—3 by ¾—1¾ in. (in a specimen collected by Ritchie in N. Kanara the leaf including the petiole reaches 6 in. long), elliptic or elliptic-lanceolate, acute, lineolate, glabrous or pubescent, margins entire or obscurely crenulate, base tapering and decurrent into the petiole ; main nerves 6—8 pairs ; petioles ½—1 in. long. Flowers in axillary and terminal 1-sided, often clustered, softly hairy spikes ⅓—¾ in. long ; bracts ¼ by 1/16 in., oblong-lanceolate, scarious, acute, spinous-pointed, softly hairy on the back, ciliate, 3-nerved ; bracteoles ⅛ by 1/20 in. long, lanceolate, finely spinescent, ciliate, 1-nerved. Calyx ⅓ in. long, 4-partite to about 1/10 in. from the base, softly hairy with simple and gland-tipped hairs ; segments equal in length or very nearly so ; the upper of the 2 outer segments 1/20 in. wide, lanceolate, acute, ciliate, 3-nerved ;

the lower 2-lobed to below the middle, the lobes lanceolate, hardly $\frac{1}{30}$ in. wide, ciliate; the 2 inner lateral segments linear-lanceolate, all the 5 lobes with very fine subspinous points. Corolla white, rather more than $\frac{1}{4}$ in. long, pubescent outside; tube not much inflated at the top, the narrow part $\frac{1}{8}$ in. long; upper lip $\frac{1}{8}$ in. long, suborbicular, slightly notched; lower lip $\frac{1}{6}$ in. long, 3-lobed rather less than $\frac{1}{2}$-way down, the lobes oblong, rounded at the apex, the middle one twice as broad as the lateral; palate glabrous. Filaments glabrous; anther-cells bearded. Ovary pubescent at the tip. Capsules $\frac{1}{3}$ by $\frac{1}{16}$ in., oblong-lanceolate, acute, pubescent at the tip, 4-seeded. Seeds $\frac{1}{30}$ in. long, broadly ovoid or suborbicular, shortly hygroscopically hairy. *Lepidagathis hyalina* var. *mucronata*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1885) p. 521. *Lepidagathis hyalina*, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357 (*not* of Nees). *L. mucronata* (sp.), Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 95.—Flowers: Jan.—May.

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks*! KANARA: *Stocks*!, *Woodrow*; Hatkumba, *Ritchie*, [illegible]!; Kála naddi, *Ritchie*, 1215!—DISTRIB. India (W. Peninsula).

11. **Lepidagathis fasciculata,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 95. A diffuse weak herb; stems 1 ft. long, spreading, much-branched, slender, quadrangular, geniculate, softly hairy. Leaves often in unequal pairs, 1—2½ by ½—1 in., ovate or elliptic, subacute, irregularly crenate or dentate, more or less softly pubescent on both sides, base cuneate, suddenly decurrent into the petiole; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long, softly hairy. Flowers few, in terminal often paniculately arranged leafy spikes; bracts $\frac{1}{4}$—$\frac{1}{2}$ by $\frac{1}{8}$—$\frac{1}{3}$ in., ovate, acute, 3-nerved; bracteoles $\frac{1}{4}$ in. long, linear, both bracts and bracteoles hairy with simple and glandular hairs. Calyx $\frac{1}{4}$ in. long, 5-partite nearly to the base, softly hairy with simple and gland-tipped hairs; outer upper segment the longest, $\frac{1}{16}$ in. broad, linear-lanceolate not spinous- nor bristle-pointed, 3-nerved and reticulately veined, ciliate with long hairs; the two lower segments about $\frac{1}{30}$ in. broad, linear, very acute, 1-nerved and reticulately veined, ciliate; the 2 inner lateral segments shorter, subulate. Corolla rather less than $\frac{1}{2}$ in. long, white, pubescent outside; narrow portion of the tube $\frac{1}{8}$ in. long; upper lip short, $\frac{1}{10}$ in. long, 2-fid, spotted with purple (*Dalzell*); lower lip $\frac{1}{3}$ in. long, 3-lobed, the lobes obtuse, the middle the longest; palate glabrous. Filaments glabrous; anther-cells, very slightly bearded, one attached much lower than the other. Ovary slightly hairy at the tip; style pubescent in the lower half. Capsules $\frac{1}{4}$ in. long, oblong-lanceolate, pubescent at the tip. Seeds $\frac{1}{20}$ in. in diam., suborbicular, shortly hygroscopically hairy. Fl. B. I. v. 4, p. 522; Nees, Monogr. Lepidag. (1841) p. 10; Trim Fl. Ceyl. v. 3, p. 332; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Lepidagathis goensis*, Dalz. in Kew Journ. Bot. v. 2 (1850) p. 340; Dalz. & Gibs. p. 191.—Flowers: Feb.

KONKAN: *Stocks*!, *Dalzell*!; Goa districts at the foot of the Sahyadris, *Dalzell*!; Wari country, *Dalzell & Gibson*. S. M. COUNTRY: Rámghát, *Ritchie*, 592!—DISTRIB. Throughout Tropical and Subtropical India; Ceylon.

28. HYPŒSTES, R. Br.

Herbs or shrubs. Leaves entire, often with waved margins. Flowers axillary and terminal, usually clustered, running into terminal spikes or panicles; bracts longer than the calyx, oblong-lanceolate, 2 beneath each spikelet, free or connate at the base, each pair enclosing 1 perfect and 1 or 2 rudimentary flowers; bracteoles longer than the calyx. Calyx deeply 5-fid; segments narrow or setaceous, subequal. Corolla deeply 2-lipped; tube slender, dilated near the top. Stamens 2, attached below the throat; anthers 1-celled, muticous; pollen ellipsoid, longitudinally banded. Disk cupular. Ovary 2-celled; ovules 2 (rarely 1) in each cell; style shortly and equally 2-fid. Capsule oblong with a solid stalk, 4- or 2-seeded; placentas not rising elastically from the base of the capsule. Seeds smooth or rough, not hairy.—DISTRIB. Asia, Africa, and Australia; species 60.

1. **Hypœstes lanata,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 343. An undershrub; stems glabrous, geniculate, ascending. Leaves 3—6 by 1½—2½ in., elliptic-lanceolate, acuminate, entire, glabrous or nearly so, base acute, decurrent along the petiole, sometimes nearly to the base. Inflorescence axillary and terminal, in woolly-tomentose elongate interrupted leafy spikes 6 in. long and upwards running into terminal panicles; flowers in clusters of 1—3 in the opposite axils of floral leaves; bracts 2, connate at the base, $\frac{7}{16}$ in. long, linear, subacute, densely glandular-hairy; bracteoles $\frac{1}{3}$ in. long, linear, acute, glandular-hairy. Calyx pubescent, $\frac{1}{4}$ in. long, divided $\frac{2}{3}$ the way down; segments linear-subulate. Corolla light-purple (*Nairne*), 1 in. or more long, pubescent outside; tube slender below, slightly enlarged above; upper lip $\frac{5}{8}$ by $\frac{1}{8}$ in., ligulate, truncate, shortly emarginate, parallel-nerved; lower lip as long as the upper, $\frac{1}{8}$ in. broad, oblong, obtuse, shortly and equally 3-lobed, spotted with dark purple at the base. Filaments flat, hairy, purple; anthers yellow, 1-celled. Style filiform, glabrous; stigma 2-forked. Capsules $\frac{1}{2}$—$\frac{5}{8}$ in. long, with a long solid stalk, pubescent, narrowly clavate, pointed, 2-seeded. Seeds $\frac{1}{8}$ by $\frac{1}{12}$ in., oblong, rounded at the apex, tuberculate. Fl. B. I. v. 4, p. 557; Dalz. & Gibs. p. 197; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.—Flowers: Oct.—Feb.

Rare. KONKAN: *Law*!; hills in the Konkan, *Dalzell*!; Rohe (N. Konkan), *Dalzell & Gibson*. DISTRIB. India (W. Peninsula).

29. RUNGIA, Nees.

Erect or diffuse herbs or undershrubs. Leaves entire. Flowers in terminal or axillary perfectly or imperfectly 1-sided spikes; bracts in 2 or 4 rows, 2 of the rows often barren, the flowering bracts often with scarious margins; bracteoles narrower than the bracts. Calyx small, 5-partite; segments linear-lanceolate. Corolla 2-lipped, the lower lip longer than the upper. Stamens 2; anthers 2-celled, the cells often superposed, the lower cell often with a white basal appendage. Disk annular or shortly cupular. Ovary 2-celled; ovules

2 in each cell ; style filiform ; stigma minutely 2-fid. Capsule ovoid or oblong, shortly stipitate ; placentas, together with the retinacula, elastically separating from the base of the capsule after dehiscence, to scatter the seeds. Seeds normally 4, compressed, orbicular, glabrous, minutely tubercular or verrucose, often with concentric furrows.—DISTRIB. Warmer parts of the world ; species 20.

Bracts dimorphic; upper lip of corolla acute, not notched.	
Corolla ½ in. long; barren bracts ⅓—½ in. long...	1. *R. crenata.*
Corolla ⅛ in. long; barren bracts ⅛ in long.....	2. *R. parviflora,* var. *pectinata.*
Bracts uniform; upper lip of corolla notched or emarginate.	
Spikes perfectly 1-sided; bracts herbaceous; corolla ⅛ in. long.....	3. *R. linifolia.*
Spikes imperfectly 1-sided; bracts with broad scarious margins; corolla exceeding ⅛ in. long.	
Stems decumbent and rooting, nearly glabrous; capsules ovoid, acute.....	4. *R. repens.*
Stems erect, densely hairy; capsules obovoid, obtuse	5. *R. elegans.*

1. **Rungia crenata,** *T. Anders. in Journ. Linn. Soc.* v. 9 (1867) p. 518. An erect branched herb 1—1½ ft. high ; stems and branches slender, terete or obscurely quadrangular, glabrous or nearly so. Leaves 1—2½ by ½—1 in., elliptic-lanceolate, subacute, lineolate, sparsely hairy with hairs often bulbous-based, base acute ; petioles ¼—⅜ in. long, hairy. Flowers in dense 1-sided spikes ¾—1 by ⅛ in., terminal or axillary, sessile or pedunculate ; bracts on one side of the spike, dimorphic, the barren bracts alternate, in 2 opposite rows, foliaceous, ⅓—½ by 1/10—⅛ in., elliptic-oblong or somewhat obovate, densely softly hairy, strongly nerved, mucronate, often with a narrow scarious margin on the lower edge reaching about ½-way up from the base, the fertile bracts ⅛ by 1/10 in. (including the scarious margin), broadly obovate, mucronate, pubescent, with a broad scarious margin ; bracteoles ⅛ in. long, elliptic-oblong, concave, pubescent, with scarious ciliolate margins. Calyx densely hairy, ⅛ in. long, divided nearly to the base ; segments linear-lanceolate. Corolla blue, ½ in. long, hairy outside : upper lip rather less than ⅛ in. long, broadly ovate, acutely acuminate ; lower lip nearly ⅛ in. long, obovate, with 3 short obtuse lobes, the middle lobe the narrowest. Filaments glabrous ; lower cell of anthers with an obtuse white appendage. Capsules 1/10—⅛ in. long, ovoid, acute, pubescent at the apex, compressed, the 2 flat faces scarious, the narrow edge hard, white, shining. Seeds 1/20 by 1/30 in., ellipsoid. Fl. B. I. v. 4, p. 547 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.

Rare. KONKAN : *Stocks* ! ; Goa jungles, *Dalzell* ! S. M. COUNTRY : Belgaum, *Ritchie,* 609 ! KANARA : *Law* !—DISTRIB. India (W. Peninsula).

2. **Rungia parviflora,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 110, VAR. **pectinata,** *C. B. Clarke, in Hook, f. Fl. B. I.* v. 4 (1885) p. 550. A much-branched annual straggling weed ; stems subterete, glabrous or pubescent. Leaves very variable in size, ¼—2½ by ⅛—1¼ in. (in a luxuriant specimen from Matheran 4 by 1½ in.),

elliptic-lanceolate or oblong-lanceolate, acute or subobtuse, lineolate, glabrous or nearly so, base acute ; petioles ⅛—½ in. long. Flowers in terminal and axillary 1-sided subsessile spikes ½—1 in. long, sometimes 2 or 3 together at the ends of the branches ; bracts dimorphic, the barren ⅛ by $\frac{1}{16}$ in., in 2 rows, lanceolate, cuspidate, pubescent, usually with scarious margins on both sides or sometimes on one side only, rarely not margined ; fertile bracts ⅛ in. in diam. (including the broad scarious margin), hairy on both sides, orbicular, the central herbaceous portion lanceolate, cuspidate, the scarious margins often $\frac{1}{20}$ in. broad, usually 2-fid at the rounded apex ; bracteoles $\frac{1}{16}$ in. long, elliptic-oblong, concave, with ciliate scarious margins which are 2-fid at the apex. Corolla blue, ¼ in. long, pubescent outside ; upper lip $\frac{1}{16}$ in. long, broadly ovate, acutely acuminate ; lower lip $\frac{1}{16}$ in. long, obovate, shortly obtusely 3-lobed. Filaments glabrous ; cells of the lower anthers with a long white appendage. Capsules $\frac{1}{16}$ by $\frac{1}{30}$ in., ovoid, acute, compressed, pubescent at the tip, with scarious faces, 2- or 4-seeded. Seeds when 2 about $\frac{1}{30}$ in., when 4 hardly $\frac{1}{30}$ in. in diam., orbicular, minutely echinulate, yellow. Trim Fl. Ceyl. v. 3, p. 343 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 592. *Rungia pectinata* (sp.), Nees, in DC. Prodr. v. 11, p. 470 ; Wight, Icon. t. 1547. *R. parviflora*, Dalz. & Gibs. p. 195. *R. polygonoides*, Nees, in Wall. Pl. As. Rar. v. 3, p. 110 ; Dalz. Gibs. p. 196. *Justicia pectinata*, Linn. Amœn, Acad. v. 4, p. 299 ; Grah. Cat. p. 165.—Flowers : Nov.—Feb.

Very common. KONKAN : *Law* ! ; Ratnagiri !, *Kanitkar* ! ; Marmagão, *Woodrow* ! ; Ambeghát, *Bhiva* ! ; Panvel, *Woodrow* ; Matheran, *Cooke* ! DECCAN : Panchgani Ghát, *Cooke* ! ; Khandala, *Woodrow*. KANARA : *Law* ! ; Kumpta, *Bhiva* !—DISTRIB. Throughout India ; Ceylon.

VAR. *muralis*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 550. Spikes very dense, reaching 2 in. long and only ⅛ in. wide ; barren bracts ovate, acute, hardly longer than the fertile. *R. muralis* (sp.), Nees, in DC. Prodr. v. 11, p. 470.

KONKAN : *Stocks* ! KANARA : *Hohenhacker* !

3. **Rungia linifolia,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 110. A small suberect herb 6—12 in. high ; stems very slender with almost filiform branches. Leaves ½—1 by ¼—½ in., elliptic-lanceolate, acute or subobtuse, lineolate, glabrous or nearly so, base usually tapering ; main nerves 4—6 pairs ; petioles 0—⅛ in. long. Flowers in narrow pedunculate terminal slender quadrifarious secund spikes ½—1½ in. long ; bracts herbaceous, ⅛ by $\frac{1}{20}$ in., elliptic-lanceolate, acute, mucronate, minutely pubescent ; bracteoles $\frac{1}{16}$ by $\frac{1}{40}$ in., linear-lanceolate. Calyx $\frac{1}{16}$ in. long, minutely pubescent, divided almost to the base ; segments linear-subulate. Corolla pale-purple (*Ritchie*), ⅛ in. long, slightly pubescent outside ; upper lip $\frac{1}{16}$ by $\frac{1}{12}$ in., bifid ; lower lip ⅛ in. long, obovate, shortly 3-lobed. Filaments glabrous ; lower cells of the anthers not of slightly appendiculate at the base. Capsules not seen. Fl. B. I. v. 4, p. 548 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Rostellularia gracilis*, Wight, Icon. t. 1541.—Flowers : Dec.

Rare. KONKAN: *Stocks*! KANARA: *Stocks*!, *Law*!, *Dalzell*!; Kála naddi, *Ritchie*, 1221!, *Woodrow*.—DISTRIB. India (W. Peninsula).

4. **Rungia repens,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 110. Stems usually decumbent, often rooting near the base, then erect, slender, subterete, glabrous or puberulous. Leaves 1—2 by ½—¾ in., subsessile or shortly petiolate, oblong-lanceolate, acute, lineolate on both sides, glabrous or nearly so, base usually tapering, less commonly rounded and unequal-sided; main nerves about 6 pairs; petioles rarely reaching ⅛ in. long. Flowers in erect terminal usually pubescent, imperfectly 1-sided spikes, 1—2½ in. long; bracts (including the scarious margin) ¼ by ⅛ in., broadly elliptic, pubescent (the herbaceous part inside the margin often lanceolate), cuspidate, much imbricate, the margins thinly scarious, ciliate, often $\frac{1}{10}$ in. wide; bracteoles ⅛ in. long, linear-lanceolate, acute, with scarious margins, minutely pubescent. Calyx ⅛ in. long, puberulous, divided to within $\frac{1}{25}$ in. of the base; segments lanceolate-subulate. Corolla white, blue, or pink, with darker spots, pubescent outside, nearly ½ in. long; upper lip ⅛ in. long, oblong, emarginate; lower lip ⅛ in. long, shortly 3-lobed. Lower anther-cells with a white appendage at the base. Capsules ⅛—¼ in. long, ovoid-oblong, acute, compressed, with scarious faces and hard edges, pubescent. Seeds $\frac{1}{10}$ in. in diam., suborbicular, rugose with concentric furrows, pale-brown. Fl. B. I. v. 4, p. 549; Dalz. and Gibs. p. 196; Wight, Icon. t. 465; Trim. Fl. Ceyl. v. 3, p. 343; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358; Watt, Dict. Econ. Prod. v. 6, part 1, p. 593. *Justicia repens,* Linn. Sp. Pl. (1753) p. 15; Grah. Cat. p. 165. Flowers: Nov.—Jan. VERN. *Ghátipitpápra.*

Common throughout the Presidency. KONKAN: *Stocks*! DECCAN: Panchgani, *Cooke*!; Khandala, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie*, 607! KANARA: *Woodrow*.—DISTRIB. Throughout India; Ceylon.

5. **Rungia elegans,** *Dalz. & Gibs. Bo. Fl.* (1861) p. 196. An erect herb 6—15 in. high; stems somewhat angular, clothed with soft white hairs. Leaves sessile or very shortly petiolate, 1½—2½ by ½—1½ in., elliptic-lanceolate, acute or acuminate, glabrous or nearly so, base usually rounded; main nerves about 8 pairs, prominent beneath; petioles 0—⅛ in. long. Flowers in sessile terminal imperfectly 1-sided spikes 1—2 in. long; bracts ⅜ by ¼ in., hairy on both sides and with scarious margins, broadly elliptic, rounded at the apex, cuspidate, the central herbaceous portion of the bract lanceolate, the scarious margin $\frac{1}{10}$ in. broad, ciliate, sometimes tinged with pink; bracteoles ⅛ by $\frac{1}{25}$ in., linear-lanceolate with scarious margins. Calyx ⅛ in. long, divided to within $\frac{1}{20}$ in. of the base, pubescent; segments linear-subulate. Corolla of a fine blue, exceeding ½ in. long, pubescent outside; upper lip ⅛ in. long, oblong, notched; lower lip exceeding ¼ in. long, divided ½-way down into 3 obtuse lobes. Filaments glabrous; lower cells of the anthers with white appendages. Ovary pubescent. Capsules ⅛—⅓ by $\frac{1}{10}$—⅛ in., obovoid-oblong, truncate, shortly mucronate, shortly narrowed at the base, pubescent on the sides and on the scarious faces. Seeds $\frac{1}{10}$ in. long, broadly oblong and rounded at the apex, or suborbicular,

rugose with concentric furrows, yellow or brown. Fl. B. I. v. 4, p. 549 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Justicia repens* var. *villosa*, Nees, in DC. Prodr. v. 11, p. 472.—Flowers: Sept.—Jan.

KONKAN : *Stocks* ! ; Salsette, *Nairne*. DECCAN : Poona, *Cooke* !, *Woodrow* ! ; hills 4 miles W. of Poona, *Krishna* ! ; high hills round Junnar, *Dalzell & Gibson* ; Panchgani Ghát, *Cooke* ! KANARA : *Law* !—DISTRIB. India (W. Peninsula).

30. **DICLIPTERA,** Juss.

Diffuse or suberect herbs. Leaves ovate or elliptic, acute, entire or obscurely undulate. Flowers in axillary and terminal clusters or paniculate often umbel-like cymes, 1 or more enclosed within a pair of opposite involucral bracts, the flowers sessile within the bracts, one or more often reduced to a calyx and bracteoles ; bracts exceeding the calyx, opposite, unequal, often connate at the base ; bracteoles linear or linear-lanceolate, about equalling the calyx. Calyx deeply 5-partite ; segments equal, linear-lanceolate, more or less pubescent. Corolla usually red, often spotted with purple ; tube slender, slightly or not enlarged above ; limb deeply 2-lipped, the upper lip entire or emarginate, the lower lip very shortly 3-lobed. Stamens 2; anthers 2-celled, usually superposed, rarely with basal appendages. Disk cupular. Ovary 2-celled ; ovules 2 in each cell ; style filiform ; stigma shortly 2-fid. Capsules ellipsoid, ovoid or obovoid, subsessile or with a short solid stalk ; placentas separating elastically from the base of the capsule after dehiscence, to scatter the seeds. Seeds ovoid or sub-orbicular, verrucose, echinulate, tuberculate, or papillose.—DISTRIB. Tropical and subtropical regions of both hemispheres ; species 60.

Tubercles on the seeds glochidiate.	
Corolla ½ in. long; capsules pubescent at the apex; bracts $\frac{1}{16}$ in. broad	1. *D. micranthes.*
Corolla ¾ in. long; capsules pubescent all over; bracts nearly ⅛ in. broad	2. *D. zeylanica.*
Tubercles on the seeds not glochidiate.	
Flowers in clusters; bracts lanceolate	3. *D. Leonotis.*
Flowers in terminal lax panicles; bracts obovate, cuneate	4. *D. cuneata.*

1. **Dicliptera micranthes,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 112. A more or less branched erect herb 6—18 in. high ; branches angular, usually glabrous. Leaves 1¾—3½ by ¾—1¾ in., ovate or elliptic, acuminate, lineolate, glabrous or nearly so ; main nerves 5—6 pairs, slender ; petioles ½—1½ in. long. Flowers in axillary clusters of usually 3—5, small sessile, sometimes umbel-like cymes ; bracts herbaceous, veined, unequal, the longer of the pair ⅛ by $\frac{1}{16}$ in., oblong-obovate, cuspidately acuminate, nearly glabrous, the lower half of each bract with scarious densely ciliate margins, each pair of bracts enclosing usually 3 flowers very closely packed together ; bracteoles ⅛ in. long, linear-lanceolate, hairy. Calyx ⅛—⅛ in. long, hairy, 5-partite to about $\frac{3}{16}$ in. from the base ; seg-

ments lanceolate-subulate, very acute. Corolla ⅛ in. long, pubescent outside; tube narrow, scarcely enlarged above; upper lip $\frac{1}{20}$ in. long; lower lip $\frac{1}{16}$ in. long. Capsules ⅛ by $\frac{1}{16}$ in., ellipsoid, compressed, subacute, very shortly stalked, pubescent at the apex, the sides glabrous, 4-seeded. Seeds $\frac{1}{30}$ in. in diam., orbicular, echinulate with small tubercles with stellately radiating tips. Fl. B. I. v. 4, p. 553; Dalz. & Gibs. p. 197; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.—Flowers: Oct. Vern. *A'mphutaváni.*

KONKAN: Ságargarh (N. Konkan), *Stocks*!, *Dalzell & Gibson.* GUJARAT: *Dalzell*!; Neriad, *Kanitkar*! SIND: Sákhpur, *Woodrow.*—DISTRIB. India (Behar, Chota-Nagpur, Central India, W. Peninsula); Tropical Africa.

2. **Dicliptera zeylanica,** *Nees, in DC. Prodr.* v. 11 (1847) p. 474. A prostrate or subscandent herb; stems long, glabrous or hairy, or sometimes densely woolly; branches 4- or 6-sided. Leaves 1½—4½ by ¾—2½ in., ovate or elliptic, shortly acuminate, lineolate, glabrous or somewhat scabrid above, paler and more or less hairy on the nerves beneath, mucroanate, base acute; petioles ⅛—⅝ in. long. Flowers in axillary and terminal umbel-like few-flowered sometimes clustered cymes, rarely reduced to a single head; peduncles of the cyme ¼—1 in. long; branches of the cyme very often 3, less commonly 4 or 5, usually short, pedicel-like, each supporting a pair of bracts which enclose 1—3 sessile flowers of which usually 1 only is fertile; bracts herbaceous, in opposite pairs, equal or unequal, connate at the base, broadly ovate, ½—¾ in. long and nearly as broad as long (occasionally reniform and broader than long), mucronate, more or less hairy on both sides, reticulately veined; bracteoles ¼ in. long, linear-subulate, very hairy. Calyx ¼ in. long, hairy, 5-partite to about $\frac{1}{12}$ in. from the base; segments lanceolate, very acute. Corolla deep-rose, often exceeding ¾ in. long, pubescent outside, deeply 2-lipped; tube slender below, slightly enlarged above; upper lip ⅜ in. long and as broad, obovate, entire; lower lip nearly ½ by ⅓ in., oblong, truncate, shortly 3-lobed, the lobes $\frac{1}{16}$ in. long, subequal, oblong, rounded. Filaments flat; one anther-cell attached much higher up than the other, the lower cells not appendaged at the base. Style filiform, more or less pubescent. Capsules ¼ in. long, obovoid, truncate or rounded, shortly mucronate, compressed and with a stalk about $\frac{1}{16}$ in. long, densely pubescent all over. Seeds $\frac{1}{10}$ in. in diam., compressed, minutely tubercular, the tubercles on the margins minutely glochidiate. Fl. B. I. v. 4, p. 552; Trim. Fl. Ceyl. v. 3, p. 344; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Dicliptera bivalvis*, Nees, l. c. p. 475 (*not* of Juss.); Wight, Icon. t. 1551; Dalz. & Gibs. p. 196. *Justicia bivalvis*, Grah. Cat. p. 164 (*not* of Linn.).—Flowers: Dec.—Mar.

KONKAN: *Stocks*!, *Dalzell*!; S. Konkan, *Graham, Ritchie,* 585!; Matheran, *Cooke*! DECCAN: Khandala, *Woodrow*!; Mahableshwar, *Cooke*! S. M. COUNTRY: Belgaum, *Ritchie,* 591!—DISTRIB. India (W. Peninsula); Ceylon.

3. **Dicliptera Leonotis,** *Dalz. MS. in Herb. Kew., ex C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1885) p. 553. Glabrous or nearly so; stem 6-angular, erect, 2—3 ft. high with elongate opposite branches.

Leaves 2—3 by $\frac{3}{4}$—1 in., elliptic-lanceolate, glabrous or pubescent, attenuated at the base ; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long. Flowers in clusters of small subsessile somewhat umbel-like cymes in the opposite axils and at the ends of the branches ; bracts in unequal pairs, the longer $\frac{1}{2}$ by $\frac{1}{8}$ in., lanceolate, acuminate cuspidate, pubescent, 3-nerved, the 2 lateral nerves close to the margin, without scarious margins in the lower part ; bracteoles $\frac{3}{8}$ by $\frac{1}{20}$ in., linear-lanceolate, very acute. Calyx $\frac{1}{4}$—$\frac{1}{3}$ in. long, divided to within $\frac{1}{16}$ in. of the base ; segments linear-lanceolate, very acute. Corolla $\frac{5}{8}$ in. long, pubescent outside ; upper lip shorter than the lower, entire ; lower lip $\frac{3}{8}$ in. long, oblong, subtruncate, very shortly 3-lobed, the lobes scarcely $\frac{1}{20}$ in. deep. Capsules $\frac{1}{4}$ by $\frac{1}{8}$—$\frac{1}{6}$ in., obovoid, mucronate, much compressed, shortly stalked, with scarious faces, hairy all over, 4-seeded. Seeds $\frac{1}{16}$ by $\frac{1}{20}$ in., obovoid-oblong, rounded at the apex, with small not glochidiate tubercles. *Dicliptera Burmanni*, Dalz. & Gibs. p. 196 (*not* of Nees). *D. Roxburghiana*, Dalz. & Gibs. p. 196 ? (*not* of Nees).

Rare. KONKAN : S. Konkan, *Nairne*. DECCAN : Anjaniri hill above Trimbak near Nasik, *Dalzell* !—DISTRIB. Tropical Africa.

4. **Dicliptera cuneata,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 111. Stems branched, glabrous, terete or obscurely tetragonal. Leaves 1½—3 by ¾—1½ in., ovate or elliptic, acuminate, lineolate, glabrous, base acute or rounded ; petioles ½—1½ in. long. Inflorescene in lax terminal panicles, the branches of the panicle ½—1½ in. long, 1 or often 2 from an axil, each bearing an umbel-like cyme of 3—8 heads, the branches of the cyme pedicel-like, 0—⅛ in. long ; bracts below the cyme ⅛ in. long, lanceolate, acute ; bracts of the flower-heads ⅓—½ by $\frac{1}{16}$—⅛ in., obovate-oblong, somewhat cuneate at the base, mucronate, hairy, ciliate, each pair of bracts enclosing 1 or more sessile flowers ; bracteoles ¼—⅓ in. long, linear, very acute, pubescent. Calyx ⅛—¼ in. long, divided to about $\frac{1}{20}$ in. from the base ; segments linear-subulate. Corolla rather more than ½ in. long, pubescent outside ; upper lip ¼ in. long, obovate-oblong, entire ; lower lip slightly longer than the upper, oblong, shortly 3-lobed, the lobes subacute. Filaments glabrous or sparsely hairy. Ovary glandular-pubescent. Capsules ¼—⅓ by $\frac{1}{10}$—⅛ in., with a stalk about $\frac{1}{12}$ in. long, compressed, obovoid, obtusely rounded or subtruncate and bluntly pointed at the apex, densely pubescent at the tip with short glandular hairs, less densely so on the sides and scarious faces, 4-seeded. Seeds somewhat obovoid, $\frac{1}{12}$ by $\frac{1}{16}$ in., compressed, tubercular, the tubercles not glochidiate. Fl. B. I. v. 4, p. 552 ; Wight, Icon. t. 1552 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.—Flowers : Dec.—Jan.

Rare. DECCAN : Máwal, *Woodrow;* Jaronda hill, *Woodrow*. S. M. COUNTRY : Yellur hill near Belgaum, *Ritchie*, 594 !—DISTRIB. India (W. Peninsula).

31. ECBOLIUM, Kurz.

Glabrous or hairy shrubs. Leaves entire, rather thick. Flowers numerous, in terminal spikes ; bracts large, imbricate ; bracteoles small, linear or lanceolate. Calyx 5-partite ; segments linear. Corolla-

tube very long and narrowly linear (in the Indian species) ; upper lip entire or 2-fid ; lower lip 3-lobed. Stamens 2, without rudiments of others ; anther-cells 2, linear, not spurred nor appendaged at the base, of nearly equal height. Ovary glabrous or hairy, 2-celled ; ovules 2 in each cell ; style filiform ; stigma very shortly equally 2-fid. Capsule much flattened, on a solid stalk, 2-seeded ; placentas not rising elastically from the base of the valves. Seeds (in the Indian species) large, much flattened, tubercular and scabrous, without hairs.—DISTRIB. Africa, Madagascar, Arabia, India ; species 12.

1. **Ecbolium Linneanum,** *Kurz, in Journ. As. Soc.* v. 40 (1871) part 2, p. 75, VAR. **lætevirens,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1885) p. 545. A low shrub ; branches erect, terete, thickened above the nodes, glabrous. Leaves 3½—7 by 1¼—2½ in., lanceolate or elliptic-lanceolate, acuminate, glabrous, shining and dark green above, paler beneath, base acute ; main nerves about 6 pairs, slender, prominent beneath ; petioles ¼—½ in. long. Flowers in terminal dense or lax nearly sessile spikes 2—8 in. long ; bracts foliaceous, reaching ⅞ by ⅜ in., elliptic-lanceolate, acute, sometimes aristate, entire, tapering towards the base, pubescent and ciliate, reticulately veined ; bracteoles ⅛ in. long, lanceolate, acute, hairy. Calyx ¼ in. long, hairy, divided to within 1/12 in. of the base ; segments linear-lanceolate, very acute. Corolla bluish-green, hairy outside (very densely so in bud), reaching 1¾ in. long ; upper lip rather more than ⅜ in. long ; narrowly linear from a triangular base, notched at the apex ; lower lip ½ in. long, divided almost to the base into 3 lobes, the lateral lobes oblong, subacute, the middle lobe broader, oblong, obtuse. Filaments of the stamens hairy at the base ; anthers 1/10 in. long. Ovary pubescent at the very tip ; style filiform, glabrous in the upper, pubescent in the lower part ; stigma of 2 short divaricate lobes. Capsules nearly 1 in. long by ⅜ in. wide above the seeds, battledore-shaped, acutely pointed, pubescent all over ; stalk about ⅜ in. long. Seeds ⅛ in. in diam., broadly ovoid, much compressed, white, covered with small acute tubercles, the basal notch very deep. *Ecbolium Linneanum,* Trim. Fl. Ceyl. v. 3, p. 341 ; Talb. Trees, Bomb. ed. 2, p. 266 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Justicia Ecbolium,* Linn. Sp. Pl. (1753) p. 15 *in part* ; Wight, Icon. t. 463 ; Dalz. & Gibs. p. 194. *Justicia lætevirens,* Vahl, Enum. v. 1, p. 118.—Flowers : Oct.—Jan. VERN. *Odu-játi* ; *Ránaboli* ; *Dhákta-adulsa.*

KONKAN : Matheran, *Cooke!*, *H. M. Birdwood*; Karjat, *Bhíva!* DECCAN : Khandala, *Graham;* east of Phunda Ghát, *Ritchie,* 1197! S. M. COUNTRY : Castlerock, *Kanitkar!*—DISTRIB. India (W. Peninsula) ; Ceylon.

VAR. *dentata,* C. B. Clarke (*l. c.*). Bracts acuminate with irregularly dentate margins ; spikes dense. *Justicia dentata,* Klein, ex Link, Jahrb. v. 1, Heft 3, p. 48.

KONKAN : *Law!* ; island of Karanja in Bombay Harbour, *Woodrow!*

32. **JUSTICIA,** Linn.

Herbs or shrubs. Leaves entire. Flowers sessile or subsessile, in spikes or panicles (rarely solitary or clustered), usually small ; bracts

various ; bracteoles narrow or obsolete. Calyx 5- or 4-partite ; segments narrow. Corolla 2-lipped ; tube equalling or shorter than the limb ; upper lip 2-lobed or subentire ; lower lip 3-lobed, the lobes imbricate in bud. Stamens 2 ; filaments often dilated ; anthers 2-celled, one cell higher up than the other, the cells oblong or round, the lower always with a white basal appendage. Ovary 2-celled ; ovules 2 in each cell ; style filiform ; stigma shortly 2-fid. Capsule ovoid or ellipsoid, 4-seeded (except in the abnormal capsules of *J. heterocarpa*), sometimes seed bearing from the base, sometimes contracted below into a solid stalk and seed-bearing at the apex. Seeds ovoid or suborbicular, more or less compressed, tubercular, scaly or glochidiate.—DISTRIB. All warm regions ; species about 200.

Calyx 5-partite, segments subequal.
- Shrubs.
  - Stems erect; leaves reaching 9 in. long; corolla 1 in. long and upwards ..... 1. *J. montana.*
  - Stems decumbent; leaves reaching 3 in. long; corolla less than 1 in. long ..... 2. *J. Betonica*, var. *ramosissima.*
- Herbs.
  - Flowers 1—4-nate, axillary; capsules dimorphous ..... 3. *J. heterocarpa.*
  - Flowers numerous in spikes; capsules not dimorphous.
    - Leaves less than 2 in. long.
      - Bracts lanceolate, white with green nerves ..... 4. *J. trinervia.*
      - Bracts orbicular, green ..... 5. *J. glauca.*
    - Leaves exceeding 2 in. long; bracts ovate, glandular-pubescent ..... 6. *J. wynaadensis.*

Calyx 4-partite; corolla less than ½ in. long.
- Sepals scarious, the midrib produced into a long arista ..... 7. *J. micrantha.*
- Sepals not scarious, not aristate.
  - Bracts and bracteoles shorter than the calyx; sepals minutely scabrous at the tip, elsewhere glabrous; corolla ½ in. long ..... 8. *J. diffusa.*
  - Bracts and bracteoles as long as or longer than the calyx.
    - Bracts linear, obtuse, glabrous; sepals similar to the bracts, glabrous; corolla reaching ¼ in. long ..... 9. *J. quinqueangularis.*
    - Bracts elliptic, subacute, $\frac{1}{16}$—$\frac{1}{12}$ in. broad, clothed with glistening jointed hairs; sepals hairy ..... 10. *J. simplex.*
    - Bracts linear-lanceolate, hairy, $\frac{1}{25}$ in. broad 11. *J. procumbens.*

1. **Justicia montana,** *Wall. Cat.* (1828) 2471 (*not* of Roxb.). Shrubby, 2—3 ft. high ; stem erect, subtetragonal, nearly glabrous. Leaves 6—10 by 2—3½ in., elliptic-lanceolate, acute, glabrous, base attenuated into the petiole ; main nerves 9—11 pairs, slender, arcuate, prominent beneath ; petioles ¾—1 in. long. Flowers white, clustered, in large terminal paniculate sometimes thyrsoid spikes or racemes 6—15 in. long, the lower clusters of flowers often distant ; bracts ¼ by ⅛ in., ovate-oblong, puberulous ; bracteoles ⅛ in. long, elliptic ; pedicels 0—⅛ in. long. Calyx ¼ in. long, pubescent, 5-partite to within $\frac{1}{16}$ in. of the base ; segments linear-lanceolate, acute. Corolla

1 in. long, pubescent outside, 2-lipped more than ½-way down ; upper lip ⅛ in. long, oblong, notched ; lower lip 3-lobed ; tube hairy within below the insertion of the filaments. Filaments glabrous except at their insertion which is densely hairy ; lower anthers with a long acute white spur. Ovary pubescent. Capsules 1 in. long, clavate, pubescent, 4-seeded near the top. Seeds ⅛ in. in diam., suborbicular, labyrinthically rugose, glabrous. Fl. B. I. v. 4, p. 525 ; Talb. Trees, Bomb. ed. 2, p. 264 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Hemichoriste montana,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 102 ; Dalz. & Gibs. p. 194 ; Wight, Icon. t. 1538.—Flowers : Jan.—Feb.

Dalzell without locality in Herb. Kew.! KONKAN : *Law*!, *Stocks*! ; Ghâts, *Dalzell & Gibson.* DECCAN : Phunda Ghât, *Ritchie,* 1951 ! KANARA : Deviman Ghât, *Kanitkar*! ; Yacombi, *Woodrow.*—DISTRIB. India (W. Peninsula).

2. **Justicia Betonica,** *Linn. Sp. Pl.* (1753) p. 15, VAR. **ramosissima,** *C. B. Clarke, in Hook. f. Fl. B. Ind.* v. 4 (1885) p. 525. A diffusely branched more or less decumbent undershrub, 2—4 ft.; stem cylindric, striate, with swollen nodes, often tinged with purple above the nodes. Leaves 2—4 by ¾—1¾ in., ovate, acute or acuminate, light green, glabrous, entire, subcrenulate or slightly toothed, glabrous ; main nerves about 6 pairs ; petioles 0—¼ in. long. Flowers in terminal (rarely axillary) spikes, often at the ends of short lateral branches, the spikes simple or paniculately branched, 1—5 in. long ; bracts reaching ⅜ by ¼ in., ovate, acute, mucronate, membranous, white with green veins, glabrous ; bracteoles more than ½ in. long by ⅛ in. wide, lanceolate, acute, unequal-sided, somewhat falcately curved, thinly membranous, white with green veins, faintly ciliolate, otherwise glabrous. Calyx ⅛ in. long, pubescent, 5-partite to within 1/16 in. from the base ; segments linear-lanceolate, very acute. Corolla ½ in. long, pubescent outside, dull-white or pale-pink, 2-lipped about ½-way down ; upper lip erect, emarginate ; lower lip deflexed, 3-lobed, the lobes deep, oblong, rounded, subequal. Stamens conniving under the upper lip ; filaments hairy at their insertion, otherwise glabrous ; lower anther-cells with a long acute spur. Style pubescent. Capsules ⅜ by ¼ in., softly pubescent, broadly clavate, with a short solid stalk, 4-seeded in the upper half, protuberant above the seeds. Seeds ⅛ in. in diam., suborbicular, with a blunt ridge in the middle of one face, densely tuberculately rugose when wetted, the tubercles often 3—4-angular. Talb. Trees, Bomb. ed. 2, p. 265 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Justicia ramosissima,* Roxb. Fl. Ind. v. 1, p. 129 ; Grah. Cat. p. 165. *Adhatoda ramosissima,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 103 ; Dalz. & Gibs. p. 193.—Flowers : Oct.—Dec.

KONKAN : Matheran, *Cooke*!, *H. M. Birdwood;* Ghâts, *Dalzell & Gibson.* DECCAN : hills east of Mahableshwar, *Graham* ; hills below Mahableshwar, *Cooke*! ; Khandala, *Cooke*!, *Woodrow*! ; Sangameshwar, *Woodrow* ; north of Poona, *Woodrow*! S. M. COUNTRY : Gokak, *Cooke*!—DISTRIB. Throughout India.

3. **Justicia heterocarpa,** *T. Anders. in Journ. Linn. Soc.* v. 7 (1864) p. 41. A slender annual herb 6—12 in. high ; stems minutely grey-pubescent. Leaves ½—1¼ by ¼—⅝ in., ovate or ovate-lanceolate,

acute, thin, minutely lineolate, glabrous or more or less pubescent, base usually rounded; main nerves 4—5 pairs; petioles ½—1 in. long. Flowers small, in close axillary clusters of 2—4 flowers; bracts minute. Calyx ⅛ in. long, 5-partite nearly to the base, hairy; segments linear-subulate, ciliate. Corolla ¼ in. long, pubescent outside; upper lip about $\frac{1}{16}$ in. long, oblong, obtuse, rounded, 2-fid; lower lip slightly longer than the upper, broadly obovate or subquadrate, shortly 3-lobed. Capsules dimorphous; normal capsules ⅛—¼ in. long, ellipsoid, acutely pointed, pubescent at the top, 4-seeded with scarcely any stalk; abnormal capsules 1-celled, 1-seeded, ⅛ in. long, ellipsoid with 3—6 vertical pectinate wings, the teeth of which are densely hairy. Seeds of the normal capsules $\frac{1}{30}$ in. in diam., tuberculate, glabrous; seeds of the abnormal capsules ovoid, larger than in the normal, nearly smooth, on a nearly basal retinaculum (*C. B. Clarke*). Fl. B. I. v. 4, p. 531; Aitch. Pb. & Sind Pl. p. 113; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers: Oct.—Nov.

GUJARAT: Deesa, *Stocks*, 74!; Porbandar (Kathiawar), *Woodrow*. SIND: Jemadar ka Landa near Karachi, *Stocks*, 74!—DISTRIB. India (Panjáb); Tropical Africa.

4. **Justicia trinervia,** *Vahl, Enum.* v. 1 (1805) p. 156 A small procumbent herb with a woody rootstock; stems glabrous, from a few inches to 1—2 ft. long. Leaves ½—1½ by ¼—⅜ in., the upper sessile, the lower shortly petiolate, elliptic or oblong or obovate-oblong, obtuse. Flowers in continuous somewhat lax glabrous spikes 1—5 in. long; bracts $\frac{7}{16}$ by ⅛ in., white with green veins, lanceolate, acute, glabrous, sometimes ciliolate near the base; bracteoles exactly as the bracts. Calyx ⅕ in. long, pubescent, divided to within $\frac{1}{30}$ in. of the base; segments lanceolate, very acute, 3-nerved (sometimes obscurely). Corolla ⅜ in. long, pubescent outside; upper lip ⅛ in. long, broadly ovate, concave, obtuse, 2-fid at the apex; lower lip ¼ in. long, deeply 3-lobed, the lobes obtuse, the middle twice as broad as the lateral ones. Filaments glabrous above, slightly pubescent at the very base. Style pubescent. Capsules ½ by ⅕ in., oblong-clavate, shortly pointed, pubescent, 4-seeded. Seeds ⅛ in. in diam., densely clothed with acute tubercles. Fl. B. I. v. 4, p. 526; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Adhatoda trinervia*, Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 103; Dalz. & Gibs. p. 194.—Flowers: Oct.—Jan. VERN. *Sut.*

KONKAN: *Stocks!*, *Nairne*; Vingorla, *Dalzell!*; Wagdonger near Vingorla, *Dalzell & Gibson*; Matheran, *H. M. Birdwood*; Mahableshwar, *Nairne*, *Woodrow*. KANARA: Waguli (N. Kanara), *Ritchie*, 608!—DISTRIB. India (W. Peninsula).

VAR. *arenaria*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1885) p. 526. Leaves narrowly linear-oblong; spikes often small. *Adhatoda arenaria*, Nees, in DC. Prodr. v. 11, p. 387. Seems scarcely more than a form growing in stony arid ground.

S. M. COUNTRY: arid stony hill N.E. of Belgaum, *Ritchie*, 1146!

5. **Justicia glauca,** *Rottler, in Ges. Naturf. Fr. Neue Schr.* v. 4 (1802) p. 219. A branched diffuse herb 6—20 in. high; stems

puberulous, the internodes long. Leaves 1—1¾ by ¾—1 in., ovate subacute, more or less pubescent, base usually rounded; main nerves 4—6 pairs; petioles ⅛—⅝ in. long. Flowers in spikes 1—4 in. long, terminal or from the upper axils (solitary ebracteate flowers sometimes scattered in the distant lower axils); bracts ¼ in. in diam., orbicular, ciliate with glandular hairs, more or less pubescent, shortly stalked; bracteoles very small, $\frac{1}{16}$ in. long, lanceolate, acute, pubescent. Calyx ⅛ in. long, pubescent, divided to within about $\frac{1}{10}$ in. of the base; segments lanceolate, acute, ciliate. Corolla ½ in. long; tube ⅜ in. long, narrowly infundibuliform; upper lip ¼ in. long, ovate-oblong, obtuse, notched, strongly nerved, spotted with purple; lower lip nearly ¼ in. long by ⅛ in. wide, broadly obovate, truncate at the apex and divided into 3 short subimbricate rounded lobes hardly $\frac{1}{20}$ in. deep; palate with 2 transversely plicate ridges. Filaments hairy at their insertion on the corolla-tube, otherwise glabrous. Ovary pubescent at the very tip; style pubescent below. Capsules ⅜ by ⅛ in., oblong, pointed, swollen above the seeds, glabrous except at the tip, which is faintly pubescent, 4-seeded; stalk $\frac{1}{16}$ in. long. Seeds $\frac{1}{16}$ in. in diam., densely clothed with somewhat triangular acute tubercles. Fl. B. I. v. 4, p. 529; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.—Flowers: Aug.—Oct.

Rare. KONKAN: *Stocks*! S. M. COUNTRY: Badami, *Cooke*!, *Woodrow*!, *Bhiva*!—DISTRIB. India (W. Peninsula).

6. **Justicia wynaadensis,** *Heyne, in Wall. Cat.* (1828) 2474. Suffruticose; stems elongate with distant nodes, slender, terete, striate, glabrous or nearly so. Leaves 2½—4½ by 1—1¾ in., elliptic or elliptic-lanceolate, acuminate, densely lineolate, glabrous or pubescent on the nerves beneath, base acute, rarely rounded; main nerves 6—8 pairs, slender, prominent beneath; petioles ¼—¾ in. long. Flowers solitary, opposite, along a glandular-hairy rhachis, in elongate drooping interrupted axillary and terminal spikes 2—4 in. long; bracts ⅛—⅛ in. long by $\frac{1}{16}$ in. wide, ovate, acute, and, as well as the bracteoles and calyx, glandular-pubescent; bracteoles a little below the calyx ⅛ in. long, linear-lanceolate, acute. Calyx ⅛ in. long, divided to within about $\frac{1}{10}$ in. of the base; segments linear-lanceolate, acute. Corolla pubescent outside, rose-colored, rather more than ⅜ in. long; upper lip ⅛ in. long, oblong, obtuse, concave, slightly notched, nerved; lower lip very slightly longer, with 3 obtuse lobes about $\frac{1}{16}$ in. deep, the middle lobe the broadest; palate with transverse dark bands spreading on each side of the midnerve. Filaments hairy below, glabrous above. Ovary hairy; lower half of style pubescent. Capsules ⅝ by ⅛ in., densely hairy, gradually narrowed into a stalk ¼ in. long, acutely mucronate, 4-seeded. Seeds $\frac{1}{16}$ in. in diam.; rugose with small obtuse tubercles. Fl. B. I. v. 4, p. 533; Talb. Trees, Bomb. ed. 2, p. 265; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357. *Adhatoda wynaadensis,* Nees, in DC. Prodr. v. 11, p. 406; Dalz. & Gibs. p. 194.—Flowers: Nov.—Dec.

Dalzell without locality in Herb. Kew.! KONKAN: *Dalzell & Gibson*; Marmagão, *Woodrow*! DECCAN: hills about Pár, below Mahableshwar, *Dalzell*!

S. M. COUNTRY: Belgaum, *Ritchie*, 412. KANARA: N. Kanara Ghâts in evergreen forests, *Talbot*.—DISTRIB. India (W. Peninsula).

7. **Justicia micrantha,** *Heyne, ex Wall. Cat.* (1828) 2449. A low much-branched herb 4—10 in. high; stems and branches slender, grooved, glabrous or pubescent, the younger branches sometimes retrorsely hairy. Leaves ¾—1½ by ½—⅝ in., ovate or elliptic, subobtuse, densely lineolate, sparsely hairy above, more densely so on the nerves beneath with short stout hairs; main nerves 4—6 pairs; petioles ⅛—¼ in. long. Flowers in terminal and axillary dense spikes ¼—1¼ in. long; bracts ¼ by ⅛ in., linear, blunt, with scarious margins near the base, sparsely hispid with white long bristly hairs, often tipped with divaricate bristles; bracteoles similar to the bracts. Calyx ⅛ in. long, 4-partite almost to the base; segments 1/20 in. broad (twice as broad as the bracteoles), scarious, the midrib green, excurrent into a long blunt arista which is hispid with long white bristly hairs, and often with 2 divaricate bristles at the apex, the rest of the calyx glabrous or nearly so. Corolla ¼ in. long, pale-purple; upper lip ⅛ in. long, deltoid-oblong, obtuse, entire; lower lip ⅛ in long, broadly obovate, with 3 rounded subequal lobes about 1/20 in. deep. Filaments glabrous. Ovary pubescent at the tip; lower half of style pubescent. Capsules ⅛ by 1/12 in., tapering into a short stalk about 1/20 in. long, subobtuse, mucronate, and with a few hairs at the apex, otherwise glabrous or sometimes with a few scattered hairs along the valves, 4-seeded. Seeds 1/20 in. in diam., finely rugose (scarcely concentrically so). Fl. B. I. v. 4, p. 536; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Rostellaria crinita*, Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 101, Dalz. & Gibs. p. 193 (by error *Rostellularia*).—Flowers: Aug.—Oct.

KONKAN: Vingorla, *Dalzell & Gibson*, *Woodrow*. DECCAN: *Woodrow*!; Poona, *Cooke*!, *Woodrow*!; Panchgani, *Raoji*!—DISTRIB. India (W. Peninsula).

8. **Justicia diffusa,** *Willd. Sp. Pl.* v. 1 (1797) p. 87. Stems 1—2 ft. high, somewhat woody below, much-branched, subquadrangular. Leaves 1—1¾ by ½—¾ in., ovate-elliptic or elliptic-lanceolate, acute or acuminate, more or less lineolate, glabrous, base usually acute; petioles ¼—½ in. long. Flowers in axillary and terminal narrow spikes 1—6 in. long by ⅓ in. or less wide; bracts shorter than the calyx, 1/10 in. long, ovate, acuminate, with scarious margins, minutely scabrous at the tip, otherwise glabrous; bracteoles as long as and similar to the bracts but narrower. Calyx ⅛ in. long, 4-partite nearly to the base; segments with scarious margins, lanceolate, acute, unequal, minutely scabrous at the tip. Corolla ⅛ in. long, pale-purple, slightly pubescent outside; upper lip 1/10 in. long, the lower portion ovate, the apical part subquadrate, subtruncate and slightly notched at the apex; lower lip very slightly longer than the upper, nearly as broad as long, very slightly 3-lobed at the rounded apex. Filaments glabrous except at their insertion. Ovary glabrous; lower part of style pubescent. Capsules ⅛—⅓ in. long, shortly pointed, oblong, groved on the back, glabrous, the solid stalk scarcely 1/20 in. long. Seeds 1/24 in. long, subconcentrically rugose. Fl. B. I. v. 4, p. 538; Trim. Fl. Ceyl. v. 3, p. 338; Woodr.

in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Rostellaria diffusa,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 100 ; Dalz. & Gibs. p. 193 (by error *Rostellularia*).—Flowers : Oct.—Dec.

Common in pastures, *Dalzell & Gibson.* DECCAN : *Woodrow* ! ; Poona, *Cooke* !, *Woodrow* ! SIND : *Cooke* !—DISTRIB. India (Panjáb, W. Peninsula, Rangoon) ; Ceylon, Siam.

VAR. 1. *prostrata,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1885) p. 538. Stems prostrate, intricately branched, patently hairy. Leaves smaller, broadly elliptic or suborbicular, ¼—½ in. in diam. Spikes shorter and more dense ; bracteoles and sepals broader. Capsules smaller, hairy. Trim. Fl. Ceyl. v. 3, p. 338.

Dalzell without locality in Herb. Kew. !

VAR. 2. *Vahlii,* C. B. Clarke, l. c. Leaves narrowly lanceolate or linear ; bracts lanceolate. *Rostellaria Vahlii,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 102.

Stocks without locality in Herb. Kew. !

9. **Justicia quinqueangularis,** *Koen. ex Roxb. Hort. Beng.* (1814) p. 80. A slender herb reaching 20 in. high ; stems 4—5-angular with distant internodes, geniculate, glabrous. Leaves 1—3 by ⅛—⅜ in., linear-oblong or linear-lanceolate, subobtuse, slightly lineolate, glabrous ; petioles 0—⅛ in. long. Flowers in slender elongate glabrous terminal spikes 1—5 in. long ; bracts ⅛ by $\frac{1}{20}$ in., linear, obtuse, glabrous, and, as well as the bracteoles and calyx, with scarious margins ; bracteoles as long as and similar to the bracts but narrower. Calyx glabrous, ⅛ in. long (as long as the bracts and bracteoles), 4-partite nearly to the base (no 5th segment present rudimentary or otherwise) ; segments slightly broader than the bracteoles, linear, obtuse. Corolla nearly ⅜ in. long, glabrous or nearly so outside, rose-colored ; upper lip ⅛ in. long, ovate, obtuse, 2-fid ; lower lip ⅛ in. long and as broad as long, suborbicular, very shortly 3-lobed, the lobes scarcely $\frac{1}{30}$ in. deep, rounded, overlapping. Filaments glabrous. Ovary glabrous. Capsules ⅓ by $\frac{1}{10}$ in., oblong, acutely pointed, slightly narrowed into a stalk $\frac{1}{12}$ in. long, glabrous, 4-seeded. Seeds $\frac{1}{16}$ in. in diam., reticulately rugose. Fl. B. I. v. 4, p. 536 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.—Flowers : Sept.—Oct.

S. M. COUNTRY : Belgaum, *Ritchie,* 1150 ! ; Badami, *Woodrow.*—DISTRIB. India (Bengal, Central India, W. Peninsula).

VAR. *peploides,* C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1885) p. 537. Leaves oblong or elliptic-oblong, obtuse, reaching 1 in. broad ; petioles reaching ⅜ in. long ; spikes shorter and broader. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Rostellaria peploides,* Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 101 ; Dalz. & Gibs. p. 193 (by error *Rostellularia*).—Flowers : Oct.—Apr.

KONKAN : *Stocks* ! DECCAN : about watercourses, *Dalzell & Gibson* ; Poona, *Woodrow* !, *Kanitkar* !—DISTRIB. India (Panjáb, Bengal, Central India, W. Peninsula).

10. **Justicia simplex,** *D. Don, Prodr. Fl. Nep.* (1825) p. 118. A slender branched herb 6—20 in. high, variable under differing

conditions of soil and climate ; branches quadrangular, grooved, more or less hairy. Leaves 1—2 by ½—1 in., ovate or elliptic-oblong, subobtuse, strongly lineolate, glabrous or hairy, base usually acute ; petioles ⅛—¼ in. long. Flowers in dense terminal and axillary spikes 1—4 in. long ; bracts ⅛—⅛ by 1/16—1/12 in., elliptic, subacute, hairy, the margins scarious and ciliate with many-jointed hairs ; bracteoles as long as the bracts but narrower (about 1/20 in. broad), lanceolate or somewhat obovate, hairy and with scarious and ciliate margins. Calyx ⅛—⅛ in. long, hairy, divided almost to the base ; segments subequal, or 1 sometimes a little longer than the others, linear, subacute, narrower than the bracteoles, the margins scarious and densely ciliate. Corolla pubescent outside, ⅛—⅓ in. long ; tube about equalling the limb ; upper lip ovate and concave in the lower, subquadrate in the apical part, subtruncate or rounded, 2-fid ; lower lip suborbicular, with 3 very short rounded lobes. Filaments glabrous except at their insertion. Ovary pubescent at the tip ; lower part of style pubescent. Capsules ⅛—¼ by 1/20 in., oblong, obtuse, scarcely mucronate, pubescent at the apex, often slightly constricted between the seeds ; solid stalk 1/10 in. long. Seeds 1/25 in. in diam., concentrically rugose. Fl. B. I. v. 4, p. 539 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.—Flowers : Nov.—Dec.

Dalzell without locality in Herb. Kew. KONKAN : *Stocks* ! S. M. COUNTRY : Belgaum, *Ritchie*, 604 ! KANARA : Yellur, *Ritchie*, 1/2 ! GUJARAT : *Dalzell* ! ; Palanpur, *Woodrow* ! ; Rajkote (Kathiawar), *Woodrow* ! SIND : *Dalzell* !, *Stocks* !, *Cooke* !—DISTRIB. India (Kashmir, Central India, Bengal, W. Peninsula) ; Abyssinia, Malay Islands.

VAR. *serpyllifolia*, Benth. ex C. B. Clarke, in. Hook. f. Fl. B. I. v. 4 (1885) p. 539. Very small ; leaves ¼ in. in diam., elliptic or suborbicular, obtuse or subacute ; spikes 1 by ⅛ in. ; bracts 1/16—1/12 in. long, elliptic or broadly lanceolate, fulvous-hirsute. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358.—Flowers : Nov.—Dec.

S. M. COUNTRY : Badami, *Woodrow*. KANARA : *Woodrow*.—DISTRIB. India (W. Peninsula).

11. **Justicia procumbens,** *Linn. Sp. Pl.* (1753) p. 15. Stems diffuse, slender, with many divaricate branches, rooting at the lower nodes, glabrous or pubescent. Leaves ½—1½ by ¼—¾ in., variable, elliptic or ovate, or lanceolate, usually obtuse at both ends, softly pubescent on both sides ; petioles ⅛—½ in. long. Flowers in rather dense cylindric terminal spikes ½—1½ in. long ; bracts ⅛ by 1/25 in., linear-lanceolate, acute, hairy, with scarious ciliate margins ; bracteoles similar to the bracts. Calyx ⅛ in. long, divided almost to the base ; segments linear-subulate, narrower than the bracteoles, with scarious ciliate margins. Corolla pale violet-pink, ¼ in. long ; tube about equalling the limb, funnel-shaped ; upper lip broadly ovate and concave in the lower, narrowly subquadrate in the apical part, notched ; lower lip very shortly 3-lobed. Filaments glabrous. Ovary glabrous. Capsules ⅛ by 1/16 in., oblong, shortly pointed, often constricted between the seeds, pubescent at the tip ; solid stalk 1/20 in. long. Seeds 1/20 in. long, finely tuberculate. Fl. B. I. v. 4, p. 539 ; Trim. Fl. Ceyl. v. 3, p. 337 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358 ; Watt, Dict. Econ. Prod. v. 4, p. 557. *Rostellaria*

procumbens, Nees, in Wall, Pl. As. Rar. v. 3 (1832) p. 101 ; Dalz. & Gibs. p. 193 (by error *Rostellularia*).—Flowers : Oct.—Mar. VERN. *Karambal ; Kalmashi.*

KONKAN : *Stocks* ! DECCAN : *Woodrow* ! ; Panchgani, *Raoji* !—DISTRIB. India (W. Peninsula) ; Ceylon, Malaya, Australia.

Justicia Gendarussa, Burm. Fl. Ind. (1768) p. 10. A strong-scented plant of a purple hue, very common in gardens as an edging in shady positions. It is probably a native of China, but often met with in Bengal and occasionally in the Bombay Presidency as an escape. Beddome says that the plant is wild in Tenasserim. Fl. B. I. v. 4, p. 532 ; Grah. Cat. p. 164 ; Dalz. & Gibs. Suppl. p. 71 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357 & Gard. in Ind. ed. 5, p. 417 ; Watt, Dict. Econ. Prod. v. 4, p. 557.—VERN. *Tev ; Jagat-madan.*

33. **MONECHMA,** Hochst.

Herbs. Leaves entire, small. Flowers in strobilate or lax spikes, or axillary and solitary ; bracts ovate to linear-oblong ; bracteoles minute or 0. Calyx divided nearly to the base ; segments 5 or 4, narrow or linear. Corolla small, 2-lipped ; upper lip sub-entire. Stamens 2 ; one anther-cell below the other, tailed. Ovary 2-celled ; ovules 1 or 2 in each cell ; style shortly 2-lobed or sub-entire. Capsule small, usually pubescent, 2-seeded. Seeds discoid, quite smooth, often shining and blotched, without tubercles or corrugations.—DISTRIB. All African except 1 species (the following), which extends through Arabia to India ; species 27.

The 2-seeded capsule and smooth seeds distinguish this genus from *Justicia.*

1. **Monechma bracteatum,** *Hochst. in Flora,* v. 24 (1841) p. 375. An erect herb 1—2 ft. high ; stems softly pubescent, very little branched, subquadrangular, groved. Leaves 1¼—2½ by ⅜—⅝ in., oblong-lanceolate, subobtuse, glabrous or nearly so, base tapering into the petiole ; main nerves few, 4—6 pairs ; petioles ½—¾ in. long. Flowers in axillary subsessile spikes 1—2 in. long ; bracts ⅜ by ⅛ in., elliptic, obtusely rounded and mucronate at the apex, tapering at the base into a short stalk, reticulately veined, hairy on both sides, the margins densely ciliate with long white hairs ; bracteoles 1/16 in. long, ovate, lanceolate, hairy. Calyx ¼ in. long, densely hairy, divided almost to the base ; segments linear-subulate. Corolla ¼ in. long, pubescent outside ; upper lip 1/10 in. long, oblong, rounded and entire at the apex ; lower lip ⅛ in. long, obovate, subequally 3-lobed, the lobes about 1/16 in. deep, rounded. Filaments of the anthers glabrous ; lower anther-cells with a white appendage. Ovary densely hairy ; style nearly glabrous ; stigma minutely 2-lobed. Capsules ¼ by ⅛ in., clothed with somewhat deflexed hairs, the upper part above the stalk almost orbicular, shortly and bluntly pointed, 2-seeded ; solid stalk rather narrow, 1/10 in. long. Seeds nearly ⅛ in.

in diam., orbicular, flat, yellow, smooth and shining, quite glabrous. C. B. Clarke, in Dyer, Fl. Trop. Afr. v. 5 (1900) p. 214.—Flowers: Nov.

Rare. GUJARAT: Porbandar (Kathiawar), *Cooke*!, *Woodrow*! The plant has been grown in the Botanic Garden of the College of Science at Poona from seed obtained at Porbandar.

34. **ADHATODA,** Nees.

Tall shrubs. Leaves entire, attenuated at each end. Flowers subsessile in the axils of opposite bracts, in axillary and terminal pedunculate spikes often forming a thyrsus at the ends of the branches or fascicled in the upper axils; bracts herbaceous, elliptic or oblong, exceeding the calyx; bracteoles subsimilar, nearly as large as the bracts. Calyx shortly campanulate; lobes 5, imbricate, the 2 lowest often subconnate. Corolla 2-lipped; tube short; upper lip galeate, subentire; lower lip spreading, 3-lobed. Stamens 2, inserted near the top of the corolla-tube; anthers 2-celled, the cells acute, minutely apiculate but not tailed at the base. Disk cupular. Ovary 2-celled, usually tomentose; ovules 2 in each cell; style filiform, subclavate above; stigma entire. Capsule oblong, clavate, contracted below into a long solid stalk. Seeds usually 1 or 2, suborbicular, compressed, rugose.—DISTRIB. Tropical Asia, Africa and America; species 8.

1. **Adhatoda Vasica,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 103. A dense shrub 4—8 ft. high with many long opposite ascending branches; stem with yellowish bark, terete, glabrous. Leaves 5—8 by 1½—2½ in., elliptic-lanceolate, acuminate, minutely puberulous when young, glabrous when mature, entire, dark-green above, paler beneath, base tapering; main nerves 10—12 pairs with reticulate venation between; petioles ½—1 in. long. Flowers in short dense axillary pedunculate spikes 1—3 in. long, towards the ends of the branches; peduncles 1½—4 in., stout, shorter than the leaves; bracts reaching ⅞ by ½ in., elliptic, subacute, glabrous or nearly so, 5—7-nerved, closely reticulately veined; bracteoles ¾ by ⅜ in., oblong-lanceolate, acute, with ciliolate margins, 1-nerved, reticulately veined. Calyx rather less than ½ in. long, glabrous or slightly pubescent, divided to within 1/12 in. of the base; segments imbricate, oblong-lanceolate, acute, 3-nerved, reticulately veined. Corolla white, with a few irregular rose-colored bars in the throat, 1¼ in. long, pubescent outside; tube ½ in. long, the lower half cylindric, ⅛ in. in diam., the upper half much laterally inflated; upper lip ⅜ by ½ in. long, ovate-oblong, curved, obtuse, notched; lower lip as long as the upper, the lobes ½ in. deep, oblong, rounded, the middle lobe the broadest. Filaments hairy at the very base, long, stout, curved; lower anther-cells minutely apiculate (not white-spurred) at the base. Ovary pubescent; lower part of style pubescent. Capsules ¾—⅞ by ⅓ in., clavate, subacute, shortly and bluntly pointed, pubescent; solid stalk flattened, ⅝ in. long. Seeds ¼ by ⅛ in., orbicular-oblong, tubercular-verrucose, glabrous. Fl. B. I. v. 4, p. 540; Dalz. & Gibs. p. 194; Trim. Fl. Ceyl. v. 3, p. 338;

Talb. Trees, Bomb. ed. 2, p. 265 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358 ; Watt, Dict. Econ. Prod. v. 1, p. 109. *Justicia Adhatoda,* Linn. Sp. Pl. (1753) p. 15 ; Grah. Cat. p. 164.—Flowers : Aug.—Nov. VERN. *Adulsa.*

Common as a hedge-plant about villages throughout the Presidency from Gujarat to N. Kanara.—DISTRIB. Throughout India, often cultivated; Ceylon; Singapore, Malaya.

A yellow dye is obtained from the leaves. The leaves and the root are considered an efficacious remedy in all sorts of coughs and colds. See Watt, Dict. Econ. Prod. l. c.

35. **RHINACANTHUS,** Nees.

Shrubs laxly branched, sometimes subscandent. Leaves entire. Flowers solitary or in small cymes, sessile or nearly so, in dense or divaricate panicles ; bracts and bracteoles small shorter than the calyx. Calyx deeply 5-fid or 5-partite ; segments narrow. Corolla 2-lipped ; tube long, narrow, cylindric, scarcely enlarged above ; upper lip linear-oblong, entire or shortly 2-lobed, twisted or recurved ; lower lip broad, 3-lobed. Stamens 2, inserted on the throat of the corolla ; anthers 2-celled, the cells superposed, muticous. Disk cupular. Ovary 2-celled ; ovules 2 in each cell ; style filiform ; stigma minutely 2-fid. Capsule clavate, contracted below into a long cylindric stalk, 4-seeded. Seeds ovoid or suborbicular, compressed, glabrous, obscurely rugose or tuberculate.—DISTRIB. India and Africa ; species 4.

1. **Rhinacanthus communis,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 109. An undershrub 3—5 ft. high ; stems subterete or obscurely angled, glabrous or pubescent. Leaves 2—4 by ¾—2 in. (occasionally larger), elliptic-lanceolate, acute, entire, lineolate, glabrous or nearly so, base tapering ; main nerves 8—10 pairs ; petioles ⅛—½ in. long, often obscure. Flowers sessile or shortly pedicellate, solitary or 2 or 3 together, distant on the divaricate branches of very large lax terminal panicles ; bracts and bracteoles 1/12 in. long, ovate-lanceolate, glandular-pubescent. Calyx ⅛ in. long, glandular-pubescent ; segments ¼ in. long, subequal, linear, subacute. Corolla 1—1¼ in. long, white, hairy outside ; tube ⅝—¾ by 1/10 in. ; upper lip ⅜ in. long by 1/12 in. broad at the base and about 1/20 in. broad at top, bifid ; lower lip ½ in. long ; lobes oblong, obtuse. Filaments glabrous ; lower anther-cells muticous. Ovary glabrous ; style pubescent. Capsules ¾—⅞ in. long, narrow, pointed, velvety-pubescent, not much swollen above the solid stalk which is more than half the length of the capsule. Seeds 1/10 in. in diam., tuberculate, glabrous, black. Fl. B. I. v. 4, p. 541 ; Dalz. & Gibs. p. 194 ; Wight, Icon. t. 464 ; Trim. Fl. Ceyl. v. 3, p. 339 ; Talb. Trees, Bomb. ed. 2, p. 265 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 488. *Justicia nasuta,* Linn. Sp. Pl. (1753) p. 16 ; Grah. Cat. p. 164.—Flowers : Oct.—Jan. VERN. *Gajkarni ; Nágamalli.*

DECCAN : Mahableshwar hills, *Dalzell & Gibson, Ralph!, Cooke!, Woodrow* ; Khandala, *Cooke!* S. M. COUNTRY : arid hills N. E. of Belgaum, *Ritchie,* 923!—DISTRIB. Throughout India, cultivated, perhaps wild in the Deccan

Peninsula; Ceylon (wild, not cultivated, *fide* Trimen), Straits Settlements, Java, Madagascar (cultivated), Tropical Africa.

The plant is employed medicinally by the natives of India. The fresh root and leaves bruised and mixed with lime-juice and pepper are employed as an external application in the variety of ringworm known as *Dhobi's itch.* See Watt, Dict. Econ. Prod. l. c.

36. **PERISTROPHE,** Nees.

Erect spreading herbs. Leaves entire. Flowers purple or rose-colored, solitary or in small cymose heads, often arranged in large lax panicles; bracts in pairs, longer than the calyx, often unequal, linear or ovate; bracteoles in pairs, shorter than the bracts, linear or lanceolate. Calyx small, 5-partite; segments subequal, linear-lanceolate. Corolla 2-lipped; tube slender; upper lip subentire; lower lip shortly 3-lobed. Stamens 2; filaments pubescent below; anthers 2-celled, the cells one above the other, muticous. Disk cupular. Ovary 2-celled; ovules 2 in each cell; style filiform; stigma shortly 2-lobed. Capsule ellipsoid, with a cylindric stalk, 4-seeded; placentas not rising elastically from the base of the capsule. Seeds discoid, glabrous, minutely glandular-papillose.—DISTRIB. Warmer regions of the Old World; species 20.

1. **Peristrophe bicalyculata,** *Nees, in Wall. Pl. As. Rar.* v. 3 (1832) p. 113. Herbaceous, 3—4 ft. high; stems and branches usually 6-angled, more or less hairy, usually rough on the angles. Leaves 2—3 by 1—1½ in., ovate, acuminate, densely lineolate, more or less hairy above, somewhat densely so on the nerves and veins beneath, base usually rounded; main nerves 4—6 pairs; petioles ¼—⅝ in. long. Flowers in trichotomous cymes in large lax divaricate pubescent panicles; bracts beneath the calyx 2, opposite, often very unequal, the longer of the pair sometimes ⅜ in., the shorter ¼ in. long, linear, acute, mucronate, with white membranous margins; bracteoles 4, similar to the bracts but shorter, subequal or sometimes unequal. Calyx ⅛—⅙ in. long, divided to within about 1/20 in. of the base; segments lanceolate-subulate with ciliolate margins. Corolla rosy, nearly ½ in. long, pubescent outside; upper lip ¼ by ⅛ in., elliptic-oblong, obtuse, entire; lower lip slightly longer, oblong, with 3 acute lobes about 1/12 in. deep. Filaments hairy; anther-cells one almost entirely about the other, muticous. Ovary pubescent at the tip; style nearly glabrous. Capsules ⅓ by 1/10 in., narrowed into a cylindric stalk 1/10 in. long, pointed, pubescent. Seeds 1/10—⅛ in. in diam., orbicular, papillose and slightly rugose. Fl. B. I. v. 4, p. 554; Dalz. & Gibs. p. 197; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358; Aitch. Pb. & Sind Pl. p. 114; Watt, Dict. Econ. Prod. v. 6, part 1, p. 141. *Justicia bicalyculata,* Vahl, Symb. v. 2, p. 13; Grah. Cat. p. 164.—Flowers: Oct.—Nov.

KONKAN: *Stocks*! DECCAN: Poona, *Cooke*!, *Woodrow*! GUJARAT: Surat, *Kanitkar*! KANARA: Yellur, *Ritchie*, 1204! SIND: *Bhola Puran*!; Jemadar ka Landa, near Karachi, *Stocks*!—DISTRIB. Throughout India; Tropical Africa.

The following not belonging to any of the foregoing genera are grown as ornamental plants in gardens:—

Graptophyllum hortense, Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 102. A glabrous shrub largely cultivated throughout the tropics; native country uncertain. It has green leaves mottled with creamy white patches and crimson flowers in axillary and terminal racemes. Fl. B. I. v. 4, p. 545; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358 & Gard. in Ind. ed. 5, p. 415. *Justicia picta*, Linn. Sp. Pl. ed. 2, p. 21; Dalz. & Gibs. Suppl. p. 71; Grah. Cat. p. 163.

Sanchezia nobilis, Hook. f. Bot. Mag. t. 5594. A native of Ecuador. Leaves 3—9 in. long, oblong-obovate with bright yellow veins. Corolla yeliow 2 in. long; bracts bright red. Woodr. Gard. in Ind. ed. 5, p. 415.

Aphelandra cristata, R. Br. Prodr. (1810) p. 475 in Obs. A native of the W. Indies. A shrub about 3 ft. high with lanceolate leaves 7—8 in. long and numerous large orange-scarlet flowers in terminal branching spikes. Dalz. and Gibs. Suppl. p. 71; Woodr. Gard. in Ind. ed 5, p. 415.

Fittonia argyroneura, E. Coëm. in Fl. des Serres, v. 16 (1865) p. 103. A creeping undershrub, a native of Peru, with broad flat elliptic vivid-green leaves 4 by 3 in., traversed by a network of pure white veins. Woodr. Gard. in Ind. ed. 5, p. 415.

Fittonia Pearcei, a variety with light green leaves 3 by 2 in., with bright carmine midrib and veins, a native of Peru. Woodr. Gard. in Ind. ed. 5, p. 415.

Dianthera secunda, Griseb. in Goett. Abh. v. 7 (1857) p. 246. A shrub with ovate-lanceolate acuminate leaves and red flowers in compound terminal racemes, a native of Peru. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Justicia secunda*, Vahl, Symb. v. 2, p. 7; Bot. Mag. t. 2060.—Flowers: Oct.—Nov.

Phlogocanthus curviflorus, Nees, in Wall. Pl. As. Rar. v. 3 (1832) p. 99. A shrub with very large leaves often 12 by 5 in. and brick-red flowers in terminal thyrses 4—8 in. long, a native of the Khasia mountains. Fl. B. I. v. 4, p. 511; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 357.

Beloperone aurantiaca, Benth. & Hook. f. Gen. Pl. v. 2 (1876) p. 1111. A shrub with erect stem, elliptic-lanceolate leaves, and large handsome bright orange-colored flowers. The corolla is at first golden-yellow, the tube and lower lip becoming orange-red after expansion. A native of Tropical S. America. *Cyrtanthera aurantiaca*, Hook. Bot. Mag. t. 4468; Woodr. Gard. in Ind. ed. 5, p. 415.

Jacobinia boliviensis, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. A shrub with oblong acuminate leaves and handsome rose-colored flowers in terminal and axillary spikes, a native of Bolivia. *Drejera boliviensis*, Nees, in DC. Prodr. v. 11 (1847) p. 334.

ORDER XCVII. VERBENACEÆ.

Herbs, shrubs, or trees. Leaves usually opposite or whorled, simple or (in *Vitex*) digitate; stipules 0. Inflorescence cymose, racemose or spicate; cymes often compound or paniculate; bracts usually small; flowers often brightly colored, hermaphrodite (rarely polygamous), usually irregular. Calyx inferior, gamosepalous, persistent, tubular or cup-shaped, 5—4 (rarely 6—8) -lobed or toothed. Corolla gamopetalous; tube usually cylindric or dilated above, often curved; limb 2-lipped or subequally lobed; lobes 5—4 (rarely more). Stamens 4, didynamous (rarely 2, very rarely 5—6), inserted on the corolla-tube; filaments free; anthers 2-celled, opening by longitudinal slits. Disk usually inconspicuous. Ovary superior, sessile, 2—4 (rarely 8 or almost 1) -celled, entire or 4-lobed; ovules variously attached, 2 (sometimes 1) in each cell; style terminal; stigma usually entire, less commonly 2- or more-lobed. Fruit usually more or less drupaceous, 2—4- or 1-celled; mesocarp juicy, fleshy or dry; endocarp usually bony. Seed erect or pendulous separate in distinct cells; albumen 0 in the Indian genera; embryo straight; radicle inferior.—DISTRIB. Chiefly in the tropical regions of both hemispheres; genera 73; species 700.

Inflorescence with the lowest flowers opening first (*centripetal*); flowers in dense spikes.
- Fruit with two or one 1-seeded pyrenes.
  - Calyx small, less than $\frac{1}{10}$ in. long.
    - Calyx truncate or obscurely toothed; fruit drupaceous, succulent, indehiscent; shrubs. — 1 LANTANA.
    - Calyx 2—4-lobed or toothed; fruit dry, hard, partially dehiscent; a prostrate herb (the only Bombay species) ..... — 2. LIPPIA.
  - Calyx $\frac{1}{4}$ in. long.
    - Small shrubs; perfect stamens 4, didynamous — 3. BOUCHEA.
    - A herb; perfect stamens 2..... — 4. STACHYTARPHETA.
- Fruit with two 2-seeded pyrenes..... — 5. PRIVA.

Inflorescence cymose, centrifugal.
- Cymes lax, paniculate; trees or shrubs.
  - Corolla regular; stamens isomerous, equal; leaves simple.
    - Calyx small, not accrescent in fruit; corolla purple or red; fruit with four 1-seeded pyrenes ..... — 6. CALLICARPA.
    - Calyx accrescent in fruit; corolla white; fruit with one 4-celled pyrene..... — 7. TECTONA.
  - Corolla 2-lipped; stamens 4, didynamous.
    - Fruit with one normally 4-celled pyrene.
      - Leaves simple, entire or toothed.
        - Flowers large, 1 in. long or more..... — 8. GMELINA.
        - Flowers small ..... — 9. PREMNA.
      - Leaves digitate ..... — 10. VITEX.
    - Fruit with four 1-seeded pyrenes; leaves simple ..... — 11. CLERODENDRON.
- Cymes densely capitate; trees or shrubs.
  - Cymes 3—9-flowered; bracts of flower-heads large, forming an involucre; calyx 3—8-toothed; fruit small, nearly dry..... — 12. SYMPHOREMA.
  - Cymes many-flowered; bracts shorter than the calyx; calyx 5-partite..... — 13. AVICENNIA.

1. LANTANA, Linn.

Rambling pubescent or glabrous shrubs; branches 4-angled, sometimes prickly. Leaves usually simple, opposite, petiolate crenate, often rugose. Flowers in pedunculate, capitate, ovoid or cylindric spikes; bracts ovate, conspicuous, longer than the calyx; bracteoles 0. Calyx small, membranous, truncate or obscurely toothed. Corolla-tube slender, cylindric; lobes 4—5 spreading. Stamens 4, didynamous, inserted about the middle of the tube, included; anthers broadly oblong. Ovary 2-celled; ovule solitary in each cell, erect from the base or attached laterally close to the base of each cell; style short; stigma oblique, subcapitate. Fruit drupaceous with a more or less fleshy mesocarp; endocarp hard, separating when ripe into two 1-celled 1-seeded pyrenes. Seeds exalbuminous; radicle inferior.—DISTRIB. Mostly Tropical American; several introduced into the tropical and subtropical regions of the Old World; species about 50.

1. **Lantana indica,** *Roxb. Hort. Beng.* (1814) p. 46. A shrub 3—8 ft. high; branches quadrangular, strigosely hairy, yellowish-brown. Leaves 1½—2½ by 1—1½ in., opposite or in whorls of 3, ovate, acute or subobtuse, crenate-serrate, rugose and finely pubescent above, softly white-pubescent or subvillous beneath, rounded but usually suddenly narrowed at the base; petioles ¼—⅜ in. long. Flowers odorless, sessile, in axillary pedunculate ovoid heads ½—¾ in. long, lengthening out into short spikes and elongating in fruit; peduncles 1—3¼ in long, usually in opposite axils, 4-sided, slender, hairy, somewhat thickened upwards; bracts reaching ⅜ in. long, ovate, acuminate, softly hairy on both sides, smaller upwards. Calyx $\frac{1}{10}$ in. long, truncate, membranous, very hairy. Corolla light-purple with a yellowish tube, hairy outside; tube ¼ in. long, cylindric, often slightly swollen over the stamens; limb ⅛ in. across; lobes 4, rounded, spreading. Filaments very short, slender. Ovary glabrous; style short, about $\frac{1}{30}$ in. long. Drupe ⅛ in. in diam., purple. Fl. B. I. v. 4, p. 562; Grah. Cat. p. 156; Wight, Icon. t. 1464; Trim. Fl. Ceyl. v. 3, p. 346; Talb. Trees, Bomb. ed. 2, p. 267; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Lantana alba,* Schauer, in DC. Prodr. v. 11 (1847) p. 606; Dalz. & Gibs. p. 198.—Flowers: Sept.—Jan.

Not very common. KONKAN: *Stocks*! DECCAN: thinly scattered, *Dalzell & Gibson*; Schivneri fort, Junnar, *Kanitkar*! S. M. COUNTRY: Dharwar, *Graham, Dalzell & Gibson.* GUJARAT: Chandod, *Kanitkar*!; Surat, *Kanitkar*! —DISTRIB. Throughout India; Ceylon, Beluchistan, Trop. Africa.

Lantana Camara, Linn. Sp. Pl. (1753) p. 627. A straggling shrub with an odor of black currants, numerous recurved prickles on the branches and orange-colored flowers, a native of Tropical America, has run wild in many parts of the Bombay Presidency and, from the rapidity with which it is propagated and the difficulty of eradicating it when established, seems likely to become a serious evil. Introduced into Ceylon in 1824 it spread throughout the moist low country often to the exclusion of all other plants.

Recently cross-bred varieties of the plant with variously colored flowers, varying from pure white to dark crimson, have been introduced into gardens. Woodrow (Gard. in Ind. ed. 5, p. 420) recommends that the pruning-shears should be applied immediately after flowering to prevent seed ripening and that all seedling plants should be destroyed. Fl. B. I. v. 4, p. 562 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 358. *Lantana aculeata,* Linn. Sp. Pl. (1753) p. 627 ; Dalz. & Gibs. Suppl. p 68.—Flowers: More or less throughout the year. VERN. *Tántáni.*

2. **LIPPIA,** Linn.

Shrubs or undershrubs, rarely herbs ; the only Bombay species a prostrate herb with stems widely creeping and rooting at the nodes. Leaves small, opposite, serrate. Flowers small, in dense long-stalked, axillary heads ; bracts small ; bracteoles 0. Calyx small, membranous, 2—4-lobed, ultimately 2-valved, enclosing or sometimes adhering to the fruit. Corolla-tube cylindric, straight or curved ; limb oblique, more or less 2-lipped ; upper lip 2-fid, emarginate or 2-lobed ; lower lip 3-lobed Stamens 4, didynamous, included ; anthers ovate with parallel cells. Ovary 2-celled ; ovule solitary in each cell, erect from the base or laterally attached near the base of the cell ; style short ; stigma oblique, subcapitate. Fruit small, with a hard dry epicarp, enclosed in the slightly accrescent calyx ; endocarp hard and bony, easily separable into two 1-seeded pyrenes. Seeds exalbuminous ; radicle inferior.—DISTRIB. Chiefly Tropical America and Africa ; species 110

1. **Lippia nodiflora,** *Michaux, Fl. Bor Amer.* v. 2 (1803) p. 15. A creeping perennial herb ; stems rooting at the nodes, much-branched, subquadrangular, more or less clothed with appressed, medifixed, white hairs, sometimes nearly glabrous. Leaves opposite, subsessile, $\frac{3}{4}$—$1\frac{1}{4}$ by $\frac{3}{8}$—$\frac{3}{4}$ in., spathulate, cuneate at the base, rounded at the apex, deeply and sharply serrate in the upper part, appressedly hairy on both sides with medifixed white hairs. Flowers sessile, densely packed in long-pedunculate axillary heads which are at first globose, afterwards elongate and becoming spicate and oblong in fruit , peduncles 1—3 in. long, usually from the axil of one only of each pair of leaves ; bracts $\frac{1}{10}$ in. long, broadly elliptic or obovate with a somewhat cuneate base, mucronate, glabrous. Calyx $\frac{1}{12}$ in. long, membranous, deeply 2-lobed, compressed, mitre-shaped, pubescent on the back with basifixed hairs, closely covering the fruit, the 2 acuminate lobes projecting beyond it. Corolla $\frac{1}{10}$—$\frac{1}{8}$ in. long, white or pale-pink, pushed off as a calyptra by the ripening fruit, 2-lipped ; upper lip erect, bifid ; lower lip 3-lobed, the middle lobe the largest. Fruit $\frac{1}{16}$ in. long, globose-oblong, dry, splitting into two 1-seeded plano-convex glabrous pyrenes. Fl. B. I. v. 4, p. 563 ; Dalz. & Gibs. p. 198 ; Wight, Icon. t. 1463 ; Trim. Fl. Ceyl. v. 3, p. 347 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 ; Watt, Dict. Econ. Prod. v. 5, p. 78. *Zapania nodiflora,* Lam. Tab. Encyc. v. 1 (1791) p. 59 ; Grah. Cat. p. 158.—Flowers: more or less all the year. VERN. *Ratoliya.*

Common in grassy and sandy places throughout the Presidency. DECCAN : *Woodrow*; Poona, *Cooke*!; Bijapur, *Woodrow*! GUJARAT : *Woodrow*; Porbandar, *Cooke*! SIND : *Cooke*!, *Woodrow*.—DISTRIB. Throughout India; Ceylon, Africa, and most tropical and subtropical regions.

3. **BOUCHEA,** Cham.

Perennial herbs or low undershrubs. Leaves opposite or subopposite, petiolate, ovate or oblong, usually toothed. Flowers sessile or shortly pedicellate, in terminal spikes or spicate racemes, solitary in the axils of persistent bracts which are shorter than the calyx; bracteoles minute or 0. Calyx narrowly tubular, prominently 5-ribbed, obliquely truncate or shortly 5-toothed, usually becoming more or less dilated below as the fruit ripens, at length splitting longitudinally to the base. Corolla-tube long, slender, cylindric; limb spreading, oblique, with 5 subequal lobes. Perfect stamens 4, didynamous, inserted in the upper part of the corolla-tube, included; filaments very short; anthers ovate with parallel cells. Ovary 2-celled; ovules 1—2 in each cell, erect from the base of the cell; style filiform; stigma sub-2-lobed. Fruit usually shorter than the calyx and enclosed in it, separating into two elongate-oblong 1-seeded pyrenes.—DISTRIB. Tropical and S. Africa, Tropical America, India; species 25.

1. **Bouchea marrubifolia,** *Schauer, in DC. Prodr.* v. 11 (1847) p. 558. A much-branched woody perennial herb; stems and branches pubescent. Leaves ½—1 by ⅜—1 in., broadly ovate or suborbicular, coarsely toothed, pubescent on both sides, strongly nerved and rugosely reticulately veined, base truncate or shortly cuneate; petioles ½—¾ in. long. Flowers sessile, in nearly continuous spikes reaching sometimes 8 in. long, closely appressed to the pubescent rhachis; bracts ⅛—⅙ in. long, lanceolate, pubescent, with scarious ciliate margins. Calyx tubular, ¼—⅓ in. long, densely pubescent, 5-ribbed, ultimately splitting down one side, truncate at the top, the teeth very minute. Corolla glabrous outside; tube slender, ½ in. long, slightly enlarged below the limb; limb ⅓ in. across; lobes 5, rounded, spreading. Filaments slender, glabrous. Ovary and style glabrous. Fruit ⅛ in. long, enclosed in the calyx, rounded at the apex, consisting of 2 oblong glabrous pyrenes. Fl. B. I. v. 4, p. 564; Wight, Icon. t. 1461; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359.

In the Bombay Presidency confined to Sind. SIND : *Dalzell*!, *Bhola Puran*!; rocky ground, *Stocks*!; Karachi, *Cooke*!; spur of the Hala range, *Vicary*!; hills in Sind, *Stocks*, 498!—DISTRIB. Arabia, Egypt, Abyssinia, Tropical Africa.

4. **STACHYTARPHETA,** Vahl.

Herbs or shrubs, hairy or glabrous. Leaves opposite or alternate, toothed, usually rugose. Spikes terminal, long and slender (in the Indian species); flowers solitary in the axils of bracts, sessile or half immersed in the rhachis of the spike; bracts lanceolate, long or short; bracteoles 0. Calyx elongate, narrowly cylindric,

shortly 4—5-toothed, often variously slit in a late stage. Corolla-tube slender, cylindric ; limb oblique, with 5 equal or unequal flat spreading lobes. Perfect stamens 2 (the lower pair), included in the corolla-tube ; staminodes 2, minute or 0 ; filaments short ; anthers without appendages, the cells vertical, divaricate. Ovary 2-celled ; ovule solitary in each cell, attached laterally near the base of the cell ; style long, filiform. Fruit enclosed in the calyx, linear-oblong, separating into two hard 1-seeded pyrenes.—DISTRIB. Mostly Tropical American ; species about 40.

1. **Stachytarpheta indica,** *Vahl, Enum.* v. 1 (1805) p. 206. Annual, 1—3 ft. high ; stems erect, dichotomously branched, nearly glabrous ; young branches nearly quadrangular. Leaves 2—4 by 1—1½ in., elliptic, obtuse or acute, coarsely serrate, glabrous or nearly so, base much tapering and decurrent into the petioles which are consequently obscure. Flowers sessile, in long, slender, nearly continuous glabrous spikes reaching 1 ft. long, the rhachis hollowed out beneath each flower ; bracts ⅛ in. long, lanceolate-subulate, scariously margined near the base. Calyx ¼ in. long, membranous, tubular, glabrous ; teeth 4, short, acute. Corolla deep-blue, glabrous ; tube ⅜ in. long, slightly curved, hairy inside ; limb about ⅜ in. across, 5-lobed. Filaments slender, hairy below. Ovary glabrous ; style long, filiform, glabrous. Fruit ⅛—⅛ in. long, oblong, ribbed, splitting into 2 pyrenes. Fl. B. I. v. 4, p. 564 ; Grah. Cat. p. 154 ; Trim. Fl. Ceyl. v. 3, p. 348 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359. *Stachytarpheta urticifolia,* Dalz. & Gibs. Suppl. p. 68. *S. jamaicensis,* Vahl, Enum. v. 1, p. 206 ; Grah. Cat. p. 154.—Flowers : Aug.—Nov.

Though common as a weed in gardens and as an escape, the plant cannot be considered indigenous. It is very abundant along roadsides about Dharwar.—DISTRIB. Throughout India; Ceylon; Tropical Asia, America, Africa, sometimes cultivated.

Stachytarpheta mutabilis, Vahl, Enum. v. 1 (1805) p. 208. An erect branching shrub reaching 6 ft. high, a native of S. America, with acutely tetragonal branches, ovate leaves decurrent into the petiole and flowers in long spikes reaching 1½ ft. long. The corolla is at first crimson then rose-colored. Grah. Cat. p. 154 ; Dalz. & Gibs. Suppl. p. 68 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899), p. 359. *Verbena mutabilis,* Jacquin, Collect. v. 2 (1788) p. 334.

5. PRIVA, Adans.

Erect herbs. Leaves toothed. Flowers solitary, bracteate, arranged in simple terminal or axillary spikes or racemes ; bracteoles 0. Calyx tubular, becoming inflated in fruit, 5-ribbed, the ribs terminating in short teeth. Corolla-tube narrowly cylindric, straight or curved ; limb spreading, 5-lobed, sub-2-lipped, the 2 upper lobes usually shorter than the 3 lower. Stamens 4, didynamous, inserted in the middle of the corolla-tube, included ; anther-cells parallel or slightly divergent ; upper staminode minute or 0. Ovary 2-celled ;

ovules 2 in each cell ; style long, filiform, persistent ; stigma on one side. Fruit dry, enclosed in the dilated calyx-tube, separating when ripe into two 2-seeded pyrenes.—DISTRIB. Warm regions of both hemispheres ; species about 10.

1. **Priva leptostachya,** *Juss. in Ann. Mus. Par.* v. 7 (1806) p. 70. An erect branched herb 1—3 ft. high ; stems quadrangular, pubescent (especially at the nodes), with small often hooked hairs ; internodes long. Leaves 1—3 by $\frac{3}{4}$—2 in., ovate or elliptic, obtuse, clothed on both sides with fine hooked hairs and also with a few stout hairs above, coarsely crenate-serrate, base subcordate or truncate, but slightly decurrent on the petiole ; petioles $\frac{1}{2}$—$1\frac{1}{4}$ in. long. Flowers distant, in long spicate racemes 6—12 in. long ; rhachis quadrangular, more or less pubescent with small often hooked hairs ; pedicels $\frac{1}{20}$ in. long ; bracts $\frac{1}{10}$ in. long, linear-lanceolate, hairy. Calyx $\frac{1}{8}$ in. long, nearly cylindric in flower, becoming nearly globose in fruit, densely clothed with fine spreading hooked hairs ; teeth small, acute. Corolla pure-white ; tube $\frac{1}{8}$ in. long, scarcely enlarged above ; limb 2-lipped ; upper lip 2-lobed ; lower lip larger than the upper, deeply 3-lobed. Fruit enclosed in the enlarged calyx $\frac{1}{8}$ in. long, obcordate, readily splitting into 2 glabrous pyrenes which are reticulately pitted, echinate on the back with 2 rows of straight and curved spines, deeply excavate on the faces. Fl. B. I. v. 4, p. 565 ; Dalz. & Gibs. p. 198 ; Trim. Fl. Ceyl. v. 3, p. 349 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359. *Streptium asperum,* Roxb., Cor. Pl. v. 2 (1798) p. 25, t. 146 ; Grah. Cat. p. 154.—Flowers : Dec.—Jan.

Rare. DECCAN : Bijapur, *Cooke* !, *Woodrow* ; Gapuri on old walls, *Dr. Lush* ex *Graham*. SIND : *Woodrow* !—DISTRIB. India (W. Peninsula), Africa.

6. CALLICARPA, Linn.

Trees or shrubs ; young branches stellately hairy. Leaves opposite (rarely ternate), crenulate, serrulate or toothed (rarely quite entire). Flowers small, in axillary sessile or pedunculate many-flowered cymes which are shorter than the leaves. Calyx very small, shortly campanulate, truncate or minutely 4-lobed, unaltered in fruit. Corolla purple or red ; tube short ; lobes 4, subquadrate, spreading. Stamens 4, equal, inserted above the middle of the tube, usually exserted ; anthers 2-celled, the cells parallel. Ovary imperfectly 2-celled ; ovules 2 in each cell ; style linear ; stigma dilated, obscurely 2-fid. Fruit a small globose drupe ; pyrenes 4 or fewer by suppression, 1-seeded. Seeds shortly oblong ; albumen 0.—DISTRIB. Tropical and Subtropical Asia, Malaya, Japan, N. Australia, N. and Central America, W. India ; species 30.

1. **Callicarpa lanata,** *Linn. Mant.* v. 2 (1771) p. 331. A tall shrub or sometimes a small tree ; bark grey, rough and corky ; young branches stout, cylindric, closely covered with a thick easily detachable felt of grey or fulvous stellate hairs. Leaves crowded towards the ends of the branches, 6—9 by 3—4 in., ovate or elliptic-lanceolate, acuminate, entire or toothed, dark-green, rugose, glabrous

and shining above, with dense stellate tomentum beneath ; base rounded, cordate or acute ; main nerves 6—9 pairs, impressed above, very prominent beneath, with conspicuous reticulate venation between ; petioles 1—1¾ in. long, stout, densely tomentose. Flowers sessile, in divaricately branched shortly pedunculate densely stellately tomentose axillary cymes ; bracts scarcely $\frac{1}{20}$ in. long, linear. Calyx $\frac{1}{10}$ in. long, campanulate, very faintly 4-lobed, densely stellately tomentose. Corolla $\frac{1}{8}$ in. long, reddish-purple, glabrous; tube $\frac{1}{10}$ in. long ; lobes 4, subequal, subquadrate, rounded. Stamens much exserted ; filaments slender, glabrous ; anthers cream-colored, the cells parallel. Ovary and style glabrous. Drupe scarcely $\frac{1}{8}$ in. in diam., globose, black, smooth, shining. Fl. B. I. v. 4, p. 567 ; Grah. Cat. p. 156 ; Trim. Fl. Ceyl. v. 3, p. 350 ; Talb. Trees, Bomb. ed. 2, p. 269 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 ; Watt, Dict. Econ. Prod. v. 2, p. 26. *Callicarpa cana*, Dalz. & Gibs. p. 200 (*not* of Linn.). *C. Wallichiana*, Walp. Rep. v. 4, p. 125 ; Wight, Icon. t. 1480.—Flowers : Dec.—Apr. VERN. *Aisar.*

KONKAN : common on the Ghâts, *Dalzell & Gibson*; hills east of Panvel, *Graham*; Marmagão, *Kanitkar*! ; Matheran, *Cooke*! DECCAN : Khandala, *Graham*, *Cooke*! ; Párghât, *Graham*; Mahableshwar, *Cooke*! S. M COUNTRY : Castlerock, *Woodrow*; Rámghât, *Ritchie*, 570! KANARA : evergreen forests of N. Kanara Ghâts, *Talbot*.—DISTRIB. India (W. Peninsula) ; Ceylon.

The plant has some repute in native medicine (see Watt, Dict. Econ. Prod. l. c.). The tomentose buds are used as wicks in oil-lamps (*Talbot*).

7. TECTONA, Linn. f.

Trees stellately tomentose. Leaves opposite or whorled, large, petiolate, entire. Flowers small, numerous, in dichotomous cymes arranged in large terminal panicles ; bracts small, narrow. Calyx campanulate, shortly 5—6-lobed, enlarged and becoming bladder-like in fruit, ovoid or urceolate. Corolla white ; tube short ; limb with 5—6 short subequal spreading imbricate lobes. Stamens 5—6, inserted near the base of the corolla, equal, exserted ; anthers ovate or oblong with distinct parallel cells. Ovary fleshy, 4-celled ; ovule solitary in each cell ; style linear ; stigma shortly 2-fid. Fruit a drupe enclosed in the enlarged calyx ; endocarp thick, bony, 4-celled. Seeds erect, oblong ; albumen 0.—DISTRIB. Species 3 Asiatic, of which 2 are Indian and 1 a native of the Philippine Islands.

1. **Tectona grandis,** *Linn. f. Suppl.* (1781) p. 151. A large deciduous tree ; branchlets quadrangular, channelled, stellately tomentose. Leaves 1—2 by ½—1 ft. (in seedlings often much larger), elliptic or obovate, acute or acuminate, the upper surface rough but usually glabrous, the lower clothed with dense stellate grey or tawny tomentum, entire, base usually cuneate ; main nerves 8—10 pairs with 2 or 3 large branches near the edge of the leaf, joined by numerous parallel transverse veins. Flowers shortly pedicellate, in large erect terminal branched tomentose cymose panicles 1—3 ft. long, with lanceolate bracts at the forks ; bracts beneath the calyx $\frac{1}{10}$ in. long, linear-lanceolate. Calyx in flower $\frac{1}{8}$ in. long, stellately tomentose, semiglobose-campanulate, the lobes 5 or 6, spreading,

subequal, $\frac{1}{20}$ in. long ; in fruit enlarged to 1 in. or even more long, bladder-like, enclosing the fruit, ovoid, more or less crumpled or irregularly plaited, reticulately veined. Corolla white, glabrous, 5—6-lobed ; tube about $\frac{1}{12}$ in. long ; limb $\frac{1}{4}$ in. across when expanded, with spreading subequal lobes. Fruit $\frac{1}{2}$ in. in diam., subglobose, somewhat 4-lobed, the pericarp soft with dense felted stellate hairs ; endocarp bony. Fl. B. I. v. 4, p. 570 ; Grah. Cat. p. 158 ; Dalz. & Gibs. p. 199 ; Bedd. Fl. Sylvat. t. 250 ; Talb. Trees, Bomb. ed. 2, p. 273 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 ; Watt, Dict. Econ Prod. v. 6, part 4, p. 1.—Flowers : June—Sept. VERN. *Ság; Ságwán.*

The well-known *Teak-tree.* It grows abundantly all along the slopes of the Western Ghâts and extends northward to the Mhye River in Gujarat (*Brandis*). For a full description of the Teak, its mode of cultivation, uses, &c., consult Watt, Dict. Econ. Prod. l. c.—DISTRIB. India (W. Peninsula, Central India, Birma); Malay Peninsula, Sumatra, Java.

8. GMELINA, Linn.

Trees or shrubs unarmed or spinous ; young shoots usually tomentose. Leaves opposite, entire or toothed, sometimes more or less lobed. Flowers large, yellow or brownish-yellow often tomentose, in small dense or lax sessile or pedunculate cymes along the branches of a terminal panicle ; bracts usually narrow, rarely leafy. Calyx campanulate, 4—5-toothed or subentire, persistent and unaltered in fruit. Corolla 2-lipped, infundibuliform, ventricose in the upper part ; tube slender below, much swollen above ; limb oblique, spreading, 4—5-lobed. Stamens 4, didynamous, inserted below the throat, shorter than the corolla ; anthers with oblong more or less discrete cells. Ovary 4-celled ; ovule solitary in each cell ; style slender ; stigma shortly 2-fid. Fruit a succulent drupe; endocarp undivided, bony, 2—4-celled. Seeds oblong ; albumen 0 ; cotyledons thick.—DISTRIB. India, China, Malay Archipelago, Tropical Australia : species about 8.

An unarmed tree; leaves exceeding 3 in. long, stellately fulvous-tomentose beneath; calyx-teeth 5.....	1. *G. arborea.*
A shrub often spinous; leaves less than 2 in. long, glabrous and studded beneath with round glands; calyx-teeth 4	2. *G. asiatica.*

1. **Gmelina arborea,** *Roxb. Hort. Beng.* (1814) p. 46. A moderate-sized unarmed deciduous tree, reaching 60 ft. high ; bark greyish-yellow, rather corky; branchlets and young parts clothed with fine white mealy pubescence. Leaves 4—8 by 3—6 in. broadly ovate, acuminate, entire, glabrous above when mature, stellately fulvous-tomentose beneath, base cordate or sometimes truncate and shortly cuneate ; petioles 2—3 in. long, cylindric, puberulous, glandular at the top. Flowers appearing with or sometimes before the young leaves, usually in small cymes of about 3 flowers arranged along the branches of a densely fulvous-hairy panicle reaching 12 in. long ; buds clavate, angular ; bracts $\frac{1}{3}$ in. long, linear-lanceolate. Calyx $\frac{1}{3}$ in. long, broadly campanulate, densely fulvous-hairy ; teeth

5, small, triangular, acute. Corolla brownish-yellow, densely hairy outside, reaching 1½ in. long, 5-lobed, 2-lipped; upper lip rather more than ⅜ in. long, deeply divided into 2 oblong, obtuse lobes; lower lip nearly 1 in. long, 3-lobed, the middle lobe projecting forward, ovate, subobtuse, with irregularly crenulate margin, much longer and broader than the obovate rounded lateral lobes. Drupe ¾—1 in. long, ovoid or pyriform, smooth, orange-yellow when ripe. Fl. B. I. v. 4, p. 581; Grah. Cat. p. 158; Dalz. & Gibs. p. 201; Wight, Icon. t. 1470; Trim. Fl. Ceyl. v. 3, p. 355; Talb. Trees, Bomb. ed. 2, p. 269; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359; Watt, Dict. Econ. Prod. v. 3, p. 514.—Flowers: Mar.—May. VERN. *Shivan.*

KONKAN: *Dalzell & Gibson.* DECCAN; Máwal, *Woodrow*; Ganesh Khind, *Woodrow*! KANARA: deciduous forests, *Talbot*; near Waguli, *Ritchie*, 1962! GUJARAT: Dangs, *Woodrow*. SIND: (introduced) *Dalzell & Gibson.*—DISTRIB. Throughout India; Ceylon, Malayan and Philippine Islands.

The root, the bark, and the fruit are used medicinally; the fruit is also eaten by some of the hill-tribes. The timber is excellent, strong and light, does not warp nor shrink, and is valuable for ornamental work. See Watt, Dict. Econ. Prod. l. c.

2. **Gmelina asiatica,** *Linn. Sp. Pl.* (1753) p. 626. A much-branched more or less spinous shrub; bark yellowish-white; branchlets horizontal, rigid, puberulous, often much shortened and spinous at the ends. Leaves ¾—1½ by ½—1 in., ovate or elliptic, sometimes irregularly and more or less obscurely lobulate, obtuse, glabrous, glaucescent beneath from a coating of minute round glands, base acute or rounded; petioles ¼ in. long. Flowers large, nodding, in terminal densely pubescent racemes or panicles; pedicels short, pubescent; bracts small, caducous. Calyx ⅛—¼ in. long, cup-shaped, truncate, pubescent, clothed with flattened round glands; lobes 4, very small, triangular, acute. Corolla 2-lipped, bright-yellow, 1¾ in. long or more, finely pubescent outside; tube narrow below, curved, very much inflated above; lobes 4, ovate, subacute, the lower one the largest. Drupe ¾ in. long, obovoid, yellow when ripe, containing 1 pyrene. Fl. B. I. v. 4, p. 582; Grah. Cat. p. 158; Wight, Ill. t. 174; Bedd. For. Man. in Flor. Sylvat. p. clxxii; Trim. Fl. Ceyl. v. 3, p. 355; Talb. Trees, Bomb. ed. 2, p. 269; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359; Watt, Dict. Econ. Prod. v. 3, p. 516.—Flowers more or less throughout the year. VERN. *Kálishivan.*

Doubtfully wild in the Bombay Presidency, where it is however extensively grown in gardens and employed for making fences. It is abundant on the Coromandel coast, being according to Roxburgh, "one of the commonest bushes in every uncultivated place." It is also common in Ceylon and is cultivated in Bengal. The root and leaves are used in native medicine, the latter apparently possessing the property of rendering water mucilaginous. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. India (W. Peninsula, Birma); Ceylon.

Gmelina Hystrix, Schult. ex Kurz, in Journ. As. Soc. Beng. v. 39 (1870) part 2, p. 81. A spinous shrub, a native of Siam and the Philippine Islands, scandent if shaded. It has smooth entire

elliptic leaves 3 by 1½ in., glaucous beneath with scattered round glands, and pendulous panicles of large yellow flowers consisting of small cymes enclosed in large membranous purple-veined bracts. Fl. B. I. v. 4, p. 582; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 & Gard. in Ind. ed. 5, p. 418.

9. **PREMNA,** Linn.

Trees or shrubs sometimes climbing. Leaves opposite, entire or toothed. Flowers in corymbose or paniculate sometimes thyrsoid pubescent cymes; bracts small, narrow; bracteoles 0. Calyx small, cup-shaped; limb truncate or minutely 2—5-toothed or 2-lipped. Corolla small; tube short; throat hairy inside; limb 2-lipped, 5-lobed or sub-equally 4-lobed. Stamens 4, didynamous, inserted below the throat of the corolla, rarely exserted; anthers ovate or rounded, the cells parallel or divergent. Ovary 2- or 4-celled; ovules 4; style linear; stigma shortly 2-fid. Fruit a small drupe, embraced below by the calyx, globose or oblong-obovoid; endocarp hard, undivided, normally 4- or by abortion 1—3-celled, with a central cavity. Seeds oblong; albumen 0.—DISTRIB. Species 40 in the warmer regions of the Old World.

A scandent shrub; corymbs purplish; calyx truncate... 1. *P. coriacea.*
An erect tree; corymbs greenish-yellow; calyx 2-lipped 2. *P. integrifolia.*

1. **Premna coriacea,** *C. B. Clarke, in Hook. f. Fl. B. I.* v. 4 (1885) p. 573. An extensive climber; bark smooth, thin, covered with round scattered corky lenticels; stems and branches glabrous or nearly so. Leaves coriaceous, 4—8 by 3—4½ in., ovate or elliptic, shortly acuminate, entire, glabrous, cordate or rounded at the base; main nerves 4—5 pairs with reticulate venation between them; petioles 1—1½ in. long. Flowers numerous, in large finely pubescent terminal paniculate corymbose cymes; pedicels very short; bracts minute, scattered. Calyx puberulous, $\frac{1}{16}$ in. long, cup-shaped, truncate, membranous. Corolla-tube $\frac{1}{16}$ in. long, hairy in the throat inside; lobes 4, as long as the tube, subequal, oblong, rounded, the lobes white, the rest of the inflorescence purple or red (*Talbot*). Filaments densely hairy. Ovary and style glabrous. Drupe ⅛ in. long, narrowly obovoid, 1-seeded, smooth, black when ripe. Talb. Trees, Bomb. ed. 2, p. 268; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359. *Premna scandens,* Grah. Cat. p. 155 (*not* of Roxb.); Dalz. & Gibs. p. 199.—Flowers: Mar.—May. VERN. *Rawan; Chámbári.*

KONKAN: *Gibson*!, *Stocks*!, *Law*!, *Dalzell*! DECCAN: Lanoli, *Kanitkar*!; Khandala, *Bhiva*! KANARA: Mandele (N. Kanara), *Ritchie,* 920!—DISTRIB. India (W. Peninsula).

2. **Premna integrifolia,** *Linn. Mant.* v. 2 (1771) p. 252. A large shrub or small tree reaching 30 ft. high; bark yellowish, lenticellate; young parts glabrous or slightly pubescent; trunk and large branches sometimes spinous. Leaves 2—3½ by 1¼—2½ in., broadly elliptic, obtuse, very shortly acuminate, glabrous entire or

the upper part dentate, base rounded or subacute ; main nerves 4—5 pairs ; petioles $\frac{3}{8}$—$\frac{5}{8}$ in. long. Flowers small, greenish-yellow, with a disagreeable odor, in terminal pubescent paniculate corymbose cymes ; bracts minute, lanceolate. Calyx $\frac{1}{10}$ in. long, thick, glabrous, 2-lipped, one lip 2-toothed, the other subentire (so that the calyx appears 3-lobed). Corolla glabrous outside ; tube $\frac{1}{8}$ by $\frac{1}{12}$ in., cylindric, hairy in the throat inside ; lobes 4, oblong, rounded, $\frac{1}{20}$ in. long. Stamens slightly exserted ; filaments hairy at the base. Ovary and style glabrous ; stigma of 2 equal divaricate lobes. Fruit $\frac{1}{8}$ in. long, pear-shaped ; endocarp ridged, bony, 4-celled, 4-seeded. Fl. B. I. v. p. 574 ; Grah. Cat. p. 155 ; Wight, Icon. t. 1469 ; Talb. Trees, Bomb. ed. 2, p. 268 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 337. *Premna serratifolia,* Linn. Mantiss. v. 2 (1771) p. 253 ; Bedd. For. Man. in Flor. Sylvat. p. clxxii ; Trim. Fl. Ceyl. v. 3, p. 352. *P. latifolia,* Dalz. & Gibs. p. 200 (*not* of Roxb.).—Flowers : June—July. VERN. *Khárá-narvel.*

KONKAN : *Law* !, *Dalzell* ! *Talbot* ; by the sea-shore near Bombay, *Graham.* KANARA : N. Kanara usually near the sea-coast, *Talbot.*—DISTRIB. India (near the sea from Bombay to Malacca) ; Ceylon, Andamans and Nicobars, Malaya.

DOUBTFUL AND UNKNOWN SPECIES.

PREMNA CORDIFOLIA, Grah. Cat. Bo. Pl. (1839) p. 155 ; Dalz. & Gibs. p. 199 (*not* of Roxb.), which Graham describes as a small tree growing at Khandala but not common, is probably, as Mr. Talbot suggests (Trees and Shrubs Bom. ed. 2, p. 268), a form of *P. integrifolia,* Linn., growing on the hills. In Fl. B. I. v. 4, p. 573, Graham's *P. cordifolia* is made synonymous with *P. coriacea,* C. B. Clarke, while Dalzell & Gibson's *P. cordifolia* is doubtfully referred to *P. corymbosa,* Rottl. & Willd. It is clear, however, from the way in which Dalzell & Gibson quote Graham, that these authors meant to describe the plant indicated by the latter.

PREMNA NIMMONIANA, Grah. Cat. Bo. Pl. (1839) p. 155, is said by Graham to be found on the tableland of Mahableshwar and on the Rotunda Ghát leading thereto (*fide* Dr. Murray). No such plant has been found at Mahableshwar, where it is described by Graham as common, and it is probable that some other plant has been mistaken for it. The fact that the leaves are described by Graham as alternate would indicate that his plant does not belong to the genus.

10. **VITEX,** Linn.

Trees or shrubs ; young shoots hairy or tomentose. Leaves opposite, digitately 3—5-foliolate (sometimes simple in *V. trifolia*). Flowers in sessile or pedunculate cymes forming large or small terminal and axillary or wholly axillary panicles or corymbs ; bracts small, longer or shorter than the calyx. Calyx campanulate, truncate or shortly 5 (rarely 3) -toothed. Corolla small, 2-lipped ; tube short ; limb 5-lobed, the middle lobe of the lower lip much the largest. Stamens 4, didynamous, usually exserted ; anther-cells at first parallel and pendulous, afterwards divaricate, often twisting so that the lower ends are erect. Ovary 2—4-celled ; ovules 4 ; style filiform ; stigma shortly 2-fid. Fruit a globose or ovoid drupe, invested at the base by the somewhat enlarged calyx ; endocarp

bony, normally 4-celled and 4-seeded, but some of the cells often suppressed. Seeds obovate or oblong; albumen 0.—DISTRIB. Species 120 in all tropical and warm temperate regions.

Panicles terminal (axillary peduncles sometimes present in the upper leaf-axils). Shrubs or small trees. Leaves 3- and 5-foliolate; leaflets petioluled, lanceolate	1. *V. Negundo.*
Leaves 3-foliolate and simple; leaflets sessile, obovate-oblong	2. *V. trifolia.*
A large tree; leaves usually 3-foliolate; leaflets subsessile; common petiole sometimes winged; drupe less than ¼ in. in diam.	3. *V. altissima.*
Peduncles wholly axillary; leaves 3- or 5-foliolate; common petiole not winged; drupe ¾ in. long; a large tree	4. *V. leucoxylon.*

1. **Vitex Negundo,** *Linn. Sp. Pl.* (1753) p. 638. A large shrub or sometimes a small slender tree; bark thin, grey; branchlets quadrangular, whitish with a fine tomentum. Leaves 3—5-foliolate; leaflets lanceolate, acute, the terminal leaflet 2—4 by ⅝—1¼ in. with a petiolule ⅜—½ in. long, the lateral leaflets smaller with a very short petiolule, all nearly glabrous above, covered with a fine white tomentum beneath, base acute; common petioles 1—1½ in. long. Flowers in pedunculate branched tomentose cymes, opposite along the quadrangular tomentose rhachis of a large terminal often compound pyramidal panicle (axillary peduncles in the upper axils sometimes present); bracts $\frac{1}{16}$—$\frac{1}{10}$ in. long, lanceolate, caducous. Calyx ⅛ in. long, white-tomentose; teeth triangular, $\frac{1}{10}$—$\frac{1}{5}$ in. long. Corolla ⅜ in. long, bluish-purple, tomentose outside, hairy inside at the insertion of the stamens; upper lip $\frac{1}{12}$ in. long, divided to the base into 2 obtuse lobes; lower lip large, ⅕ in. long, with 2 short oblong obtuse lateral lobes $\frac{1}{16}$ in. deep, and a large broadly obovate crenulate terminal lobe ⅛ in. long. Filaments hairy at the very base. Ovary glabrous; style glabrous; stigma forked. Drupe less than ¼ in. in diam., black when ripe. Fl. B. I. v. 4, p. 583; Wight, Icon. t. 519; Trim. Fl. Ceyl. v. 3, p. 357; Talb. Trees, Bomb. ed. 2, p. 270; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359; Watt, Dict. Econ. Prod. v. 6, part 4, p. 248. *Vitex bicolor,* Willd. Enum. Hort. Berol. p. 660 (in Note); Dalz. & Gibs. p. 201. *V. trifolia,* Grah. Cat. p. 155 (*not* of Linn.).—Flowers more or less throughout the year. VERN. *Nirgud*; *Nirgundi.*

A common shrub throughout the Presidency often cultivated in gardens and for hedges. *Dalzell* without locality in Herb. Kew.!; very common along the banks of rivers and in moist situations in or near deciduous forests, *Talbot.* KONKAN: W. Ghâts, *Woodrow.* DECCAN: Mahableshwar, abundant (planted), *Cooke!* SIND: Sukkur, cultivated, *Cooke!*—DISTRIB. Throughout India; Ceylon, Afghanistan, Philippine Islands.

The leaves are agreeably aromatic when bruised and are employed in native medicine. A pillow stuffed with the leaves is placed under the head to relieve headache. The leaves are also employed as a remedy in inflammatory swellings of the joints. See Watt, Dict. Econ. Prod. l. c.

2. **Vitex trifolia,** *Linn. Sp. Pl.* (1753) p. 638. A shrub or small tree; bark smooth, pale-grey. Leaves variable, some simple and some 3-foliolate; leaflets elliptic or oblong-obovate, usually

obtuse, the terminal leaflet sessile (rarely very shortly petiolulate), 2—2½ by 1—1½ in., the lateral smaller, sessile, all glabrous above, very densely white-tomentose beneath, base tapering; common petioles ½—⅝ in. long. Flowers in pedunculate tomentose cymes, opposite along the tomentose rhachis of a terminal panicle; bracts minute. Calyx ⅛ in. long in flower, white-pubescent, slightly enlarged in fruit; teeth very short, triangular, acute, sometimes obscure. Corolla pubescent outside, pale-purple, rather more than ⅜ in. long, 2-lipped; upper lip with 2 short obtuse lobes; lower lip 3-lobed, the middle lobe much the largest. Filaments hairy at the base. Drupe globose, exceeding ¼ in. in diam., purplish-black when ripe, embraced for rather more than half its length by the veined persistent calyx; stone often 1- or 2-celled by abortion. Fl. B. I. v. 4, p. 583; Bedd. For. Man. in Flor. Sylvat. p. clxxii; Trim. Fl. Ceyl. v. 3, p. 356; Talb. Trees, Bomb. ed. 2, p. 270.—Flowers more or less throughout the year (*Talbot*). VERN. *Nirgundi*; *Lingur.*

Very closely allied to the preceding species, from which it is distinguished by the sessile obtuse leaflets, occasionally simple leaves, and rather larger flowers and fruit.

Rare. KONKAN: Goa, *Dalzell*!, *Gibson*! KANARA: sandy sea-shores near Murdeshwar, *Talbot*.—DISTRIB. Scattered throughout India in the tropical and subtropical regions; Ceylon, Japan, Philippines, N. Australia.

3. **Vitex altissima,** *Linn. f. Suppl.* (1781) p. 294. A very large tree with a dense head and somewhat drooping branches; bark grey, scaly. Leaves 3 (rarely 5) -foliolate; leaflets sessile, the terminal reaching 6 by 1¾ in., the lateral 4 by 1¼ in., lanceolate, acuminate, entire, glabrous above, more or less pubescent especially on the nerves beneath, base acute; main nerves numerous (up to 20 pairs), slender with intermediate finely reticulate venation; common petioles 2½ in. long, sometimes slightly winged. Flowers numerous in shortly pedunculate or nearly sessile cymes, clustered along the branches of large lax fulvous-pubescent terminal panicles; bracts beneath the flowers ⅛—⅓ in. long, oblong, obtuse. Calyx ⅛ in. long, fulvous-villous; teeth small, 1/20 in. long, oblong, obtuse. Corolla white, tinged with blue, rather more than ¼ in. long, 2-lipped; upper lip 1/10 in. long with 2 triangular subacute lobes; lower lip ⅛ in. long, 3-lobed, the middle lobe more than twice as large as the lateral ones. Drupe irregularly globose, less than ½ in. in diam.; supported by the enlarged flattened calyx, purple, smooth, often dotted with white specks. Fl. B. I. v. 4, p. 584; Grah. Cat. p. 155; Dalz. & Gibs. p. 201; Wight, Icon. t. 1466; Bedd. Flor. Sylvat. t. 252; Trim. Fl. Ceyl. v. 3, p. 357; Talb. Trees, Bomb. ed. 2, p. 270; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359; Watt, Dict. Econ. Prod. v. 6, part 4, p. 247.—Flowers: May. VERN. *Balage.*

KONKAN: *Law*!, *Stocks*!; ravines near Nagotna, *Dalzell & Gibson*. KANARA: plentiful, *Dalzell & Gibson*; Yacombi (N. Kanara), *Woodrow*!; evergreen forests of N. Kanara, abundant in the Kumpta and Yellapur forests, *Talbot*.—DISTRIB. India (W. Peninsula); Ceylon.

The wood is hard and close-grained, brownish-grey, weighing 60 lbs. to the cub. ft. (*Talbot*), does not split nor warp, and polishes well. It is used

for building purposes, furniture, and carts, and is in much demand in parts of N. Kanara (*Talbot*). See Watt, Dict. Econ. Prod. l. c.

VAR. *alata*, Trim. Fl. Ceyl. v. 3 (1895) p. 358. Petioles always rather broadly winged, widened and cordate at the base ; leaflets very finely pubescent above, densely grey-pubescent beneath, flowers more laxly arranged. *Vitex alata* (sp.), Willd. in Ges. Naturf. Fr. Neue Schr. v. 4 (1803) p. 203 ; Grah. Cat. p. 155 ; Dalz. & Gibs. p. 201 ; C. B. Clarke, in Hook. f. Fl. B. I. v. 4, p. 584 ; Talb. Trees, Bomb. ed. 2, p. 271 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359.—Flowers : Apr.-May.

KONKAN : hills west of Panvel, *Nimmo* ex *Graham*. DECCAN : Limbagaon (Sattara districts), *Bhiva* ! S. M. COUNTRY : Duddi, *Law* ex *Graham*. KANARA : Yellapur taluka in evergreen forests, *Talbot*.

4. **Vitex leucoxylon,** *Linn. f. Suppl.* (1781) p. 293. A large deciduous tree with spreading head ; trunk thick, short ; bark smooth, light-colored ; young parts more or less pubescent. Leaves 3—5-foliolate (when 5-foliolate the basal pair of leaflets much smaller than the other pair) ; leaflets petiolulate, oblong, subobtuse, the terminal leaflet usually the largest, reaching 3—4 by 1—1¼ in., all glabrous above, pale and more or less hairy with yellowish hairs on each side of the midrib and with close reticulate venation beneath, base usually acute, often unequal-sided ; petiolules ¼ in. long ; common petioles 1½—2 in. long, not winged. Flowers fragrant, in axillary pedunculate lax corymbose cymes; peduncles 1—2½ in. long ; bracts $\frac{1}{12}$ in. long, lanceolate, caducous. Calyx pubescent or tomentose, ⅛ in. long ; teeth 5, small, triangular. Corolla ½ in. long, pubescent outside, white with purplish hairs (*Trimen*) ; upper lip ⅛ in. long, divided to the middle into 2 rounded lobes ; lower lip 3-lobed, ⅜ in. long, nearly as broad across the 2 obtuse lateral lobes, the middle lobe broadly obovate, projecting, hairy in the centre with purplish hairs and with crisped margin. Filaments hairy at the base. Ovary densely hairy at the top with erect white hairs. Drupe ¾ in. long, succulent, obovoid, blunt, dark purple when ripe, supported on the enlarged flattened calyx ; stone large, 4-celled and 4-seeded. Fl. B. I. v. 4, p. 587 ; Grah. Cat. p. 156 ; Dalz & Gibs. p. 201 ; Bedd. For. Man. in Flor. Sylvat. p. clxxi ; Trim. Fl. Ceyl. v. 3, p. 358 ; Talb. Trees, Bomb. ed. 2, p. 271 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359. *Wallrothia leucoxylon*, Roth, Nov. Pl. Sp. (1821) p. 319 ; Wight, Icon. t. 1467.—Flowers : Feb.—Apr. VERN. *Sheras*.

KONKAN : *Law* ! ; Ghâts, *Talbot* ; banks of the Savitree River near Poladpur, *Graham* ; Atgaon (Thâna districts), *Woodrow* ! DECCAN : Khandala, *Graham* ; Koina Valley below Mahableshwar, *Cooke* ! ; Limbagaon (Sattara districts), *Woodrow* ! S. M. COUNTRY : Duddi, *Law* ex *Graham*. KANARA : N. Kanara Ghâts along the banks of rivers and nálas in moist forests, *Talbot*.—DISTRIB. India (W. Peninsula) ; Ceylon.

11. CLERODENDRON, Linn.

Trees or shrubs sometimes sarmentose. Leaves opposite, rarely 3—4-nate, simple, entire or toothed. Flowers in axillary cymes or terminal panicles often leafy below ; bracts conspicuous or small :

bracteoles 0. Calyx campanulate, truncate or 5-toothed or almost 5-partite, persistent, often accrescent or colored. Corolla-tube slender, usually long; limb more or less oblique, with 5 spreading lobes. Stamens 4, didynamous, much-exserted; anthers ovate or oblong, the cells parallel. Ovary imperfectly 4-celled; ovule solitary in each cell; style filiform; stigma shortly 2-fid. Fruit a globose succulent (very rarely dry) drupe, 4-grooved, separating into 4 pyrenes, of which 1—3 are sometimes suppressed. Seeds oblong; albumen 0.—DISTRIB. Chiefly in the warm regions of the Old World, a few in Tropical America; species about 100.

Cymes few-flowered, axillary, distinct; calyx slightly enlarged in fruit, a straggling or subscandent shrub . . 1 *C. inerme.*
Cymes collectively forming a terminal panicle
Calyx not enlarged in fruit
Calyx-lobes long, ovate, acuminate, leaves opposite, less than 3 in. long . . 2. *C. Phlomidis.*
Calyx-lobes very short, broadly triangular, leaves often in whorls of 3, reaching more than 6 in. long . . . . 3 *C. serratum.*
Calyx much enlarged in fruit turning red . . 4 *C. infortunatum*

1. **Clerodendron inerme,** *Gærtn. Fruct.* v. 1 (1788 p. 271, t. 57, fig 1. A straggling much-branched shrub 3—7 ft. long, sometimes scandent; bark pale-brown; branches twiggy. Leaves opposite (rarely ternate), ¾—2 by ½—1 in., elliptic or obovate, obtuse, glabrous or nearly so, base acute; petioles ¼—⅜ in. long. Flowers in axillary pedunculate cymes 3—9 (commonly 3) -flowered; peduncles long, slender, ½—1¾ in long, bracts minute, linear or subulate. Calyx ⅛ in. long, enlarged in fruit, glabrous or puberulous, somewhat leathery, teeth about $\frac{1}{20}$ in. long, triangular, acute Corolla white, tube long, slender, reaching 1 in. long or even more, glabrous outside, very hairy inside, lobes subequal, ¼—⅜ in. long, oblong, obtuse, with slightly crenulate margins. Filaments very long, hairy at the base, much exserted. Ovary glabrous; style glabrous, much exserted; stigma acutely 2-lobed. Drupe pyriform, ½—⅝ in long, seated in the veined persistent enlarged calyx, separating into 4 woody pyrenes. Fl. B. I. v. 4, p. 589; Grah. Cat p. 157; Dalz & Gibs. p 200; Trim. Fl. Ceyl. v. 3, p. 359; Talb. Trees, Bomb. ed 2, p. 272; Woodr. in Journ. Bomb. Nat. v 12 (1899) p. 359; Watt, Dict. Econ. Prod. v. 2, p 372.—Flowers: Nov.—Jan. VERN. *Vanjai.*

Common along the sea-coast KONKAN *Law!*, on the verge of high-water mark along the west face of the Island of Bombay, *Graham*; Salsette, *Graham*, Island of Bombay, *Cooke!*, *Woodrow!* GUJARAT *Woodrow.*—DISTRIB Throughout India near the sea; Ceylon

2. **Clerodendron Phlomidis,** *Linn. f. Suppl.* (1781) p. 292. A large bush or small tree, reaching 30 ft. high, with more or less pubescent branches. Leaves 1½—2½ by 1¼—1½ in., ovate or subrhomboid, obtuse or acute, coarsely crenate-dentate or subentire, undulate, glabrous above, more or less puberulous beneath, base truncate or subcordate; petioles ¼—¾ in. long. Flowers moderate-sized, fragrant, in small dichotomous axillary cymes arranged so as to form a rounded terminal panicle; bracts obovate or lanceolate,

acute, leafy. Calyx ⅜ in. long or more, divided about ½-way down, glabrous, not enlarged in fruit ; segments ovate, acutely acuminate, veined. Corolla white or pinkish ; tube ¾—1 in. long, slightly pubescent outside, glabrous inside ; lobes nearly equal, exceeding ¼ in. long, elliptic, obtuse, veined. Filaments slightly pubescent below. Ovary and style glabrous. Drupe ¼ in. long, broadly obovoid, depressed, the top about level with the points of the persistent calyx-lobes, normally 4-lobed with 1 pyrene in each lobe (1—3 sometimes suppressed). Vahl, Symb. v. 2 (1791) p. 74 ; Trim. Fl. Ceyl. v. 3, p. 360. *Clerodendron phlomoides*, Willd. Sp. Pl. v. 3 (1800) p. 386 ; C. B. Clarke, in Hook, f. Fl. B. I. v. 4, p. 590 ; Grah. Cat. p. 157 ; Dalz. & Gibs. p. 200 ; Wight, Icon. t. 1473 ; Talb. Trees, Bomb. ed. 2, p. 272 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 ; Watt, Dict. Econ. Prod. v. 2, p. 374.—Flowers : Aug.—Feb. VERN. *Iran*.

The name given to the plant by Linnæus f. is *C. Phlomidis* not *C. phlomoides*

Common in hedges throughout the Presidency, especially in the drier parts. KONKAN : Thána, *Woodrow*! DECCAN : in hedges and about villages, *Graham*. S. M. COUNTRY : Padshapur, *Ritchie*, 1961 ! ; common in the south of Dharwar and the Belgaum district, *Talbot*. GUJARAT : common in hedges, *Dalzell & Gibson;* Broach, *Kanitkar*! ; Surat, *Woodrow*.—DISTRIB. Throughout India in the drier parts; Ceylon.

3. **Clerodendron serratum,** *Spreng. Syst. Veg.* v. 2 (1825) p. 758. A shrub 3—8 ft. high, scarcely woody, not much branched ; stems bluntly quadrangular ; young parts usually glabrous. Leaves often some ternate as well as opposite (passing into bracts above), sometimes reaching as much as 11 in. long but usually 5—6 by 2¼—2½ in., oblong or elliptic, acute, coarsely and sharply serrate (sometimes but rarely only dentate), glabrous, base acute ; petioles very stout, ¼ in. long. Flowers numerous, showy, in lax pubescent dichotomous cymes, with a pair of acute bracts at each branching and a flower in the fork, each in the axil of a large leafy bract and collectively forming a long lax terminal usually pyramidal erect panicle 6—10 in. long ; pedicels often twisted so as to make the large lower corolla-tube appear uppermost ; bracts ½—1½ in. long, from obovate to lanceolate, pubescent, subpersistent, often colored. Calyx ⅛ in. long, puberulous, cup-shaped, truncate, not enlarged in fruit ; lobes very small, triangular, acute, ciliolate. Corolla glabrous outside, pale-blue, the large lower lobe (often appearing upper in flower) dark bluish-purple ; tube ⅜ in. long, cylindric, hairy within at the insertion of the stamens, oblique at the mouth ; the 2 upper and 2 lateral lobes elliptic, obtuse, flat, spreading, ⅜ in. long, the lower lobe lip-like, more than ½ in. long, concave, deflexed. Filaments much curved, densely hairy at the base. Ovary and style glabrous. Drupe ¼ in. long, somewhat succulent, broadly obovoid, normally 4-lobed with 1 pyrene in each lobe (1—3 often suppressed). Fl. B. I. v. 4, p. 592 ; Grah. Cat. p. 157 ; Dalz. & Gibs. p. 200 ; Wight, Icon. t. 1472 ; Trim. Fl. Ceyl. v. 3, p. 360 ; Talb. Trees, Bomb. ed. 2, p. 272 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899)

p. 360 ; Watt, Dict. Econ. Prod. v. 2, p. 374.—Flowers : Aug.—Sept. VERN. *Bhárang.*

KONKAN : *Stocks* ! Miradonger near Pen, *Dalzell & Gibson*; Salsette, *Nimmo* ex *Graham.* DECCAN : Khandala, *Graham, Dalzell & Gibson, Bhiva* ! ; Mahableshwar, *Cooke* ! ; Kartriz Ghát, *Sirpati* ! ; Purandhar, *Woodrow* !—DISTRIB. More or less throughout India ; Ceylon.

4. **Clerodendron infortunatum,** *Linn. Sp. Pl.* (1753) p. 637. A shrub 3—8 ft. high, often gregarious ; branchlets bluntly quadrangular, clothed with yellowish silky pubescence. Leaves large, 4—10 by 3½—8 in., ovate, acuminate, thinly hairy on both sides, more strongly so on the nerves beneath, entire or denticulate, reticulately veined, base cordate or rounded ; petioles 1½—4 in. long, cylindric, hairy. Flowers on rather long pubescent pedicels, in stalked cymes forming large pubescent panicles ; bracts leafy, deciduous. Calyx ½ in. long in flower, much enlarged in fruit (sometimes reaching in fruit 1½ in across the lobes when spread out) divided to within about ⅛ in. of the base, silky-pubescent ; segments broadly lanceolate, very acute. Corolla densely pubescent outside, white tinged with pink ; tube ¾ in. long, slender ; lobes exceeding ⅜ in. long, oblong, obtuse. Filaments glabrous. Ovary and style glabrous. Drupe ⅓ in. in diam., black, nearly globose, seated on the enlarged pink calyx, containing 4—1 pyrenes. Fl. B. I. v. 4, p. 594 ; Grah. Cat. p. 157 ; Dalz. & Gibs. p. 200 ; Wight, Icon. t. 1471 ; Bedd. For. Man. in Flor. Sylvat, p. clxxiii ; Trim. Fl. Ceyl. v. 3, p. 361 ; Talb. Trees, Bomb. ed. 2, p. 272 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Watt, Dict. Econ. Prod. v. 2, p. 373.—Flowers : Oct.—Jan. VERN. *Bhandira.*

KONKAN : Vingorla, *Dalzell & Gibson*; Belgaum and Vingorla road, *Woodrow* ! ; Amboli Ghát, *Kanitkar* ! S. M. COUNTRY : common about Belgaum, *Graham* ; Londa, *Bhiva* ! ; Castlerock, *Cooke* ! KANARA : very common in N. Kanara, *Talbot.*—DISTRIB. Throughout India ; Ceylon, Malaya.

The leaves of the plant have been used as a cheap substitute for chiretta as a tonic and antiperiodic. See Watt, Dict. Econ. Prod. l. c.

Clerodendron calamitosum, Linn. Mant. (1767) p. 90. A shrub, a native of Malacca and Java, often grown in gardens. It has elliptic leaves 4 by 2 in. and panicles of white flowers with a corolla-tube 1 in. long. The flowers appear in September and October. Fl. B. I. v. 4, p. 591 ; Bot. Mag. t. 5294 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360.

Clerodendron nutans, Wall. Cat. (1828) 1793. A shrub 6 ft. high, a native of Madagascar. Leaves reaching 8 in. long, narrowly obovate or lanceolate ; calyx divided nearly to the base, red in fruit. Flowers white, in long drooping panicles ; corolla-tube ½ in. long. Fl. B. I. v. 4, p. 591 ; Bot. Mag. t. 3049 ; Dalz. & Gibs. Suppl. p. 69 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 & Gard. in Ind. ed. 5, p. 419.—Flowers : Aug.—Sept.

Clerodendron squamatum, Vahl, Symb. v. 2 (1791) p. 74. A shrub 2—5 ft. high, a native of China and Sumatra. Leaves broadly

ovate, cordate. Flowers scarlet, in large panicles, the corolla-tube 1 in. long. Fl. B. I. v. 4, p. 593 ; Dalz. & Gibs. Suppl. p. 69 ; Woodr. Gard. in Ind. ed. 5, p. 419.

Clerodendron fragrans, R. Br. in Ait. Hort. Kew. ed. 2, v. 4 (1812) p. 63. The double-flowered variety, a native of China, is frequently cultivated in gardens. The leaves are large, wrinkled, fœtid when bruised, the flowers white merging into dark purple, very fragrant. Fl. B. I. v. 4, p. 589 ; Grah. Cat. p. 157 ; Dalz. & Gibs. Suppl. p. 69 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 & Gard. in Ind. ed. 5, p. 419. *Volkameria fragrans,* Vent. Jard. Malm. (1803) t. 70.—Flowers : Sept.—Nov.

Clerodendron Siphonanthus, R. Br. in Ait. Hort. Kew. ed. 2, v. 4 (1812) p. 65. A shrub 4—8 ft. high, with narrowly lanceolate shortly acuminate oleander-like leaves 6 by 1 in., a native of Sikkim, Assam, and Sumatra, extensively cultivated in both hemispheres. The flowers are white, in large terminal panicles, with a fleshy curved corolla-tube 3—4 in. long. Fl. B. I. v. 4, p. 595 ; Grah. Cat. p. 157 ; Dalz. & Gibs. Suppl. p. 69 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 & Gard. in Ind. ed. 5, p. 419.—Flowers : Sept.—Oct.

Clerodendron aculeatum, Griseb. Fl. Brit. W. I. (1861) p. 500. A shrub 5—10 ft. high, armed with short axillary spines, a native of the West Indies. It has elliptic-lanceolate leaves and small fragrant white flowers with long-exserted purple stamens. It is very suitable for fences. Fl. B. I. v. 4, p. 589 ; Grah. Cat. p. 157 ; Dalz. & Gibs. Suppl. p. 69 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 & Gard. in Ind. ed. 5, p. 420.—Flowers : Oct.

Clerodendron emirnense, Boj. ex Hook. Bot. Mag. (1829) t. 2925. A much-branched shrub 10—20 ft. high, with ovate or oblong-ovate smooth shining leaves and large terminal corymbs of white flowers sometimes tinged with purple, a native of Emirne in Madagascar, whence its specific name. Grah. Cat. p. 158 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 & Gard. in Ind. ed. 5, p. 419 (by error *emirense*).—Flowers : Sept.—Oct.

Clerodendron Thomsonæ, Balf. in Edin. New Phil. Journ. N. S. v. 15 (Jan.—Apr. 1862) p. 233. A climbing shrub, a native of Tropical Africa, with ovate leaves 3—6 in. long, a white pentagonal calyx, and light crimson corolla with tube 1 in. long. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 & Gard. in Ind. ed. 5, p. 419. —Flowers : Sept.—Dec.

12. **SYMPHOREMA,** Roxb.

Scandent shrubs. Leaves opposite, entire or toothed. Flowers in pedunculate capitate usually 7-flowered cymes ; bracts 6, oblong, involucrate, accrescent in fruit. Calyx short, obovoid, 4—8-lobed, somewhat accrescent. Corolla small, white ; tube cylindric ; limb with 6—16 subequal narrowly oblong lobes. Stamens 6—16 (as many as

the corolla-lobes) ; anthers exserted, ovate, the cells parallel. Ovary 2- or imperfectly 4-celled ; ovules 4 ; style filiform ; stigma shortly 2-fid. Fruit dry, included in the calyx, 1-seeded. Seed erect ; cotyledons fleshy.—DISTRIB. Species 3, a Philippine Island one and the 2 following.

Corolla ¼ in. long, 6—8—lobed	1. *S. involucratum.*
Corolla ½ in. long or more, 12—16-lobed	2. *S. polyandrum.*

1. **Symphorema involucratum,** *Roxb. Cor. Pl.* v. 2 (1798) p. 46, t. 186. A climbing shrub ; stems slender ; young parts stellately tomentose. Leaves 2—3 by 1½—1¾ in., ovate or elliptic, subacute, crenate-serrate or toothed, glabrous above or nearly so when mature, white or pale-buff with close stellate pubescence beneath, base usually rounded ; petioles ¼ in. long. Flowers crowded in about 7-flowered capitate pedunculate cymes ; bracts in flower ¾ by ⅛ in., lanceolate, densely pubescent or villous ; bracts in fruit enlarging to 1½ by ½ in. and then spathulate-elliptic, thinly pubescent, submembranous, reticulately veined. Calyx ⅛—⅓ in. long, stellately tomentose, slightly enlarged in fruit ; lobes 1/16 in. long, triangular-oblong, subacute. Corolla white, glabrous, less than ⅓ in. long, 6—8-lobed ; lobes ⅛ in. long, linear-oblong, obtuse. Stamens inserted at the top of the corolla-tube, exserted ; filaments glabrous. Ovary and style glabrous. Fruit ⅛ in. in diam., subglobose, glabrous or nearly so. Fl. B. I. v. 4, p. 599 ; Dalz. & Gibs. p. 199 ; Wight, Icon. t. 362 ; Trim. Fl. Ceyl. v. 3, p. 363 ; Talb. Trees, Bomb. ed. 2, p. 273 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain, Beng. Pl. p. 837 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 396.—Flowers : Mar.—May.

Dalzell without locality in Herb. Kew. KONKAN : between Nagotna and Alibág, *Dalzell & Gibson*; Wassind (Thána districts), *Woodrow*. KANARA : *Law* !, *Stocks* !; moist forests near Yellapur, *Talbot*; Arbail Ghát, *Talbot* !—DISTRIB. India (W. Peninsula, Birma) ; Ceylon.

2. **Symphorema polyandrum,** *Wight, Icon.* (1840) t. 363. A climbing or spreading shrub, bare of leaves when in flower (*Talbot*) ; young parts densely fulvous-pubescent. Leaves 3—6 by 2—4½ in., broadly ovate or suborbicular, usually acuminate, crenate-serrate or dentate, stellately hairy on both sides, base rounded ; petioles ½—¾ in. long, stout, densely pubescent. Flowers crowded in capitate pedunculate pubescent cymes ; bracts in fruit reaching 1½ by 1 in., obovate-oblong, obtuse, densely pubescent. Calyx ⅜—½ in. long, white-tomentose and with fine stellate hairs, campanulate-infundibuliform in flower, enlarged and becoming somewhat urceolate-globose in fruit ; teeth 6—8, triangular-oblong, subacute, ⅛ in. long. Corolla white, ⅜ in. long ; tube ⅜ in. long ; lobes 12—16, lanceolate, acute. Stamens as many as the corolla-lobes ; filaments glabrous. Ovary and style glabrous. Fruit ¼—⅓ in. in diam., enclosed in the persistent calyx. Fl. B. I. v. 4, p. 599 ; Talb. Trees, Bomb. ed. 2, p. 273 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain, Beng. Pl. p. 837.—Flowers : Feb.—Mar.

Rare. S. M. COUNTRY : Belgaum, *Woodrow, Talbot, Ritchie,* 925 ! ; Dharwar districts, *Talbot*; Gokak, *Ritchie,* 925 ! ;—DISTRIB. India (W. Peninsula).

13. AVICENNIA, Linn.

Shrubs or small trees. Leaves coriaceous, opposite, entire. Flowers small, sessile, in capitate pedunculate heads of close cymes, paired in the penultimate axils or terminal in trichotomous corymbs; bracts small. Calyx short, 5-partite, unaltered in fruit; segments ovate, imbricate. Corolla short; tube wide, cylindric, straight; lobes 4, subequal or the uppermost rather the widest. Stamens 4, inserted on the corolla-throat; filaments subequal; anthers shortly exserted, ovate, the cells parallel. Ovary imperfectly 4-celled by a 4-winged central axis; ovules 4, pendulous between the axial wings; style long or short; stigma 2-fid. Fruit a compressed capsule; valves 2, thick, leathery. Seeds solitary, erect; embryo imperfectly covered by the two integuments; cotyledons large, longitudinally plicate; radicle inferior, villous.—DISTRIB. Sea-shores of the warmer regions of the globe; species 4 or 5.

A tree; leaves very obtuse; capsule 1 in. and more long; stamens exserted; style long ..... 1. *A. officinalis.*
A shrub; leaves very acute; capsule less than 1 in. long; stamens included; style short ..... 2. *A. alba.*

1. **Avicennia officinalis,** *Linn. Sp. Pl.* (1753) p. 110. A small tree with smooth pale bark. Leaves coriaceous, 2—3 by 1—1½ in., elliptic-oblong or obovate-oblong, very obtuse, glabrous, smooth and shining above, pale and with a hard thin tomentum beneath, base acute, attenuated into the petiole; main nerves 4—6 pairs with reticulate venation between; petioles ¼—⅓ in. long. Flowers dingy yellow, sessile in small heads, on rigid angular peduncles which are often 2 together in the upper axils or several in small terminal thyrses; bract and 2 bracteoles concave, ciliate, shorter than the sepals. Calyx 5-partite almost to the base; sepals ⅛—⅙ in. long, broadly ovate or suborbicular, obtuse, concave, ciliate. Corolla ½ in. in diam.; lobes 4, ovate, acute, subequal. Stamens exserted. Ovary and style together reaching ¼ in. long, the ovary tapering into and about as long as the style, both villous; stigma shortly 2-fid. Capsules 1—1½ in. long, ovoid, compressed, beaked, green, wrinkled especially at the base (*Gammie*). Seed completely filling the fruit, often germinating on the tree. Fl. B. I. v. 4, p. 604; Bedd. For. Man. in Flor. Sylvat. p. clxxiv & Anal. Gen. t. 22, fig. 2; Trim. Fl. Ceyl. v. 3, p. 363; Talb. Trees, Bomb. ed. 2, p. 274; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360; Prain, Beng. Pl. p. 838. *Avicennia tomentosa,* Jacq. Enum. Pl. Carib. (1760) p. 25; Grah. Cat. p. 159; Watt, Dict. Econ. Prod. v. 1, p. 361.—Flowers: Apr.—June. VERN. *Tivar.*

In creeks and salt-marshes along the coast. KONKAN: Vellard and Sion causeway (Bombay), *Graham*; Bassein, *Gammie*!, *Burkill*; Malgund near Ratnagiri, *Bhide*! KANARA: tidal rivers and creeks, *Talbot.*—DISTRIB. Throughout India in salt-marshes and tidal creeks; Ceylon, Malaya, shores of the Indian and Pacific Oceans.

The tree is often called *"The White Mangrove."* Though the bark possesses tanning properties and is said to be used as a tanning material in Rio Janeiro, it does not seem to be so employed in India.

2. **Avicennia alba,** *Blume, Bijdr.* (1826) p. 821. A shrub; branches pale. Leaves 2—3 by ¾—1 in., lanceolate, very acute, glabrous above, whitish-tomentose beneath, base acute; petioles ⅛ in. long. Flowers sessile, in heads at the apex of stout angular peduncles usually 3—4 from the last pair of leaves, less often solitary from each of a lower pair of leaves. Calyx and corolla as in the last species. Stamens included. Ovary villous, style villous, shorter than the ovary, 2-cleft. Capsules ½—¾ in. long, ovoid, compressed, apiculate, bright-yellow and smooth when ripe (*Gammie*). Seed often germinating on the tree. Wight, Icon. t. 1482; Prain, Beng. Pl. p. 838. *Avicennia officinalis,* Watt, Dict. Econ. Prod. v. 1, p. 360 (*not* of Linn.). *A. officinalis* var. *alba,* Hook. f. Fl. B. I. v. 5, p. 604.—Flowers: Mar.—May. VERN. *Tivar.*

KONKAN: Salsette, *Stocks*; Borivli (Salsette) near the Railway Station, *Bhide*!; Bassein, *Gammie*!, *Burkill*; Sasaunghar, near Bassein, *Ryan*!—DISTRIB. India in tidal creeks; Malaya, S.E. Asia, N. Australia.

The following non-indigenous plants of the Order are more or less grown in gardens throughout the Presidency:—

Lippia citriodora, H. B. & K. Nov. Gen. & Sp. v. 2 (1817) p. 269. A graceful shrub with pale green lanceolate ternate sweetly scented leaves and small whitish or lilac flowers in terminal panicles, a native of S. America. It was introduced into Bombay by the Earl of Clare (fide *Dalzell*) and is very common in gardens. It is known as the *Lemon-scented Aloysia* or *Lemon-scented Verbena* and is much esteemed for its fragrant leaves. *Aloysia citriodora,* Orteg. ex Pers. Syn. v. 2 (1807) p. 139; Grah. Cat. p. 154; Dalz. & Gibs. Suppl. p. 68; Woodr. Gard. in Ind. ed. 5, p. 420.

Verbena venosa, Gill & Hook. in Hook. Bot. Misc. v. 1 (1830) p. 167. A dwarf spreading herbaceous plant, a native of S. America, with stiff ascending branches, rough sessile oblong-lanceolate leaves and bluish-purple flowers. The plant flowers freely in the cold season, is easy of culture, but of no great beauty. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359 & Gard. in Ind. ed. 5, p. 421.

Verbena incisa, Hook. Bot. Mag. (1839) t. 3628. A pretty little creeping annual with irregularly and coarsely toothed leaves and rosy flowers resembling those of the garden Verbena but smaller. Flowers during January and February and often springs up from self-sown seeds. Woodr. Gard. in Ind. ed. 5, p. 421.

Verbena officinalis, Linn. Sp. Pl. (1753) p. 20. A native of the Himalayas and Bengal, sometimes found as a weed in gardens. It has variously lobed leaves and small blue flowers in terminal spikes. Fl. B. I. v. 4, p. 565; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359; Watt, Dict. Econ. Prod. v. 6, part 4, p. 229.

The garden *Verbenas* of various colors, well known as bedding plants in England, are grown largely in gardens. They are hybrids, the principal parent of which is supposed to be *Verbena*

chamædryfolia, Juss. in Ann. Mus. Par. v. 7 (1806) p. 73, a native of S. America.

Citharexylum subserratum, Sw. Prodr. Veg Ind. Occ. v. 2 (1800) p. 1043. A shrub, a native of the W. Indies, with tetragonal branches, elliptic or obovate subserrate leaves and short axillary nodding racemes of white fragrant flowers which appear in November and December. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359.

Duranta Plumieri, Jacq. Select. Stirp. Am. (1763) p. 186. An erect bushy shrub, a native of S. America and the West Indies, with spinous branches, oblong-lanceolate acuminate leaves and blue flowers borne in great profusion in racemes at the ends of the branches, succeeded by orange-colored berries. It blooms more or less throughout the year and makes a good hedge. Fl. B. I. v. 4, p. 560 ; Dalz. & Gibs. Suppl. p. 70 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 359.

Holmskioldia sanguinea, Retz. Obs. fasc. 6 (1791) p. 31. A straggling shrub, a native of the subtropical Himalaya, remarkable for its large subrotately campanulate red calyx reaching 1 in. in diam. in fruit. Fl. B. I. v. 4, p. 596 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Watt, Dict. Econ. Prod. v. 4, p. 260.

Petrea volubilis, Linn. Sp. Pl. (1753) p. 626. A large climber with ovate or lanceolate scabrous leaves 3—4 in. long, a native of Tropical America. The flowers are inodorous, in copious racemes, remarkable for the large persistent purplish-blue calyx which remains long after the violet corollas have fallen off. Bot. Mag. t. 628 ; Dalz. & Gibs. Suppl. p. 70 ; Jacq. Select. Stirp. Am. p. 180, t. 114 (*Petræa* in text, *Petrea* in Tab.). *Petræa volubilis*, Woodr. Gard. in Ind. ed. 5, p. 420. The genus was named by Linnæus after Lord Petre, and should be written *Petrea* not *Petræa* (Linn. Hort. Cliff. p. 319).

Congea tomentosa, Roxb. Cor. Pl. v. 3 (1819) p. 90, t. 293, var. *azurea*, C. B. Clarke, in Hook. f. Fl. B. I. v. 4 (1885) p. 604. A large climber much cultivated in N. India and often grown in gardens in the Bombay Presidency, with elliptic acute leaves and large lilac bracts beneath the cymes. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360. *Congea azurea* (sp.), Wall. Cat. 1733; Wight, Icon. t. 1479, 1, fig. A. Dalz. & Gibs. Suppl. p. 69 ; Woodr. Gard. in Ind. ed. 5, p. 420.

ORDER XCVIII. LABIATÆ.

Herbs rarely shrubs, often gland-dotted ; branches opposite or verticillate, usually 4-angled. Leaves opposite or whorled ; stipules 0. Flowers hermaphrodite, irregular, solitary, 2-nate or fascicled and axillary, or in centrifugal spicate cymes which by union in pairs form false whorls ; bracts small ; bracteoles usually minute, opposite. Calyx inferior, gamosepalous, persistent, subregular or irregular, 4—5-fid or distinctly 2-lipped. Corolla gamopetalous ; limb 4—5-

lobed or distinctly 2-lipped ; lobes imbricate. Stamens adnate to the corolla-tube, 4, didynamous or only 2 perfect ; anther-cells connate, separate or confluent, dehiscing longitudinally. Disk prominent. Ovary superior, deeply 4-lobed ; style simple from the centre of the ovary between the lobes, erect, filiform ; stigma usually 2-fid, sometimes unequally ; ovules solitary in each lobe of the ovary, erect, anatropous Fruit of 4 dry (rarely fleshy) 1-seeded nutlets at the base of the calyx, sometimes 1 or more suppressed Seed solitary in the nutlets, small, erect ; albumen scanty or 0 ; embryo conform to the seed ; radicle inferior —DISTRIB Genera about 140 ; species about 3000, chiefly in warm dry temperate regions

Perfect stamens 4, declinate, anther-cells at length confluent
- Attachment of nutlets basilar
  - Lower lip of corolla somewhat declinate, flat or or slightly concave, generally narrower but hardly longer than the usually 4-lobed upper lip.
    - Fruiting calyx deflexed, the upper lobe widest, large, ovate, recurved, the margins decurrent on the tube
      - Corolla-tube short, lower lip flat, stigma 2-fid — 1 OCIMUM.
      - Corolla-tube usually long, lower lip concave, stigma entire — 2 ORTHOSIPHON
    - Fruiting calyx suberect or declinate, the upper lobe broader than the others, the margins not decurrent on the tube
      - Whorls crowded in terminal and axillary globose or ovoid heads with imbricate bracts, calyx suberect — 3 ACROCEPHALUS
      - Whorls racemose or spicate, calyx usually declinate
        - Racemes simple
          - Bracts conspicuous, lower lip of calyx not inflexed — 4 GENIOSPORUM
          - Bracts small, lower lip of calyx inflexed — 5 PLATYSTOMA
        - Racemes paniculate — 6 MOSCHOSMA
  - Lower lip of corolla deflexed, concave, boat-shaped or saccate, much longer than the upper lip
    - Upper lip of corolla very short, obtusely 3—4-toothed
      - Calyx equally 5-toothed or somewhat 2-lipped with 3-toothed upper and 2-toothed lower lip; or with upper lobe large, rounded, reflexed, the others narrow subulate.
        - Filaments free ... . — 7. PLECTRANTHUS.
        - Filaments connate at the base round the style .. . . — 8 COLEUS.
      - Calyx very oblique, suberect, 2-lipped, the upper lip large, entire, inflexed and closing the mouth, the lower lip truncate, obscurely 4-toothed, or calyx 1-lipped, slit in front, the solitary lip 5-toothed, incurved, but not quite closing the calyx-mouth ..... — 9. ANISOCHILUS.

Attachment of nutlets slightly oblique to the outer side, the nutlets also dorsally attached to the lobes of the disk leaving a large areole on separation; calyx-lobes subequal, tube 13—15-nerved; stamens included in the tube ..... 10. LAVANDULA.
Perfect stamens 4, erect or spreading or ascending.
Corolla-lobes 4; stamens equal or subequal.
Calyx 5-toothed; stamens exserted.
Corolla-lobes unequal; whorls in glomerate or solitary interrupted spikes; filaments bearded or naked ..... 11. POGOSTEMON.
Corolla-lobes equal; whorls in slender continuous spikes; filaments bearded ..... 12. DYSOPHYLLA.
Calyx 5-partite; segments plumose; filaments naked, included ..... 13. COLEBROOKEA.
Corolla 2-lipped; stamens didynamous.
Lower pair of stamens the longer.
Calyx 13-nerved, equally 5-toothed; anthers 2-celled, the cells short ..... 14. MICROMERIA.
Calyx 5—10-nerved.
Upper lip of corolla short, nearly flat; stamens exserted, the anther-cells of upper dimidiate, of the lower pair transverse ..... 15. ANISOMELES.
Upper lip of corolla hooded.
Upper lip of corolla not woolly; calyx 2-lipped with a broad plate at the back, the mouth closed after flowering ..... 16. SCUTELLARIA.
Upper lip of corolla densely woolly.
Calyx 5-toothed, the teeth spinescent; stamens more or less exserted; anther-cells parallel ..... 17. LEONURUS.
Calyx 6—10-toothed; stamens included; anther-cells divergent.
Lower lip of corolla longer than the upper ..... 18. LEUCAS.
Lower lip of corolla shorter than the upper ..... 19. LEONOTIS.
Upper pair of stamens the longer; calyx tubular, 15-nerved, 5-toothed; stamens included ..... 20. NEPETA.
Perfect stamens 2 (the lower pair) ascending or erect; anthers with a long linear transverse connective articulated with the filament; calyx 2-lipped, 5-nerved... 21. SALVIA.

1. **OCIMUM,** Linn.

Strongly scented herbs, shrubs, or undershrubs. Flowers small, in 6—10-flowered whorls, spicate or racemose ; pedicels with recurved tips ; bracts small, caducous. Calyx ovoid or campanulate, deflexed in fruit, 2-lipped ; upper lip broad, flat, decurrent, erect in fruit ; lower lip usually with 4 mucronate teeth, the 2 middle the largest. Corolla 2-lipped ; tube short, not annulate within ; upper lip subequally 4-fid ; lower lip hardly longer than the upper, declinate, entire, flat or nearly so. Stamens 4, didynamous, declinate, exserted ; filaments free or the lower pair connate below, naked, or the upper toothed or hairy below ; anther-cells confluent. Disk entire or 3—4-lobed. Ovary 4-partite ; style-lobes subulate or flattened. Nutlets 4, dry, smooth or subrugose, mucilaginous when moistened, enclosed in the enlarged membranous veined strongly

recurved calyx.—DISTRIB. Throughout the warmer regions of both hemispheres; species 60.

Pedicels as long as or longer than the calyx; 2 lower calyx-teeth longer than the upper lip ..... 1. *O. sanctum.*
Pedicels shorter than the calyx.
Lower calyx-teeth longer than the upper lip.
Bracts stalked ..... 2. *O. canum.*
Bracts sessile ..... 3. *O. adscendens.*
Lower calyx-teeth shorter than the upper lip..... 4. *O. gratissimum.*

1. **Ocimum sanctum,** *Linn. Mant.* v. 1 (1767) p. 85. Annual, 1—2 ft. high, much branched; stems and branches usually purplish, subquadrangular, sometimes woody below, clothed with soft spreading hairs. Leaves 1—2 by ⅝—1¼ in., elliptic-oblong, obtuse or acute, entire or serrate, pubescent on both sides, minutely gland-dotted, base obtuse or acute; petioles ½—1 in. long, slender, hairy. Flowers in racemes 6—8 in. long in close whorls; bracts nearly ⅛ in. long and almost as broad as long, broadly ovate with a long slender acumen, ciliate; pedicels longer than the flowering calyx, slender, pubescent. Calyx ⅛—⅛ in. long in flower, pubescent, reaching ¼ in. long in fruit; upper lip broadly obovate or suborbicular, much reflexed, very shortly apiculate; lower lip longer than the upper, the teeth lanceolate at the base, the 2 lateral with short straight, the 2 central with long slender awns which project beyond the upper lip and are much curved upwards. Corolla ⅛ in. long, purplish; upper lip pubescent on the back. Stamens exserted; filaments slender, the upper pair with a small bearded appendage at the base. Nutlets $\frac{1}{20}$ in. long, broadly ellipsoid, nearly smooth, yellow with small black markings. Fl. B. I. v. 4, p. 609: Grah. Cat. p. 147; Dalz. & Gibs. p. 204; Trim. Fl. Ceyl. v. 3, p. 366; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360; Prain, Beng. Pl. p. 842; Watt, Dict. Econ. Prod. v. 5, p. 443.—VERN. *Tulshi; Tulas; Kála-tulshi.*

The *Holy Basil*, the most sacred plant in the Hindu religion, very doubtfully indigenous. It is grown in or near almost every Hindu house and in temples. The Brahmins hold it sacred to the gods, Krishna and Vishnu. The leaves have expectorant properties, and their expressed juice is employed for a variety of purposes in native medicine. See Watt, Dict. Econ. Prod. l. c.—DISTRIB. Throughout India (cultivated but doubtfully indigenous); Malay Archipelago, Australia, W. Asia, Arabia.

2. **Ocimum canum,** *Sims, in Bot. Mag.* (1824) t. 2452. Herbaceous, 6—24 in. high, much branched; stems and branches subquadrangular, striate, the younger pubescent. Leaves 1—1½ by ⅜—½ in., elliptic-lanceolate, acute at both ends, glabrous or nearly so, entire or shallowly serrate, gland-dotted; petioles ½—1 in. long, slender, hairy. Flowers in rather close whorls, about 6 in a whorl, in spiciform racemes 3—8 in. long; bracts elliptic-lanceolate, stalked, ciliate with long white hairs; pedicels shorter than the calyx, sometimes almost 0. Calyx pubescent, ⅛ in. long; upper lip suborbicular, rather broader than long, flat, shortly mucronate, reticulately veined, ciliate; lower lip with 4 lanceolate-subulate teeth, the 2 central teeth longer than the lateral and exceeding the upper lip of the calyx. Corolla ⅛ in. long, white; upper lip broadly oblong,

4-toothed at the subtruncate apex, $\frac{1}{10}$—$\frac{1}{8}$ in. broad ; lower lip longer than the upper, $\frac{1}{20}$ in. broad, oblong, obtuse. Stamens much exserted ; filaments slender, the 2 upper with a tooth at the base. Style exserted beyond the filaments. Nutlets $\frac{1}{20}$ in. long, ellipsoid, black. Fl. B. I. v. 4, p 607 ; Grah. Cat. p. 147 ; Dalz. & Gibs. p. 203 ; Trim. Fl. Ceyl. v. 3, p. 365 ; Woodr in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain, Beng. Pl. p. 842 ; Watt, Dict. Econ Prod. v. 5, p. 442 —Flowers . July—Dec VERN. *Rán-tulshi.*

The *Hoary Basil,* abundant about native gardens Dalzell & Gibson (*l. c*) say that Africa is supposed to be its native country. KONKAN · *Stocks* ! DECCAN widely, *Woodrow*, Poona, *Cooke* ! S M COUNTRY hills N E of Belgaum, *Ritchie* ! —DISTRIB Plains and lower hills of India, Ceylon, Java, W. Asia, Tropical Africa, Madagascar, cultivated in America

3. **Ocimum adscendens,** *Willd Sp Pl* v 3 (1800) p 166, Annual, 6—15 in high, erect, or prostrate with ascending branches. Leaves ½—1 by ¼—½ in , oblong, obtuse, entire or faintly serrate, glabrous, much gland-dotted, base tapering ; petioles ⅛—⅜ in long. Flowers in short racemes, the whorls distant ; bracts reaching ½ by $\frac{1}{20}$ in., linear oblong-lanceolate with a small gland at the base , pedicels shorter than the calyx Corolla ⅛ in long. Upper filaments with a dilated appendage at the base Nutlets $\frac{1}{16}$ in. in diam ; subglobose, compressed, smooth, yellowish-brown Fl. B I v. 4, p 609 ; Dalz. & Gibs. p 203 ; Trim Fl Ceyl. v 3, p 366 ; Woodr. in Journ. Bomb. Nat v 12 (1899) p. 360.

I have seen no specimens of this plant from the Bombay Presidency. Though it has been often sought for, none of the plant collectors attached to the Poona College of Science have, so far as I know, succeeded in obtaining it Woodrow, in his list above cited, merely quotes Dalzell, who states (Bomb Flor l c) that it is common all over India, which is clearly a mistake There are no specimens in Dalzell's Herbarium in Herb Kew The plant occurs in S India and sparingly in Ceylon and is also given for Jubbulpore

4 **Ocimum gratissimum,** *Linn Sp Pl* (1753) p 1197. Shrubby, perennial, 4—6 ft. high, much branched, woody below ; stem and branches subquandrangular, the young ones pubescent. Leaves 2½—5 by 1½—2¼ in , elliptic-lanceolate, acute, coarsely crenate-serrate, pubescent on both sides, gland-dotted, base cuneate ; petioles 1—2½ in. long, slender, more or less pubescent. Flowers in simple or branched rather short racemes, in tolerably close whorls ; rhachis quadrangular, softly pubescent ; bracts sessile, longer than the calyx, acuminate from a broad ovate base, decussate and squarrose in the young inflorescence, ciliate ; pedicels shorter than the calyx, softly pubescent. Calyx ⅛ in long in flower, becoming twice as long in fruit, pubescent and glandular ; upper lip rounded, veined, scarcely mucronate, curved upwards in fruit, longer than the lower ; lower lip strongly nerved, the 2 central teeth short, subulate, the lateral teeth shorter and broader, lanceolate. Corolla ⅛ in. long, pale greenish-yellow, pubescent outside ; upper lip ⅛ in. broad with 4 rounded teeth ; lower lip longer than the upper, $\frac{1}{20}$ in. broad. Stamens exserted ; upper filaments with a bearded tooth at the base. Nutlets $\frac{1}{16}$ in. in diam. subglobose, rugose, brown. Fl. B. I. v. 4, p. 608 ; Grah. Cat. p. 147 ; Dalz. & Gibs. p. 203 ; Journ. Bom. N.

Rar. v. 3, t. 495 ; Trim. Fl. Ceyl. v. 3, p. 367 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain. Beng. Pl. p. 842 ; Watt, Dict. Econ. Prod. v. 5, p. 443.—Flowers : July—Oct. VERN. *Rámtulshi, Máli-tulshi.*

Doubtfully indigenous. KONKAN : *Law* ! DECCAN : Poona, *Cooke* ! ; Nasik, *Woodrow* !, *Wadthekar* ! S. M. COUNTRY : Belgaum, *Ritchie*, 548 ! GUJARAT : Balsar, *Kanitkar* !—DISTRIB. Throughout India, often cultivated ; Ceylon, Java.

Ocimum basilicum, Linn. Sp. Pl. (1753) p. 597. A widely cultivated plant known as the *Sweet Basil,* not indigenous in the Bombay Presidency but said to be so in the Punjáb on low hills. The typical form is generally quite smooth with green stems and white flowers, the 2 middle teeth of the lower lip of the calyx awned, longer than the rounded upper lip, the corolla sometimes ½ in. long, shortly pedicellate, the nutlets pitted. Fl. B. I. v. 4, p. 608 ; Grah. Cat. p. 147 ; Dalz. & Gibs. p. 203 ; Woodr in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain, Beng. Pl. p. 842 ; Watt, Dict. Econ. Prod v. 5, p. 440.

VAR. *thyrsiflora,* Benth. Lab. Gen. et Sp. p. 5. Of many described varieties, most of which are, according to Sir J. D. Hooker (Fl. B. I. l. c.), not distinguishable by any constant characters, the above seems to be the most important in the Bombay Presidency. It has purple stems and pink flowers in thyrsoid racemes.—VERN. *Sabjá ; Kámakasturi.*

The plant has a strong aromatic flavor, and is employed as a seasoning for culinary purposes The seeds are used medicinally by the natives in many parts of India See Watt, Dict Econ Prod l c

2. ORTHOSIPHON, Benth.

Undershrubs or shrubs. Flowers racemose in 6- or fewer-flowered whorls ; bracts small Calyx ovoid, campanulate or tubular, deflexed in fruit ; upper tooth broad, membranous, the margins decurrent on the tube ; lateral and lower teeth distinct or shortly connate, usually subulate. Corolla 2-lipped ; tube often slender, straight or incurved ; upper lip 3—4-fid ; lower entire, concave Stamens 4, declinate, didynamous ; filaments free, not appendaged at the base ; anther-cells confluent. Disk usually gibbous. Ovary 4-partite ; style with a small capitate or clavate entire or notched stigma. Fruit of 4 dry ovoid or globose nutlets, smooth or nearly so ; basal scar small.—DISTRIB. Warmer regions of the Old World ; species about 60.

Corolla-tube nearly equalling the calyx.	1 *O. pallidus.*
Corolla-tube longer than the calyx.	2. *O. tomentosus* var. *glabrata.*

1. **Orthosiphon pallidus,** *Royle, MSS. ex Benth. in Hook Bot. Misc.* v. 3 (1833) p. 370. A low undershrub 6—12 in. high ; branches numerous from a woody rootstock, quadrangular, more or less finely pubescent. Leaves inodorous, ½—1½ by ⅜—⅞ in., ovate, usually obtuse, crenate or serrate, glabrous or nearly so, gland-dotted, base

shortly cuneate; petioles $\frac{1}{8}$—$\frac{3}{8}$ in. long. Flowers in rather short racemes, the whorls 6-flowered, distant; bracts $\frac{1}{8}$ in. long, hairy; pedicels about equalling the flowering calyx, pubescent. Calyx in flower $\frac{1}{8}$ in. long, twice as long in fruit, the lower part hairy; upper lip with 3 obtuse lobes, the middle lobe widest; lower lip strongly parallel-nerved membranous, the 2 central teeth with a long up-curved awn from a narrow lanceolate base, longer than the upper lip, the lateral teeth broadly lanceolate with a short straight awn. Corolla $\frac{1}{4}$ in. long, white or pale lilac; tube nearly as long as the calyx; upper lip shorter than the suborbicular concave lower lip. Stamens included or scarcely exserted beyond the lower lip. Stigma clavate. Nutlets $\frac{1}{16}$ in. in diam., subglobose, smooth, yellowish-brown. Fl B. I. v. 4, p. 613; Dalz & Gibs. p. 205; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360; Prain, Beng. Pl. p. 844.—Flowers: June—Oct.

DECCAN: common, *Dalzell & Gibson, Woodrow*; Bowdhan near Poona, *Kanitkar*!; Rajwade, *Kanitkar*! S. M. COUNTRY: Belgaum, *Ritchie*, 1975!—DISTRIB. Throughout the greater part of India; Beluchistan, Arabia.

2. **Orthosiphon tomentosus,** *Benth. in Wall. Pl. As. Rar.* v. 2 (1831) p. 14. VAR. **glabrata,** *Hook. f. Fl. B. I.* v. 4 (1885) p. 614. Stems 1—2 in. long, woody at the base, slender, branched, sharply quadrangular, glabrous or nearly so. Leaves $1\frac{1}{2}$—3 by $\frac{3}{4}$—$1\frac{1}{4}$ in., ovate, acute, coarsely serrate, glabrous, base usually acute; petioles slender, $\frac{1}{2}$—$1\frac{1}{2}$ in. long. Flowers in racemes 3—8 in. long, in rather distant whorls; bracts ovate, acute, $\frac{1}{12}$ in. long. Calyx in flower $\frac{1}{4}$ in. long, glabrous or slightly pubescent, often tinged with purple; upper lip obovate-oblong, often mucronate; the two middle teeth of the lower lip lanceolate, with a long slightly curved awn, exceeding the upper lip, the lateral teeth shorter, lanceolate, with a short straight awn. Corolla variable in length, sometimes reaching $\frac{1}{2}$ in. long, slightly pubescent outside, pale-purple, inodorous; tube much longer than the calyx; upper lip with three obtuse lobes, the middle lobe the widest, shorter than the obovate-oblong obtuse concave lower lip. Stamens included. Stigma small, subclavate, sometimes slightly notched. Nutlets $\frac{1}{16}$ in. long, ellipsoid or subglobose, minutely tuberculate, brown. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360. *Orthosiphon glabratus,* (sp.)., Benth. in Wall. Pl. As. Rar. v. 2 (1831) p. 14; Dalz. & Gibs. p. 205; Trim. Fl. Ceyl. v. 3, p. 369.—Flowers: Apr.—Sept.

KONKAN: *Law*!, *Stocks*! DECCAN: Neral, *Woodrow*. S. M. COUNTRY: Bede (borders of Kanara), *Ritchie*, 1976! GUJARAT: Pali, *Woodrow*.—DISTRIB. India (W. Peninsula); Ceylon.

3. ACROCEPHALUS, Benth.

Perennial or annual herbs. Leaves opposite or whorled. Flowers very small, sessile or nearly so, in approximated whorls forming a terminal or axillary globose or ovoid head with imbricate bracts. Calyx 2-lipped, ovoid, tubular in fruit, base gibbous; upper lip usually entire; lower lip entire, emarginate or 4-toothed. Corolla small, somewhat 2-lipped; tube short; upper lip subequally 4-lobed; lower lip entire, nearly flat, scarcely longer than the upper. Stamens

4, didynamous, declinate ; filaments free, filiform, not appendiculate at the base. Disk small. Ovary 4-partite ; style shortly 2-fid at the stigmatose tip. Fruit of 4 smooth dry nutlets ; basal scar small.—DISTRIB. Tropical and Subtropical Asia, Tropical and S. Africa ; species about 40.

1. **Acrocephalus capitatus,** *Benth. in Wall. Pl. As. Rar.* v. 2 (1831) p. 18. A slender annual with simple or branched stems ; stems and branches obtusely quadrangular, glabrous or nearly so. Leaves ½—1¼ by ⅛—½ in., ovate or lanceolate, subacute, coarsely serrate, glabrous, base tapering into the petiole ; petioles often obscure owing to the decurrent leaf-blade. Flowers in terminal globose or cylindric heads ¼—¾ in. long, often with 2 spreading leaves at the base, on slender quadrangular peduncles ; bracts beneath the approximated whorls broadly obovate, shortly acuminate and with cuneate base, shorter than the fruiting calyx. Calyx in flower $\frac{1}{10}$ in., in fruit ⅛ in. long, pubescent outside ; upper lip oblong, entire, rounded at the apex ; lower lip with 4 lanceolate teeth, shorter than the upper lip. Corolla ⅛ in. long, pale-purple. Nutlets $\frac{1}{20}$ in. long, oblong-ellipsoid, compressed, smooth, brownish-black. Fl. B. I. v. 4, p. 611 ; Grah. Cat. p. 158 ; Dalz. & Gibs. p. 204 ; Hook. Icon. Pl. t. 456 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain, Beng. Pl. p. 844.—Flowers : Oct.

KONKAN : *Stocks* !; Mira hills near Pen, *Dalzell & Gibson*; Mahar (sparingly), *Dalzell & Gibson*; Poladpur, *Woodrow*; Vingorla, *Woodrow*. S. M. COUNTRY : *Law* ex *Graham*; Belgaum, *Ritchie*, 1794 !; Londa, *Cooke* ! KANARA : *Thomson*.—DISTRIB. Throughout India chiefly in hilly districts; Java, Borneo.

4. GENIOSPORUM, Wall.

Erect or procumbent glabrous or pubescent herbs. Flowers small, in many-flowered whorls forming long terminal spicate racemes ; bracts often colored. Calyx ovoid in flower, tubular in fruit, suberect or declinate ; upper tooth broadest, flat, obtuse, not decurrent ; lateral pair of teeth free or connate with the upper ; lowest pair free or connate. Corolla 2-lipped ; tube short ; upper lip 4-fid ; lower lip declinate, entire. Stamens 4, didynamous, declinate ; filaments free, inappendiculate. Disk swollen, gibbous. Ovary 4-partite ; style shortly 2-fid, the arms flattened. Fruit of 4 dry ovoid or oblong, smooth or punctulate nutlets.—DISTRIB. Tropical Asia, Africa, Madagascar ; species 10 or 12.

1. **Geniosporum prostratum,** *Benth. in Pl. As. Rar.* v. 2 (1831) p. 18. Annual ; stems many from a woody rootstock, slender, either diffuse, ascending, prostrate and rooting, or quite erect, glabrous more or less hispid with weak deflexed hairs. Leaves in distant pairs, 1—2 by ⅓—¾ in., subsessile, obovate-lanceolate or linear-lanceolate, acute or subacute, shallowly serrate or distantly toothed, with a few hairs on both sides, base tapering. Flowers minute, in many-flowered close or distant whorls, in slender racemes 2—6 in. long ; bracts ⅛ in. long, thick, broadly ovate, acuminate, pubescent,

gland-dotted ; pedicels usually longer than the calyx. Fruiting calyx ⅛ in. long, hairy outside and with a ring of hairs in the throat ; upper lip variable in size, oblong, subtruncate, mucronate, lateral teeth triangular, acute ; the 2 lower teeth lanceolate, awned. Corolla pink or white, ⅛ in. long, hairy ; tube $\frac{1}{16}$ in. long ; upper lip with 4 triangular teeth ; lower lip obovate, obtuse, rather longer than the upper. Stamens exserted. Nutlets $\frac{1}{30}$ in. long, ellipsoid, compressed, smooth, brownish-black. Fl. B. I. v. 4, p. 610 ; Grah. Cat. p. 148 ; Trim. Fl. Ceyl. v. 3, p. 368 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360 ; Prain, Beng. Pl. p. 845.

This is given on the authority of Graham (Cat. Bo. Pl. l. c.), who mentions its occurrence in the S. Konkan on the authority of Nimmo. I have seen no specimens from the Bombay Presidency; there are none from that Presidency in Herb. Kew. Dalzell does not include it in his Bombay Flora, and Woodrow in his list of Bombay plants merely cites Nimmo. It occurs in S. India and is common in Ceylon.—DISTRIB. India (W. Peninsula) ; Ceylon.

5. **PLATYSTOMA,** Beauv. (*Platostoma*).

Small annuals. Flowers minute in terminal slender spicate racemes ; whorls 6—10-flowered ; bracts small, caducous. Calyx ovoid-campanulate, deflexed in fruit, 2-lipped, the lips separated by a broad sinus ; upper lip ovate, not decurrent, with a tooth at each side near the base ; lower lip ovate, entire, obtuse or subtruncate, inflexed. Corolla-tube very short, widely campanulate at the mouth ; upper lip broad, 4-fid ; lower lip scarcely longer, entire, slightly concave. Stamens 4, declinate, included ; filaments free, dilated at the base, inappendiculate ; anther-cells confluent. Disk swollen, gibbous. Ovary 4-partite ; style shortly 2-fid at the apex. Fruit of 4 ovoid nutlets.—DISTRIB. India and Tropical Africa ; species 2.

1. **Platystoma africanum,** *Beauv. Fl. Ow. & Ben.* v. 2 (1808) p. 61, t. 95, fig. 2 (*Platostoma*). An erect annual 6—12 in. high ; stems weak, quadrangular, glabrous or slightly pubescent, simple or branched. Leaves ½—1¼ by ⅜—¾ in., ovate, acute, serrate, glabrous or nearly so, base tapering into the petiole. Flowers in moderately dense racemes 2—5 in. long, about 10 in a whorl ; bracts $\frac{1}{10}$ in. long, deltoid-ovate, acute ; pedicels about $\frac{1}{12}$ in. long. Fruiting calyx $\frac{1}{10}$ in. long ; upper lip rounded, sometimes apiculate at the apex, with an obtuse tooth at each side near the base ; lower lip shorter and narrower than the upper, obovate-oblong, rounded or subtruncate, inflexed. Corolla scarcely longer than the calyx, pale-lilac. Nutlets $\frac{1}{30}$ in. long, ovoid, black when ripe, minutely reticulate. Baker, in Dyer, Fl. Trop. Afr. v. 5, p. 349 ; Briquet, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, p. 370, fig. 106, O, P, Q. *Platystoma flaccidum,* Benth. in Benth. & Hook. Gen. Pl. v. 2, p. 1173 ; Hook. f. Fl. B. I. v. 4, p. 611 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360.

Rare. KONKAN : *Stocks* ! KANARA : Mulas, *Dalzell* ! ; on the Kála naddi, *Ritchie,* 1973 ! ; Birchi forest, *Talbot,* 1311 !—DISTRIB. India (W. Peninsula) ; Tropical Africa.

6. MOSCHOSMA, Reichb.

Annual or perennial herbs. Leaves petiolate, crenate. Flowers small, in subsecund 6—10-flowered whorls in axillary and terminal paniculate racemes; bracts small. Calyx ovoid or campanulate; upper tooth or 3 upper teeth larger than the 4 or 2 lower, not decurrent; throat naked. Corolla 2-lipped; upper lip 4-lobed, the lobes subequal or the 2 middle ones rather longer; lower lip entire, longer than the upper. Stamens 4, didynamous, declinate; filaments filiform, free, inappendiculate; anther-cells confluent. Disk uniform or somewhat swollen in fruit. Ovary 4-partite; style clavate-capitate, 2-fid at the tip. Fruit of 4 compressed smooth dry nutlets; basal scar small.—DISTRIB. Tropical Asia, Africa and Australia; species 6.

1. **Moschosma polystachyum,** *Benth. in Wall. Pl. As. Rar.* v. 2 (1831) p. 13. Annual; stem erect, 2—3 ft. high, much branched, sharply quadrangular, glabrous. Leaves ¾—1¾ by ⅜—1 in. ovate, acuminate, obtuse or subacute, apiculate, irregularly crenate-serrate, glabrous, base rounded or subcordate, narrowed into a slender petiole as long as the blade. Flowers shortly pedicellate, in numerous whorls closely placed and forming slender shortly pedunculate spicate racemes arranged in large panicles; bracts $\frac{1}{20}$ in. long, lanceolate, acute, caducous; pedicels about $\frac{1}{20}$ in. long. Calyx in flower $\frac{1}{12}$ in. long, in fruit nearly ⅛ in. long, pubescent outside; upper lip broad, suborbicular, entire, reflexed; lower lip with 4 lanceolate acute teeth, longer than the upper lip. Corolla $\frac{1}{10}$—⅛ in. long, pale-pink or flesh-colored. Nutlets scarcely $\frac{1}{10}$ in. long, broadly ellipsoid, compressed, smooth, brown. Fl. B. I. v. 4, p. 612; Dalz. & Gibs. p. 204; Trim. Fl. Ceyl. v. 3, p. 369; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360; Briquet, in Engl. & Prantl, Pflanzenf. v. 4, 3 A, p. 370, fig. 106, T; Prain, Beng. Pl. p. 845.—Flowers: Nov.

Stocks without locality in Herb. Kew. KONKAN: *Law*! GUJARAT: Ahmedabad, *Cooke*!, *Bhiva*!, *Woodrow*; Neriad, *Bhiva*!, *Woodrow*!—DISTRIB. India (Bengal, Behar, Birma, W. Peninsula); Ceylon, Java, China, Philippine Islands, Tropical Africa and N. Australia.

7. PLECTRANTHUS, L'Hérit.

Herbs or undershrubs. Flowers usually small in lax (rarely close) paniculate or racemose usually few-flowered cymes. Calyx usually 2-lipped, enlarged in fruit; lobes 5, subequal or the upper widest. Corolla 2-lipped; tube exserted, long or short, straight or decurved, the throat equal or obliquely swollen; upper lip usually short, broad, 4-fid, recurved; lower lip much longer, entire, boat-shaped, stipitate or narrowed at the base. Stamens 4, didynamous, declinate; filaments simple, free; anther-cells usually confluent. Disk usually enlarged in fruit. Ovary 4-partite; style subequally 2-fid. Fruit of 4 orbicular ovoid or oblong smooth granulate or punctate dry nutlets; basal scar small.—DISTRIB. Tropical and Subtropical Asia, Africa, Australia, Polynesia; species reaching perhaps 100.

Fruiting calyx indistinctly 2-lipped, shortly subequally 5-toothed.
Annual, reaching 2 ft. high; leaves with short stiff scattered hairs beneath ..... 1. *P. Stocksii.*
Perennial, reaching 5 ft. high; leaves white-tomentose beneath ..... 2. *P. Coetsa.*
Fruiting calyx distinctly 2-lipped; upper lip broad, rounded ..... 3. *P. incanus.*

1. **Plectranthus Stocksii,** *Hook. f. Fl. B. I.* v. 4 (1885) p. 618. Annual, erect, slender, 1—2 ft. high ; stems quadrangular, simple or branched, glabrous or sparsely hairy. Leaves thinly membranous, 2—4 by 1¼—1⅞ in., ovate, acute, coarsely serrate, gland-dotted, with short scattered stiff hairs above and on the nerves beneath, base rounded, truncate or cuneate ; petioles ¼—2 in. long. Flowers in branched cymes forming a large pyramidal panicle ; bracts at the forks of the cyme minute ; ultimate pedicels filiform, pubescent, often ¼ in. long. Calyx pubescent, covered with red or orange minute waxy glands, in flower small, 1/20 in. long, much enlarged in fruit, reaching sometimes when the fruit is fully ripe ⅛ in. long, incurved, striate, obscurely 2-lipped, with 5 subacute teeth. Corolla ¼ in. long, white with purple spots ; tube broad, straight. Stamens exserted. Nutlets 1/20 in. long, broadly ellipsoid, smooth, yellowish-brown. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360. *Plectranthus Wightii,* Grah. Cat. Bomb. Pl. p. 148 (*not* of Benth.) ; Dalz. & Gibs. p. 205 ; Woodr. in Journ. Bomb. Nat. l. c.—Flowers : Sept.—Nov.

KONKAN : *Stocks* !, *Law* ! DECCAN : Mahableshwar, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie* ! ; Párva Ghát, *Ritchie,* 1978 ! ; Castlerock, *Cooke* ! ; Londa, *Woodrow* ; Rámghát, *Law* ex *Dalzell & Gibson.* KANARA : Kála naddi above Supa, *Ritchie,* 1978 !—DISTRIB. India (W. Peninsula).

2. **Plectranthus Coetsa,** *Buch.-Ham. ex D. Don, Fl. Nep.* (1825) p. 117. A tall erect much-branched strong-smelling perennial herb 3—5 ft. high ; stems stout, quadrangular, often tinged with red and as well as the branches softly pubescent or tomentose. Leaves 1½—4 by ⅞—1¾ in., ovate, acute, serrate-dentate, softly pubescent above, white-pubescent or white-tomentose beneath, base tapering into the petiole ; main nerves and reticulate venation conspicuous beneath ; petioles ¼—½ in. long, stout, woolly. Flowers in numerous short cymes, in long axillary and terminal pubescent racemose panicles ; pedicels slender, deflexed, pubescent. Calyx in flower 1/12—1/10 in. long, hoary-pubescent, in fruit ⅛ in. long, 10-ribbed ; tube cylindric, curved upwards below the limb ; teeth subequal, ovate-deltoid, acute. Corolla ⅛—⅓ in. long, pale violet, pubescent outside ; tube deflexed ; upper lip shorter than the tube, broad, erect with shallow rounded lobes ; lower lip longer than the upper, boat-shaped. Stamens included within the lower lip of the corolla. Nutlets 1/20 in. long, broadly ellipsoid or suborbicular, compressed, smooth, yellow. Fl. B. I. v. 4, p. 619. *Plectranthus menthoides,* Benth. in Wall. Pl. As. Rar. v. 2 (1831) p. 17 ; Hook. f. Fl. B. I. v. 4, p. 620 ; Trim. Fl. Ceyl. v. 3, p. 372 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 360. *P. Macraei,* Benth. Lab. p. 42 ; Wight, Icon. t. 1430 (by error in Tab. *Pleibianthus*).—Flowers : Dec.-Feb.

Rare. KONKAN: *Stocks*! DECCAN: Panchgani, *Woodrow*!; Sinhagad, *Woodrow*!—DISTRIB. India (temperate and subtropical Himalaya, Khasia Mountains, Birma, W. Peninsula); Ceylon.

3. **Plectranthus incanus,** *Link, Enum. Hort. Berol.* v. 2 (1822) p. 120. An erect finely pubescent herb, 1—2½ ft. high; stem thick and fleshy below. Leaves 2—4½ in. long and nearly as broad as long, broadly ovate, acute, crenate, slightly pubescent or nearly glabrous above, pubescent beneath, base deeply cordate; petioles 1—3 in. long, finely pubescent. Flowers in few-flowered cymes sometimes reduced to a single flower, in racemes 3—8 in. long sometimes paniculately branched below; peduncles of the cymes very short or almost 0; bracts small, ovate, cuneate; pedicels in flower ⅛—¼ in. long, lengthened in fruit, finely pubescent. Calyx in flower ⅛ in. long, in fruit exceeding ⅜ in. long to top of longest lower tooth, conspicuously pubescent on the nerves; upper lip broad, erect, rounded, entire, much shorter than the lower teeth, reticulately veined; lower lip 4-toothed, the teeth veined, lanceolate, with subulate points, the 2 lower longer than the 2 lateral. Corolla ⅓ in. long, pale-lilac or light-blue; tube decurved about the middle; lobes of the upper lip very shallow, rounded; lower lip boat-shaped, about ⅛ in. long. Stamens included within the lower lip. Nutlets subglobose, nearly 1/10 in. in diam., pale-brown dotted with dark purple-brown spots, smooth. Bentham (Lab. p. 36) erroneously describes the root as tuberous (see N. E. Brown, in Kew Bull. 1894, p. 13). Fl. B. I. v. 4, p. 621; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361; Prain, Beng. Pl. p. 846. *Plectranthus cordifolius,* Don, Prodr. (1821) p. 116; Grah. Cat. p. 148; Dalz. & Gibs. p. 205.—Flowers: Sept.—Oct. VERN. *Lál-ágáda.*

KONKAN: Savantvadi, *Stocks*!, *Dalzell & Gibson*; Dapoli, *Nairne.* DECCAN: Khandala, *Graham, Woodrow, Dalzell & Gibson*; Bowdhan 8 miles from Poona, *Cooke*!, *Kanitkar*!; Pashan near Poona, *Ranade*! S. M. COUNTRY: Belgaum, *Ritchie,* 547!—DISTRIB. More or less throughout India especially on the hills.

DOUBTFUL SPECIES.

PLECTRANTHUS ROTUNDIFOLIUS, Grah. Cat. Bo. Pl. (1839) p. 148, which J. Graham on Nimmo's authority mentions as being found in the Konkans, has not been absolutely identified. Dalzell & Gibson (Bo. Fl. p. 205) make no mention of the tubers which Graham says are edible, and though they describe the plant, there are no specimens either in Dalzell's Herbarium in Herb. Kew. nor anywhere else so far as I know. The '*Kurka*' of Rheede (Hort. Mal. v. 11, t. 25), to which Graham refers the plant, has been shown by Trimen (Fl. Ceyl. v. 3, p. 374) to be *Coleus parviflorus,* a plant much cultivated in Ceylon for its edible tubers. That plant is not, however, indigenous in the Bombay Presidency nor has it to my knowledge been cultivated there. It has been found at Quilon in the southern part of the Peninsula, and Trimen (*l. c.*) thinks it may have reached Ceylon from Malaya.

EXCLUDED SPECIES.

PLECTRANTHUS SUBINCISUS, Benth., which Woodrow (Journ. Bomb. Nat. v. 12 (1899) p. 361) mentions as occurring at Poona, does not appear to be indigenous in the Bombay Presidency, the Poona specimens being those of an *Orthosiphon.*

8. COLEUS, Lour.

Herbs or undershrubs. Flowers in lax or close paniculate or racemose 6—10-flowered cymes. Calyx 2-lipped ; upper lip widest, not decurrent. Corolla 2-lipped ; tube exserted, decurved ; throat equal or obliquely swollen ; upper lip short, broad, 4-fid, recurved ; lower lip much longer, entire, boat-shaped, stipitate or narrowed at the base. Stamens 4, didynamous, connate below into a sheath separate from the corolla ; anther-cells usually confluent. Disk enlarged in front. Ovary 4-partite ; style subequally 2-fid. Fruit of 4 orbicular or ovoid smooth dry nutlets ; basal scar small.—DISTRIB. Asia, Tropical Africa and Australia ; species 80 or more.

Upper lip of calyx ovate, acuminate, longer than the lower; bracts with a long mucro..... 1. *C. barbatus.*
Upper lip of calyx suborbicular, shorter than the lower; bracts scarcely mucronate..... 2. *C. spicatus.*

1. **Coleus barbatus,** *Benth. in Wall. Pl. As. Rar.* v. 2 (1831) p. 15. Perennial, 1—2 ft. high with a thick fleshy rootstock ; stem cylindric, stout, ascending, slightly branched, woody at the base and, as well as the branches, villous with long hairs. Leaves 1—3 by ½—1¼ in., elliptic-oblong, obtuse, crenate, pubescent on both sides, base usually tapering ; petioles ¼—½ in. long. Flowers large and showy, in whorls of 6—10 which are at first rather close, afterwards distant, in long spike-like racemes 6—12 in. or more long ; rhachis densely glandular-hairy ; bracts large, conspicuous, imbricate before flowering, 1⅛ in. long to extremity of mucro by 1$\frac{1}{16}$ in. wide, broadly ovate with a slender mucro about $\frac{1}{10}$ in. long, membranous, veined, pubescent and ciliate, deciduous ; pedicels short, decurved. Fruiting calyx often tinged with purple, reaching nearly ⅜ in. long with white hairs outside and a ring of white hairs in the throat ; upper lip ovate, acutely acuminate, entire, veined, slightly longer than the lower ; lower lip of 4 subequal narrowly triangular subulately pointed teeth. Corolla pale-purple or blue, nearly ¾ in. long ; tube bent nearly at a right angle, the mouth oblique ; upper lip short, erect, with 4 shallow rounded lobes ; lower lip stipitately narrowed into a neck at the base ⅛ in. long, boat-shaped and curved upwards so that the boat-shaped portion projects horizontally beyond the narrow neck. Filaments combined into a sheath at the base. Nutlets globose, $\frac{1}{16}$ in. in diam. smooth, nearly black. Fl. B. I. v. 4, p. 625 ; Grah. Cat. p. 148 ; Dalz. & Gibs. p. 205 ; Wight, Icon. t. 1432 ; Trim. Fl. Ceyl. v. 3, p. 373 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Prain, Beng. Pl. p. 846 ; Watt, Dict. Econ. Prod. v. 2, p. 504.—Flowers : Sept. VERN. *Main-mul* ; *Garmar.*

KONKAN : *Stocks* ! ; Karanja hills, *Dalzall & Gibson* ; Dapoli, *Nairne.* DECCAN : *Dalzell & Gibson* ; Máwal, *Woodrow* ; Rajwade, *Cooke* ! ; Purandhar, *Kanitkar* ! S. M. COUNTRY : Belgaum, *Ritchie,* 549 ! ; Gokak, *Kanitkar* ! GUJARAT : *Graham, Woodrow.*—DISTRIB. India (subtropical Himalaya, Behar, W. Peninsula) ; Ceylon, Tropical Africa.

Sometimes cultivated for the roots which are pickled and eaten.

2. **Coleus spicatus,** *Benth. in Wall. Pl. As. Rar.* v. 2 (1831) p. 15. A perennial herb 6—12 in. high ; stems ascending, simple

or branched, quadrangular, clothed with long, soft hairs. Leaves sessile or shortly petiolate, 1—2 by ½—1 in., obovate, fleshy, entire or crenate, pubescent on both sides, narrowed at the base. Flowers in long dense spicate woolly racemes, the whorls closely approximate at flowering time, separating a little in fruit; bracts ¼ in. long, broadly ovate or suborbicular, thinly membranous, very shortly mucronate, veined; flowering pedicels $\frac{1}{16}$ in. long. Calyx ⅛ in. long, woolly outside and with a ring of hairs in the throat; upper lip shorter than the lower, orbicular, scarcely mucronate, ciliate; lower lip with 4 triangular acute ciliate teeth. Corolla exceeding ½ in. long, slender; tube bent downwards almost at a right angle; upper lip broadly obovate, rounded, 4-lobed, the 2 middle lobes broader than the 2 lateral ones; lower lip ¼ in. long, stipitately narrowed into a neck at the base, boat-shaped beyond the neck and curved upwards so that the boat-shaped part is nearly horizontal. Filaments connate into a sheath below. Style with 2 acute rather deep lobes. Nutlets subglobose, $\frac{1}{20}$ in. in diam., smooth, shining, black when ripe. Fl. B. I. v. 4, p. 624; Wight, Icon. t. 1431; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361. *Coleus Zatarhendi*, Dalz. & Gibs. p. 206; ? Benth. Lab. p. 50.—Flowers: Nov.—Jan.

Rare. KONKAN: sandy shores, N. of Bassein, *Dalzell & Gibson, Woodrow*. DECCAN: Lena near Nasik, *Nairne*; Gokak on rocks, *Ritchie*, 1983!, *Woodrow*. —DISTRIB. India (W. Peninsula).

Coleus amboinicus, Lour. Fl. Cochinch. v. 2 (1790) p. 372. A plant known as *Indian Borage* from its use in flavoring "cooling cups," with thick succulent aromatic leaves and a pale purple corolla, is grown everywhere in gardens, but is nowhere indigenous in the Bombay Presidency. *Coleus aromaticus*, Benth. in Wall. Pl. As. Rar. v. 2 (1831) p. 15; Grah. Cat. p. 148; Dalz. & Gibs. Suppl. p. 66; Hook. f. Fl. B. I. v. 4, p. 625; Trim. Fl. Ceyl. v. 3, p. 374; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361; Prain, Beng. Pl. p. 846; Watt, Dict. Econ. Prod. v. 2, p. 503.—VERN. *Pánáchaonva; Patharchur*.

Coleus Blumei, Benth. Lab. Gen. & Sp. (1833) p. 56. Of this species, a native of Java, most of the almost innumerable forms of *Coleus* grown for decorative purposes are varieties. The self-colored and variegated leaves of some of these present magnificent variations of color, and the plants, which are easily grown from cuttings, are much used as ornamental pot-plants throughout India. A very fine variety with velvety crimson leaves is *C. Verschaffelttii*, perhaps a distinct species. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361.

9. **ANISOCHILUS**, Wall.

Herbs or undershrubs. Flowers small, in dense oblong 4-angled or cylindric spikes; bracts caducous. Calyx suberect, inflated below the middle, 2-lipped or 5-toothed (rarely 1-lipped); upper lip entire and deflexed, or short and minutely 3-lobed; lower lip short, truncate

obscurely toothed or 0. Corolla 2-lipped; tube slender below, inflated at the throat; upper lip short, entire or 3—4-fid; lower elongate, concave. Stamens 4, didynamous, declinate; filaments free. Disk lobed. Ovary 4-partite; style 2-fid at the apex. Fruit of 4 ovoid or suborbicular smooth dry nutlets; basal scar small.—DISTRIB. Species 16, chiefly East Indian.

Upper lip of fruiting calyx concealing the mouth of the calyx; leaves opposite, petiolate..... 1. *A. carnosus.*
Upper lip of fruiting calyx not concealing the mouth of the calyx; leaves usually verticillate, sessile..... 2. *A. verticillatus.*

1. **Anisochilus carnosus,** *Wall. Pl. As. Rar.* v. 2 (1831) p. 18. Annual, erect, 1—2 ft. high; stem stout, bluntly quadrangular, glabrous or finely pubescent, often tinged with red. Leaves 1—2½ by ½—1⅝ in., broadly ovate, obtuse, crenate, somewhat fleshy, glabrous or slightly pubescent above, usually pubescent beneath, base subcordate or rounded; petioles ½—1¼ in. long. Flowers sessile, in dense ultimately cylindric spikes ½—1½ in. long, elongating in fruit; peduncles long, slender; bracts ⅛ in. long, broadly ovate, acuminate, pubescent and glandular, ciliate, veined, caducous. Calyx pubescent, ⅛ in. long in flower, sometimes ¼ in. long in fruit; upper lip in fruit ovate-lanceolate, acute, ciliolate, decurved over the lower lip and closing the calyx-mouth; lower lip truncate, the tip very membranous, ciliate, turned back and appressed on the tube by the pressure of the upper lip. Corolla pale-purple, ⅜ in. long, pubescent outside; tube narrow below, inflated above; upper lip short, erect, with very shallow rounded lobes; lower lip ⅛ in. long, concave. Nutlets $\frac{1}{20}$ in. in diam., suborbicular, compressed, smooth, polished, brown. Fl. B. I. v. 4, p. 627; Grah. Cat. p. 148; Dalz. & Gibs. p. 206; Wight, Ill. t. 176 b, fig. 1; Trim. Fl. Ceyl. v. 3, p. 376; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361; Prain, Beng. Pl. p. 847; Watt, Dict. Econ. Prod. v. 1, p. 254.—Flowers: Sept.—Oct. VERN. *Charonvá; Káparli; Pánjiri.*

DECCAN: Máwal, *Woodrow*; Junnar, *Kanitkar*! S. M. COUNTRY: Belgaum, *Cooke*!, *Ritchie*, 1984!—DISTRIB. India (W. Himalaya, Bengal, Central India, W. Peninsula); Ceylon, Ava.

VAR. *eriocephalus.* More slender; heads more numerous; calyx villous and glandular. *Anisochilus eriocephalus* (sp.), Benth. in DC. Prodr. v. 12, p. 81; Hook. f. Fl. B. I. v. 4, p. 627; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361. *A. decussatus,* Dalz. in Dalz. & Gibs. Bo. Fl. p. 206.

KONKAN: Ghâts, *Woodrow*; on the highest Ghâts opposite Bombay in rocky places, *Dalzell & Gibson.* DECCAN: Lena near Nasik, *Nairne.*

2. **Anisochilus verticillatus,** *Hook. f. Fl. B. I.* v. 4 (1885) p. 629. An erect herb 1½—3 ft. high; stem simple, silky-villous, deeply grooved, stout. Leaves usually in close whorls of 4—6 (rarely in opposite pairs), sessile, 1½—3½ by ¼—⅝ in., smaller upwards, oblong-lanceolate, subacute, entire or crenulate, densely silky-villous on both sides, base narrowed. Flowers sessile in dense pedunculate cylindric spikes 3—9 in. long; bracts ⅜ in. long, lanceolate, very acute, pubescent, conspicuous on the young spikes. Fruiting calyx

⅛ in. long, shortly cylindric, densely pubescent and glandular ; tube reflexed about the middle ; upper lip short, truncate or sometimes shortly and bluntly acuminate, not concealing the lower lip ; lower lip truncate, obscurely toothed. Corolla exceeding ⅜ in. long, pale-blue, pubescent and glandular ; tube deflexed, ¼ in. long ; upper lip broadly ovate or suborbicular, ⅛ in. long, with 4 shallow obtuse lobes ; lower lip longer than the upper, concave. Nutlets $\frac{1}{20}$ in. in diam., suborbicular, compressed, smooth, polished, brown.—Flowers : Oct.

Dalzell without locality in Herb. Kew.! DECCAN : Mahableshwar, *Cooke*! S. M. COUNTRY : Cheeta hill, Belgaum, *Ritchie*, 546! ; Párva Ghát, *Ritchie*, 1985!—DISTRIB. India (W. Peninsula).

UNKNOWN SPECIES.

ANISOCHILUS ADENANTHUS, Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 206. Spikes dense, pyramidal; floral leaves lanceolate, acuminate, pubescent, 3-nerved, 3 lines long; calyx minute, oblique, truncate, scarcely toothed, tomentose on the outside; corolla glandular-dotted, 5 lines long, tomentose outside, lower lip long, entire, boat-shaped, upper 3—4-lobed, rounded, obtuse, short.

The above is the description in Dalzell & Gibson's Bombay Flora (*l. c.*). There are no specimens in Dalzell's herbarium in Herb. Kew., and as Dalzell states that part of his specimens had been lost, there does not seem any likelihood of finding out what plant is meant. The habitat is given near Dharwar (S. M. Country). It may perhaps be *Anisochilus verticillatus*, Hook. f., which has been found in the S. M. Country.

10. LAVANDULA, Linn.

Herbs or shrubs. Leaves incised or entire. Flowers in 2—10-flowered whorls collected in simple or branched spikes ; bracts persistent. Calyx erect, ovoid-tubular, shortly equally 5-toothed, reflexed about the middle ; upper lip short, truncate or sometimes shortly and bluntly acuminate, not concealing the lower lip ; lower lip truncate, obscurely toothed. Corolla exceeding ⅜ in. long, pale-blue, pubescent and glandular ; tube deflexed, ¼ in. long ; upper lip broadly ovate or suborbicular, ⅛ in. long, with 4 shallow obtuse lobes ; lower lip longer than the upper, concave. Nutlets $\frac{1}{20}$ in. in diam., suborbicular, compressed, smooth, polished, brown.—Flowers : Oct.

Dalzell without locality in Herb. Kew.! DECCAN : Mahableshwar, *Cooke*! S. M. COUNTRY : Cheeta hill, Belgaum, *Ritchie*, 546! ; Párva Ghát, *Ritchie*, 1985!—DISTRIB. India (W. Peninsula).

UNKNOWN SPECIES.

ANISOCHILUS ADENANTHUS, Dalz. in Dalz. & Gibs. Bo. Fl. (1861) p. 206. Spikes dense, pyramidal; floral leaves lanceolate, acuminate, pubescent, 3-nerved, 3 lines long; calyx minute, oblique, truncate, scarcely toothed, tomentose on the outside; corolla glandular-dotted, 5 lines long, tomentose outside, lower lip long, entire, boat-shaped, upper 3—4-lobed, rounded, obtuse, short.

The above is the description in Dalzell & Gibson's Bombay Flora (*l. c.*). There are no specimens in Dalzell's herbarium in Herb. Kew., and as Dalzell states that part of his specimens had been lost, there does not seem any likelihood of finding out what plant is meant. The habitat is given near Dharwar (S. M. Country). It may perhaps be *Anisochilus verticillatus*, Hook.

long, ovate or obovate-oblong, acuminate, strongly parallel-nerved, pubescent, ciliate, persistent, each with a single flower in its axil. Fruiting calyx villous, tubular, rather more than ¼ in. long, 15-ribbed; teeth equal, lanceolate, acute, ciliate. Corolla ½ in. long; tube ⅛ in. long, very slender below, slightly dilated above; upper lip oblong with 2 short obtuse lobes; lower lip 3-lobed, the middle lobe much longer and broader than the oblong obtuse lateral ones. Nutlets 1/12 by 1/16 in., ellipsoid-oblong, smooth, mucilaginous when wetted, black when ripe, with a large white oblong areole on the dorsal side. Fl. B. I. v. 4, p. 631; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361. *Lavandula Perrottetii,* Benth. in DC. Prodr. v. 12 (1848) p. 147; Dalz. & Gibs. p. 206. *L. Lawii,* Wight, Icon. t. 1439.—Flowers: Nov.—Apr. VERN. *Nivale.*

KONKAN: *Stocks!* DECCAN: Ghâts on the road from Poona to Mahableshwar, *H. M. Birdwood;* Fort of Pandughar, *Graham;* hills near Poona, *Woodrow!*; Panchgani, *Cooke!*; Kartriz Ghât, *Kanitkar!*; hills at Sattara, *Wight,* 149!, *Dalzell & Gibson.*—DISTRIB. India (W. Peninsula).

2. **Lavandula Burmanni,** *Benth. Lab. Gen. & Sp.* (1833) p. 151. A slender erect herb; stems simple or branched, leafy, quadrangular, finely pubescent. Leaves sessile or nearly so, 1½—4 in. long and as broad as long, pinnatipartite or very deeply pinnatisect, the lobes linear, entire, cut or toothed, obtuse or subacute, 1/16—⅛ in. broad (rarely broader), glabrous or pubescent above, pale and pubescent beneath. Flowers in spikes which are simple or with few or many branches, sometimes umbellately arranged; bracts finely pubescent, persistent, ¼—⅓ in. long with a short, broadly-ovate, strongly nerved base, produced into a long capillary awn at the apex. Fruiting calyx ⅓ in. long, tubular, slightly curved, clothed with fine hoary pubescence; teeth equal, lanceolate, acute, with penicillate tips. Corolla blue or white, pubescent outside, exceeding ½ in. long; tube ⅓ in. long, the lower half very slender, the upper half slightly dilated; upper lip ⅛ in. long, oblong; with 2 short rounded lobes; lower lip 5-partite, the middle lobe oblong, rounded, more than twice as long as the ovate obtuse lateral lobes. Nutlets 1/12 by 1/20 in., oblong-ellipsoid, smooth, very mucilaginous when wetted, black when ripe, with a large white oblong areole on the dorsal side. Fl. B. I. v. 4, p. 631; Grah. Cat. p. 149; Dalz. & Gibs. p. 207; Wight, Icon. t. 1438; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361; Prain, Beng. Pl. p. 848.—Flowers: Oct.—Nov. VERN. *Ghodeghui*; *Gorea.*

KONKAN: *Stocks!*; Salsette, *Law!* DECCAN: common, *Graham*; Deccan hills, *Cooke!*, *Woodrow!*; Khandesh, *Kanitkar!*—DISTRIB. India (Chota Nagpur, Jubbulpore, W. Peninsula).

Lavandula Stœchas, Linn. Sp. Pl. (1753) p. 573. A shrub 2—3 ft. high with oblong-linear entire glaucous leaves with revolute margins, and dark-purple flowers in dense spikes, a native of the Mediterranean regions, has been grown in gardens in Blegaum and Dharwar, where it is said to have been introduced from the Cape of Good Hope.

Though not grown for economic purposes in the Bombay Presidency, the dried plants and flowers are employed in native medicine and are largely imported into Bombay from the Persian Gulf. Grah. Cat. p. 149 ; Dalz. & Gibs. Suppl. p. 66 ; Watt, Dict. Econ. Prod. v. 4, p. 595.

Lavandula vera, DC., the *True Lavender*, so well known in English gardens, does not flourish in Bombay, where it sometimes drags out a sickly existence as a pot-plant about bungalows. Dalz. & Gibs. Suppl. p. 66 ; Watt, Dict. Econ. Prod. v. 4, p. 596.

11. **POGOSTEMON**, Desf.

Herbs or undershrubs. Leaves opposite (rarely ternate). Flowers small, in simple or panicled spikes or contracted racemes formed of many dense-flowered subcapitate cymes (whorls). Calyx subequally 5-toothed. Corolla 2-lipped, 4-lobed ; upper lip 3-lobed, the middle lobe often longer and narrower than the lateral ones ; lower lip flat, spreading, narrow, entire. Stamens 4, exserted, subequal, straight or declinate ; filaments usually bearded ; anther-cells confluent. Ovary 4-partite ; style shortly 2-fid, the lobes equal, subulate. Fruit of 4 smooth ovoid or ellipsoid dry nutlets, one of the faces often angled.—DISTRIB. India and E. Asia ; species about 30.

Opposite pairs of leaves very unequal; bracts obliquely ovate or suborbicular, imbricate	1. *P. paniculatus.*
Opposite pairs of leaves not very unequal.	
Stems glabrous or nearly so, smooth and shining; leaves with an odor of black currants	2. *P. parviflorus.*
Stems hoary-pubescent or villous.	
Calyx-teeth short	3. *P. plectranthoides.*
Calyx-teeth nearly as long as the tube	4. *P. purpurascens.*

1. **Pogostemon paniculatus,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 30. An erect branched herb 2—4 ft. high ; stems slender, hairy. Leaves usually in unequal opposite pairs, one of them smaller than the other, thinly membranous, 1—5 by ½—3 in., ovate, irregularly inciso-serrate, hairy with appressed hairs on both sides, reticulately veined, base cuneate ; petioles ⅛—¾ in. long. Flowers in axillary and terminal interrupted slender spikes 4—8 in. long, forming a paniculate inflorescence ; whorls globose, distant in the lower part of the spike, becoming closer near the top, secund ; bracts ¼ by ⅛ in., thin, broadly obliquely ovate, or suborbicular, subacute, membranous, arranged in an imbricate series, veined, pubescent and ciliate. Calyx ⅛ in. long, narrowly tubular, pubescent ; teeth lanceolate, acute, equal. Corolla ⅛—⅓ in. long ; tube very slender. Filaments bearded. Nutlets $\frac{1}{20}$ in. long, broadly ovoid, smooth. Fl. B. I. v. 4, p. 631 ; Grah. Cat. p. 149 ; Dalz. & Gibs. p. 207 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361.—Flowers : Dec.

Rare. KONKAN : *Stocks* !; S. Konkan, *Graham, Dalzell & Gibson.* KANARA : Halyál (N. Kanara), *Woodrow.*—DISTRIB. India (W. Peninsula, Birma).

2. **Pogostemon parviflorus,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 31. Suffruticose, 4—6 ft. high ; stem and branches obtusely quadrangular, usually purple, smooth and shining or sometimes slightly pubescent. Leaves with a strong odor of black currants when bruised, 3—7 by 1½—3½ in., broadly ovate, acute or acuminate, coarsely and irregularly doubly-toothed, glabrous or slightly pubescent, base cuneate ; petioles ⅝—2 in. long. Flowers in dense pubescent spikes forming pyramidal lax panicles ; whorls many-flowered, usually close ; bracts pubescent and ciliate, the outer ¼ in. long, foliaceous, ovate, acute, the inner membranous, linear-lanceolate, often subfalcate, about equalling the calyx. Calyx ⅛ in. long, glandular and pubescent ; tube pentagonal ; teeth $\frac{1}{20}$ in. long, lanceolate. Corolla-tube ⅛ in. long ; upper lip white, shot with purple, 3-lobed, the middle lobe oblong, rounded, longer and narrower than the 2 rounded lateral ones ; lower lip entire, white. Stamens exserted ; filaments purple except just below the anthers, where they are white, bearded with purple hairs. Style purple, the tips of the apical lobes usually white. Nutlets $\frac{1}{30}$ in. long, ellipsoid, the inner face angular, the dorsal face rounded, smooth and shining, black. Fl. B. I. v. 4, p. 632 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Prain, Beng. Pl. p. 849 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 306. *Pogostemon frutescens,* Grah. Cat. p. 149. *P. purpuricaulis,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 336 ; Dalz. & Gibs. p. 207.—Flowers : Dec.—Feb. VERN. *Pángli.*

KONKAN : hilly parts pretty common, *Dalzell & Gibson.* DECCAN : Igatpuri, *Graham* ; Khandala, *Cooke* ! ; Mahableshwar, abundant, *Cooke* ! S. M. COUNTRY : Belgaum, *Ritchie,* 543 ! ; Rámghát, *Ritchie,* 543 ! KANARA : Sulgeri, *Woodrow.*—DISTRIB. More or less throughout India.

In the Ratnagiri district the root taken internally and applied as a paste to the wound has been long in use as a remedy for the bite of the poisonous snake *Phursa (Echis carinata),* and apparently with marked success. A full description of cases treated by several surgeons at Ratnagiri is given by Dr. Dymock in the Journal of the Bombay Natural History Society, vol. 6 (1891) pp. 450—457.

3. **Pogostemon plectranthoides,** *Desf. in Mem. Mus. Par.* v. 2 (1815) p. 155, t. 6 (*plectrantoides*). A large branched erect bush ; branches round or subquadrangular, the young ones hoary-pubescent, often dark-purple. Leaves 2—5 by 1¼—2¾ in., ovate, acute, doubly serrate, pubescent or nearly glabrous, base rounded or cuneate ; petioles ½—1¼ in. long. Flowers in dense hoary-pubescent or villous terminal and axillary stout spikes forming a paniculate inflorescence ; whorls many-flowered, close ; bracts reaching ⅓ in. long, foliaceous, broadly ovate, acute, pubescent and ciliate, enclosing a fascicle of sessile flowers intermingled with membranous bracteoles of various sizes, mostly linear-lanceolate, often tinged with purple. Calyx ⅛—⅓ in. long, slightly obconic, pubescent and glandular, often tinged with purple at the apex ; teeth lanceolate, acute, ciliate. Corolla ⅓ in. long, pink or white ; tube slender, ⅛ in. long, cylindric ; upper lip ⅛ in. long, 3-lobed, the middle lobe narrow, linear, obtuse, longer than the 2 short broad obtuse lateral lobes ; lower lip narrow, $\frac{1}{10}$—⅛ in. long, ovate-oblong, obtuse, entire. Stamens much exserted ; filaments bearded. Nutlets $\frac{1}{30}$ in. long, broadly ellipsoid,

the inner face angular, the dorsal face rounded, smooth, shining, brown-black when ripe. Fl. B. I. v. 4, p. 632 ; Dalz. & Gibs. p. 207 ; Bot. Mag. t. 3238 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Prain, Beng. Pl. p. 849.—Flowers : Jan.—Feb.

Dalzell without locality in Herb. Kew. KONKAN : *Stocks* !, *Law* ! DECCAN : Poona, *Ranade* !, *Woodrow*. KANARA : Sulgeri (N. Kanara), *Talbot*, 274 ! GUJARAT : Chikli (Surat Collectorate), *Dalzell & Gibson*.—DISTRIB. India (W. Himalaya, Lower Bengal, Behar, W. Peninsula).

4. **Pogostemon purpurascens,** *Dalz. in Kew Journ. Bot.* v. 2 (1850) p. 337. An erect branched herb ; stems and branches quadrangular, furrowed, softly hairy with spreading hairs. Leaves membranous, often tinged with purple, 2½—7 by 1¾—3½ in., ovate, acute, more or less deeply cut, often doubly serrate, softly hairy on both sides, base cuneate ; petioles ½—2 in. long. Flowers in long-pedunculate villous spikes 3—8 in. long ; whorls many-flowered, globose, the upper whorls approximate, the lower usually separate ; bracts ⅛ in. long, oblong-lanceolate, acute, sometimes slightly falcate, pubescent, penicillate at the tip, ciliate, veined. Calyx ⅛ in. long, pubescent ; tube pentagonal ; teeth nearly equalling the tube, lanceolate, acute, 3-nerved, ciliate and with penicillate tips. Corolla ¼ in. long ; tube ⅛—⅛ in. long, white ; upper lip purple with white margin, 3-lobed, the middle lobe oblong, obtuse, longer and narrower than the 2 obtuse lateral ones ; lower lip, white, deltoid-ovate, acute. Stamens bearded. Nutlets $\frac{1}{16}$ in. long, ovoid, compressed, the inner face angular, the dorsal face rounded, smooth, polished, black when ripe. Fl. B. I. v. 4, p. 632 ; Dalz. & Gibs. p. 207 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361.—Flowers : Oct.—Jan.

KONKAN : *Stocks* ! ; *Ritchie*, 541 ! ; shady woods in the Konkan, *Dalzell* ! ; Matheran, *Cooke* ! ; Marmagão, *Cooke* ! ; Viziadrug Fort, *Kanitkar* ! DECCAN : Khandala, *Woodrow* ! KANARA : *Law* ! ; Kála naddi, *Ritchie*, 541 !—DISTRIB. India (W. Peninsula).

Pogostemon Heyneanus, Benth. in Wall. Pl. As. Rar. v. 1 (1830) p. 31. The *Patchouly Plant*, grown in gardens and sometimes found as an escape. Its peculiar odor distinguishes it from *P. parviflorus*, which it much resembles. The dried leaves strewn among woollen cloths are said to keep off insects. Grah. Cat. p. 149 ; Dalz. & Gibs. p. 207 ; Wight, Icon. t. 1440 ; Jackson, Index Kewen. v. 3 (1895) p. 583 ; Trim. Fl. Ceyl. v. 3, p. 378. *Pogostemon Patchouly*, Pellet. in Mém. Soc. Sc. Orléans, v. 5 (1845) p. 277, t. 7 ; Hook. f. Fl. B. I. v. 4, p. 633 (*Patchouli*) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Dalz. & Gibs. Suppl. p. 66 (*Patchowli*).—VERN. *Pách*.

EXCLUDED SPECIES.

POGOSTEMON MOLLIS, Benth. Lab. Gen. & Sp. (1833) p. 155. A low softly tomentoso-villous plant branched from the base; stem ascending; leaves orbicular or oblong, crenate; flowers in cylindric spikes, the upper

whorls approximate, the lower distant; bracts linear-subulate; filaments bearded.

This appears to be a Nilgiri plant growing at high elevations (7000—8000 ft.). A specimen of Dalzell's in Herb. Kew. has no locality marked on the sheet, while the specimen marked "Konkan, Stocks," was not so marked by Stocks, but has merely a printed label on it. The plant has not been found in the Bombay Presidency so far as I know. Fl. B. I. v. 4, p. 635. *Pogostemon rotundatus*, Wight, Icon. t. 1441 (*not* of Benth.).

12. **DYSOPHYLLA,** Blume.

Herbs or undershrubs. Leaves opposite or whorled. Flowers minute, in very dense long spikes of many whorled cymes. Calyx minute, ovoid, equally 5-toothed; throat naked within. Corolla small, equally 4-fid; tube included or exserted; upper lobe entire or 2-fid; lower lobes somewhat spreading. Stamens 4, exserted, subequal or slightly unequal, straight or subdeclinate; filaments bearded; anther-cells confluent. Disk equal, subentire. Ovary 4-partite; style 2-fid, the lobes subulate, equal. Fruit of 4 (rarely 1) ovoid or oblong, smooth or rough dry nutlets: basal scar small.—DISTRIB. Tropical Asia and Australia; species about 12.

Leaves opposite.	
Bracts $\frac{1}{20}$ in. long, linear-oblong; corolla-tube included calyx-teeth erect, shorter than the tube...	1. *D. myosuroides.*
Bracts $\frac{1}{8}$—$\frac{1}{2}$ in. long, lanceolate; corolla-tube exserted.	
Stem and leaves densely clothed with long coarse spreading hairs; leaves with rounded base; calyx-teeth minute, inflexed in fruit.....	2. *D. auricularia.*
Stem and leaves sparsely appressedly hairy; base of leaves very acute; calyx-teeth nearly as long as the tube, erect in fruit.....	3. *D. salicifolia.*
Leaves whorled.	
Calyx not grooved nor ridged; nutlets 4.	
Leaves in whorls of 4.....	4. *D. quadrifolia.*
Leaves in whorls of 5 or more.....	5. *D. stellata.*
Calyx strongly 5-ribbed; nutlet solitary.....	6. *D. Stocksii.*

1. **Dysophylla myosuroides,** *Benth. in Wall, Pl. As. Rar.* v. 1 (1830) p. 30. A much-branched perennial herb 8—15 in. high with a woody rootstock; stem and branches nearly round, woody below, the young ones silky-villous or tomentose. Leaves $\frac{7}{8}$—$1\frac{1}{2}$ by $\frac{1}{8}$—$\frac{3}{8}$ in., nearly sessile, thick, elliptic-oblong, subacute, silky-villous, entire or denticulate, strongly nerved, the nerves conspicuous on both sides. Flowers in long simple or branched continuous dense, shortly-pedunculate tomentose cylindric spikes 1—4 by $\frac{1}{8}$ in.; bracts $\frac{1}{20}$ in. long, linear-oblong, ciliate. Calyx $\frac{1}{20}$—$\frac{1}{16}$ in. long, densely silky; teeth equal, triangular, shorter than the tube, erect in fruit. Corolla red, $\frac{1}{16}$ in. long; tube included; lobes 4, subequal, oblong, rounded. Style-arms subulate. Nutlets ellipsoid, compressed, granulate. Fl. B. I. v. 4, p. 638; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361. *Dysophylla myosuroides,* Dalz. & Gibs. p. 208.—Flowers: Jan.

Stocks !, *Dalzell* !, both without locality in Herb. Kew. DECCAN: Mahableshwar, *Dalzell & Gibson, Woodrow.*—DISTRIB. India (W. Peninsula).

2. **Dysophylla auricularia,** *Blume, Bijdr.* (1826) p. 826. A coarse annual 1—2 ft. high; stems erect, much-branched, quadran-

gular, densely clothed with long coarse spreading hairs. Leaves opposite, shortly petiolate, 1—2½ by ½—1 in. elliptic-oblong, subacute, serrate, hairy on both sides, base rounded. Flowers shortly pedicellate, in spicate racemes 2—4 by ⅛—⅓ in.; bracts ⅛ in. long, lanceolate, acute, usually shortly stalked, densely ciliate with long hairs. Calyx scarcely $\frac{1}{20}$ in. long; teeth minute, triangular, acute, inflexed in fruit. Corolla less than ⅛ in. long, pale-lilac; tube exserted; lobes ovate, acute, hairy at the back. Nutlets about $\frac{1}{16}$ in. long, broadly ellipsoid, smooth, the inner face slightly angular, the dorsal face rounded. Fl. B. I. v. 4, p. 638; Grah. Cat. p. 150?; Wight, Icon. t. 1445; Trim. Fl. Ceyl. v. 3, p. 380; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361; Prain, Beng. Pl. p. 849.

KONKAN: *Stocks*!

There is but one sheet in Herb. Kew. marked as above with a printed ticket; otherwise I have seen no specimens from Bombay. Woodrow in his list gives "Belgaum, *Ritchie*," but I have seen no specimens from Belgaum. Graham gives "hills about Goa," but it is doubtful if Graham's plant is *D. auricularia;* it is more probably *D. salicifolia* which is common in watercourses at Mahableshwar which he also assigns as a habitat of his *D. auricularia.*—DISTRIB. India (Sikkim, Assam, E. Bengal, W. Peninsula); Ceylon, China, Borneo, Philippines.

3. **Dysophylla salicifolia,** *Dalz. MS. ex Hook. f. Fl. B. I.* v. 4 (1885) p. 638. Erect, much-branched, 1—2 ft. high; stem and branches round or subquadrangular, reddish, the younger sparsely appressedly hairy. Leaves 1—3½ by ⅛—½ in., lanceolate, acute, entire or distantly serrate, appressedly hairy when young, gland-dotted, base very acute, running down into the petiole which is often obscure. Flowers in dense shortly pedunculate villous spikes 1—3 in. long; bracts ⅛—⅓ in. long; narrowly lanceolate, acute, hairy. Calyx $\frac{1}{12}$—$\frac{1}{10}$ in. long, hairy; teeth triangular, equal, nearly as long as the tube. Corolla scarcely ⅛ in. long, purple; tube slightly exserted; lobes subequal, oblong, obtuse. Nutlets $\frac{1}{30}$ in. long, ellipsoid, smooth, the inner face slightly angular, the dorsal face rounded. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361.—Flowers: Jan.—Apr.

DECCAN: abundant at Mahableshwar in watercourses, *Cooke*!, *Law*!; *Woodrow*. S. M. COUNTRY: Hingregi watercourse, Belgaum, *Ritchie*, 1990!—DISTRIB. India (W. Peninsula)

4. **Dysophylla quadrifolia,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 30. A stout erect undershrub with an odor of camphor, 2—4 ft. high; rootstock woody; stems not much branched, round, pubescent or tomentose. Leaves 4 in a whorl, 1—4 by ⅛—⅓ in., shortly petiolate, linear-oblong or linear-lanceolate, acute or subobtuse, usually serrate, softly pubescent on both sides, base narrowed. Flowers in dense tomentose or pubescent spikes 3—6 by ⅛—⅓ in., sometimes interrupted near the base; bracts $\frac{1}{12}$ in. long, linear-spathulate, hairy. Calyx obconic, $\frac{1}{16}$ in. long, pubescent; teeth about ½ as long as the tube, triangular, ciliate. Corolla ⅛ in. long, rose-colored; tube $\frac{1}{16}$ in. long; lobes oblong, obtuse. Nutlets $\frac{1}{10}$ in. long, broadly ellipsoid or subglobose, microscopically papillosorugulose, black. Fl. B. I. v. 4, p. 639; Woodr. in Journ. Bomb.

Nat. v. 12 (1899) p. 361 ; Prain, Beng. Pl. p. 850. *Dysophylla rupestris*, Dalz. in Kew Journ. Bot. v. 3 (1851) p. 120 ; Dalz. & Gibs. p. 208.

Stocks without locality in Herb. Kew.! KONKAN : Malwán on rocks, *Dalzell*! ; near Vingorla, *Dalzell & Gibson*.—DISTRIB. India (Assam, Birma, Chittagong, W. Peninsula).

5. **Dysophylla stellata,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 30. A low herb ; stems numerous, erect, 3—8 in. long, simple or branched, leafy and with short internodes from a creeping rootstock. Leaves many in a whorl, sessile, $\frac{1}{6}$—$\frac{3}{8}$ by $\frac{1}{30}$—$\frac{1}{16}$ in., linear, subacute, more or less pubescent, entire, with revolute margins and a strong midnerve, base obtuse. Flowers sessile, in dense pubescent or tomentose spikes 1—2½ by $\frac{1}{6}$ in.; bracts persistent after the fruit falls, $\frac{1}{10}$—$\frac{1}{8}$ in. long, consisting of a lanceolate acute blade $\frac{1}{20}$—$\frac{1}{16}$ in. long, bent at an angle where it joins the stalk, ciliate and terminated at the apex by 2 or 3 transparent bristles, the blade on a filiform pubescent stalk about as long as the blade. Calyx $\frac{1}{20}$—$\frac{1}{16}$ in. long, subhemispheric or campanulate, pubescent ; teeth triangular, erect or slightly inflexed, more than $\frac{1}{2}$ as long as the tube. Corolla $\frac{1}{12}$ in. long ; tube $\frac{1}{20}$ in. long ; lobes ovate-oblong, obtuse, hairy outside. Stamens much exserted, bearded with purple hairs. Nutlets ellipsoid, $\frac{1}{30}$ in. long and $\frac{1}{2}$ as broad as long, smooth, yellowish-brown. Fl. B. I. v. 4, p. 640 ; Grah. Cat. p. 150 ; Dalz. & Gibs. p. 209 ; Woodr. in. Journ. Bomb. Nat. v. 12 (1899) p. 361.—Flowers : Nov.—Jan.

KONKAN : *Law*! S. M. COUNTRY : Belgaum in great abundance in ricefields, *Law* ex *Graham, Ritchie*, 1989! KANARA : *Thomson*!—DISTRIB. India (W. Peninsula).

VAR. 1. *tomentosa*. Stout, erect, 10—12 in. high, branched, pubescent with long hairs ; internodes very short ; bracts reaching $\frac{1}{8}$ in. long exactly as in *D. stellata* ; calyx subcampanulate.

Dalzell describes the bracts as conform with the leaves which is incorrect. *Dysophylla tomentosa* (sp.), Dalz. in Kew Journ. Bot. v. 2 (1850) p. 337 ; Dalz. & Gibs. p. 208 ; Hook. f. Fl. B. I. v. 4, p. 641 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361.—Flowers : Dec.

KONKAN : Malwán in ricefields between Deoghar and Viziadrug, *Dalzell*!

VAR. 2. *gracilis*. A tall form ; stem 1—3 ft. high, sometimes as thick as a swan's quill ; leaves ¼—½ in. long, 5—20 in a whorl, entire ; spikes 1—2 by $\frac{1}{6}$ in. ; bracts exactly as in *D. stellata*, the lanceolate blade $\frac{1}{20}$ in. long ; calyx $\frac{1}{16}$ in. long, hemispheric, the teeth erect or slightly inflexed ; corolla $\frac{1}{10}$ in. long. The bracts sometimes appear filiform in consequence of the blade having broken off when the filiform stalks only are left. Dalzell describes the bracts as linear-acute, which is not the case in all specimens of his which I have examined. *Dysophylla gracilis* (sp.), Dalz. in Kew Journ. Bot. v. 2 (1850) p. 337 ; Dalz. & Gibs. p. 208 ; Hook. f. Fl. B. I. v. 4, p. 641 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361. *D. erecta* (sp.), Dalz. in Kew Journ. Bot. v. 2 (1850) p. 337 ; Dalz.

& Gibs. p. 208 ; Hook. f. Fl. B. I. v. 4, p. 641 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361.—Flowers : Nov.—Jan.

DECCAN : Phonda Ghát, *Dalzell* ! ; Gogve, west of Kolhapur, *Kanitkar* ! ; Mahableshwar, *Cooke* ! ; hills near Junnar, *Bhiva* !

6. **Dysophylla Stocksii,** *Hook. f. Fl. B. I.* v. 4 (1885) p. 642. Stout, erect, nearly glabrous ; stem as thick as a goose-quill, decumbent below ; branches suberect. Leaves 9—20 in a whorl, $\frac{1}{3}$—$\frac{2}{3}$ by $\frac{1}{12}$—$\frac{1}{10}$ in., narrowly linear, obtuse, with recurved margins, glabrous or nearly so. Flowers in dense slender spikes 2—3 by $\frac{1}{8}$—$\frac{1}{4}$ in.; rhachis hairy ; bracts with a clavate head on a filiform stalk, longer than the calyx. Calyx in flower less than $\frac{1}{20}$ in. long with triangular obtuse lobes nearly equalling the tube, in fruit $\frac{1}{16}$ in. long completely enclosing the solitary nutlet, strongly 5-ribbed, pubescent. Corolla $\frac{1}{12}$ in. long ; lobes obtuse, nearly glabrous on the back. Nutlets $\frac{1}{16}$ by $\frac{1}{10}$ in., narrowly oblong-ellipsoid, smooth, shining, brown. Woodr in Journ. Bomb. Nat. v. 12 (1899) p. 361.

KONKAN : *Stocks* !

13. COLEBROOKEA, Sm.

A densely hoary or woolly shrub. Leaves opposite or ternate, petiolate, rugose, oblong-lanceolate, crenulate. Flowers small ; whorl dense-flowered in paniculate spikes ; bracteoles connate. Calyx-tube very short ; teeth long, subulate, ultimately elongate, capillary and plumose. Corolla small ; tube very short ; lobes 4, subequal. Stamens 4, very short, included, equal, distant ; anthers orbicular, the cells confluent. Disk uniform. Ovary 4-partite ; style 2-fid, the lobes subulate. Fruit of 1 or 4 obovoid dry nutlets with hairy tips ; basal scar small.—DISTRIB. More or less throughout India on low hills ; species 1.

1. **Colebrookea oppositifolia,** *Sm. Exot. Bot.* v. 2 (1805—07) p. 111, t. 115. A functionally dicœcious much-branched shrub 4—10 ft. high ; trunk stout, light-colored ; branches pale, subquadrangular, usually verticillate in threes, grooved ; young shoots downy. Leaves light-green, crowded towards the ends of the branches, opposite or verticillate in threes, 4—6 by $\frac{7}{8}$—$1\frac{3}{4}$ in., oblong-lanceolate, acute, crenulate or serrulate, softly pubescent on both sides base acute ; petioles $\frac{3}{8}$—1 in. long. Flowers numerous, in paniculate often ternately arranged spikes 2—4 in. long by $\frac{1}{4}$ in. in diam. in flower, reaching $\frac{1}{2}$ in. in diam. or more in fruit ; bracts $\frac{1}{16}$ in. long, solitary, linear, pubescent ; bracteoles several, $\frac{1}{12}$ in. long, connate at the base into a whorl. Calyx in flower $\frac{1}{10}$—$\frac{1}{8}$ in. long, 5-partite almost to the base ; teeth subulate, plumose with white hairs, elongating to nearly $\frac{1}{4}$ in. in fruit when the spikes appear, as aptly described by Graham, like (*Indian*) squirrels' tails. Corolla $\frac{1}{12}$ in. long, white ; upper lobe emarginate. Nutlets $\frac{1}{10}$ in. long, oblong-obovoid, pubescent, usually solitary, hairy at the tip. Fl. B. I. v. 4, p. 642 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Prain, Beng. Pl. p. 851 ; Watt, Dict. Econ. Prod. v. 2, p. 503. *Colebrookea ternifolia,* Roxb. Cor. Pl. v. 3 (1819) p. 40, t. 245 ; Grah.

Cat. p. 150; Dalz. & Gibs. p. 209.—Flowers: Dec.—Apr. VERN. *Bhâman.*

Very common on the Ghâts. KONKAN: *Stocks!*, *Law!*; Konkan hills, *Woodrow!* DECCAN: Parvati hill near Poona, *Devdhar!*; Khandala, *Graham*, *Cooke!*; Karkala, *Kanitkar!*; hills about Pár, *Graham*; Mahableshwar, *Cooke!* S. M. COUNTRY: Castlerock, *Kanitkar!*; Belgaum, *Ritchie*, 130!—DISTRIB. More or less throughout India on low hills.

14. **MICROMERIA,** Benth.

Herbs or undershrubs. Leaves usually small, entire or toothed. Flowers small; whorls few- or many-flowered in axillary or terminal spikes (rarely paniculate). Calyx 13-nerved, 5-toothed or 2-lipped. Corolla 2-lipped; tube straight; upper lip entire or notched, fattish; lower lip spreading, 3-fid. Stamens 4, didynamous, the lower pair longer, ascending, incurved with diverging tips; anther-cells distinct, parallel, at length divergent; connective usually thickened. Ovary 4-lobed; style 2-lobed, the lobes equal or the upper very short the lower recurved, flattened. Fruit of 4 smooth dry ovoid or oblong nutlets; basal scar small.—DISTRIB. Species about 60, in all regions but Australia.

1. **Micromeria capitata,** *Benth. in DC. Prodr.* v. 12 (1848) p. 218. A highly aromatic herb 1—2 ft. high with woody rootstock; stems slender, erect, quadrangular, pubescent, sometimes tinged with purple. Leaves ½—1 by ¼—⅝ in., ovate, subobtuse, pubescent on both sides, gland-dotted, crenate or entire, ciliate; petioles ⅛—¼ in. long. Flowers in verticillate distant cymes in the axils of floral leaves which become smaller upwards, the lower cymes pedunculate, the upper sessile, the whole forming a long spicate raceme; bracts small, linear-lanceolate, pubescent. Calyx in flower $\frac{1}{10}$ in long, hairy and glandular; teeth $\frac{1}{30}$ in. long, lanceolate-subulate, erect, ciliate. Corolla ⅛ in. long, pubescent outside, 2-lipped; upper lip pale-violet almost white, about $\frac{1}{30}$ in. long, oblong, subtruncate, slightly notched; lower lip darker violet, twice as long as the upper, 3-lobed, the lobes spreading, the middle one the largest. Nutlets $\frac{1}{30}$ in. long, ellipsoid, the inner face slightly angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 649; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362; Prain, Beng. Pl. p. 852; Watt, Dict. Econ. Prod. v. 5, p. 244. *Micromeria Malcomiana,* Dalz. ex Dalz. & Gibs. Bo. Fl. (1861) p. 209. *M. piperita*?, Grah. Cat. p. 151 (*not* of Linn.).—Flowers: Apr.—May. VERN. *Karvat.*

Occurs in the Bombay Presidency on the Mahableshwar hills, where it is abundant on the banks of the river Yenna and in the Chinamen's gardens below the bund. DECCAN: Mahableshwar, *Graham*, *Law!*, *Dalzell!*, *Cooke!*, *Woodrow!*—DISTRIB. India (Behar, W. Himalaya, W. Peninsula).

15. **ANISOMELES,** R. Br.

Tall erect branching coarse often villous herbs. Flowers in axillary whorls or lax-flowered branched paniculate cymes. Calyx ovoid or tubular, straight; limb equally 5-toothed, but little en-

larged in fruit. Corolla 2-lipped; tube short, annulate within; upper lip erect, entire, short; lower broad, spreading, 3-lobed, the lateral lobes small, the middle lobe large, 2-fid. Stamens 4, didynamous, exserted, the lower pair the longest; anthers of the upper pair 2-celled, those of the lower pair 1-celled, the cells transverse, parallel. Disk equal. Ovary 4-partite; style 2-fid, the lobes equal, subulate. Fruit of 4 ovoid obtuse dry nutlets; basal scar small.—DISTRIB. Tropical and Subtropical Asia and Australia; species about 8.

Stem and branches acutely quadrangular.
Cymes few-flowered, pedunculate; corolla white; stem glabrous or slightly pubescent; leaves thin, narrowed at the base ..... 1. *A. Heyneana.*
Cymes many-flowered, sessile; corolla pale-purple; stem softly pubescent; leaves rather thick, truncate or rounded at the base ..... 2. *A. ovata.*
Stem and branches obtusely quadrangular; cymes in dense whorls; corolla purple; stem densely woolly; leaves very thick, rounded or shortly cuneate at the base ..... 3. *A. malabarica.*

1. **Anisomeles Heyneana,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 59. A tall erect herb reaching 5 ft. high, glabrous or slightly pubescent; stem and branches slender, acutely quadrangular. Leaves thin, green, 2—5 by ¾—2 in., smaller upwards, ovate-lanceolate, acuminate, crenate-serrate, glabrous or sparsely hairy, narrowed at the base; petioles ¼—1¼ in. long. Flowers subsessile or shortly pedicellate, in pedunculate secund usually few-flowered cymes, the peduncles of the lower cymes reaching nearly 1 in. long, those of the upper cymes much shorter; floral leaves becoming smaller upwards, the uppermost very small; bracts ⅛—⅓ in. long, linear, subobtuse. Calyx in flower reaching ¼—⅓ in. long with a few stiff hairs on the nerves that run into the teeth hairy inside with long slender white hairs and reticulately veined; teeth ⅛ in. long. Calyx in fruit slightly enlarged, pale-brown, becoming glabrous, showing the reticulate venation on the outside. Corolla reaching ¾ in. long, white or greenish-white, the lower lip tinged with pink; tube ⅛ in. long; upper lip ⅛ in. long, oblong, obtuse, entire; lower lip 3-lobed, the lateral lobes small, rounded, the middle lobe very large, deeply 2-fid. Filaments bearded. Nutlets ⅛ in. long, broadly ovoid, obtuse, subcompressed, the inner face slightly angled, the dorsal face rounded, smooth, polished, dark-brown. Fl. B. I. v. 4, p. 672; Dalz. & Gibs. p. 210; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362.—Flowers: Oct.—Nov. VERN. *Chandhára.*

Stocks and *Dalzell* without localities in Herb. Kew.! KONKAN: *Law*!; Bassein, *Kanitkar*!; Matheran, *Cooke*!; S. Konkan, *Ritchie*, 540!; Salsette, common, *Dalzell & Gibson.* DECCAN: Mahableshwar, *Cooke*!, *H. M. Birdwood*; Sinhagad, *Bhiva*!; below Phonda Ghát, *Ritchie*, 540! S. M. COUNTRY: Badami, *Woodrow.*—DISTRIB. India (W. Peninsula).

2. **Anisomeles ovata,** *R. Br. in Ait. Hort. Kew.* ed. 2, v. 3 (1811) p. 364. Suffruticose, 2—5 ft. high, hirsute, pubescent or

tomentose, r[illegible] parsely hairy; stems acutely quadrangular, softly pubescent. Leaves rather thick, 1½—4 by 1—2½ in. (in one specimen from Mahableshwar 5 by 3 in.), ovate, acute, crenate-serrate, softly pubescent on both sides, base truncate, rounded or subcordate, rarely shortly cuneate; petioles ⅝—1½ in. long, densely hairy. Flowers sessile or nearly so, in dense whorls which are distant below but approximated above to form a dense spicate inflorescence; bracts ⅛—⅓ in. long, linear, clothed with long stiff hairs. Calyx ¼ in. long, hirsute with long stiff hairs; teeth lanceolate, acute, nearly as long as the tube, hairy on both sides, ciliate. Corolla ⅝ in. long, light-purple with a deep-blue lower lip; tube ⅛ in. long; upper lip ¼ in. long, oblong, rounded at the apex; lower lip much longer, 3-lobed, the lateral lobes small, rounded, the middle lobe ¼ in. long, deeply divided into 2 oblong lobes ⅛ in. long (making the lower lip 4-lobed). Filaments bearded. Nutlets 1/10 in. long, broadly ovoid with rounded ends, subcompressed, the inner face obtusely angled, the dorsal face rounded, smooth, polished, nearly black when ripe. Fl. B. I. v. 4, p. 672; Grah. Cat. p. 153; Dalz. & Gibs. p. 210; Wight, Icon. t. 865; Trim. Fl. Ceyl. v. 3, p. 384; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362; Prain, Beng. Pl. p. 853; Watt, Dict. Econ. Prod. v. 1, p. 255.—Flowers: Aug.—Oct. VERN. *Gopáli*

Common everywhere, *Dalzell & Gibson*. KONKAN: Matheran, *Cooke*!; Malabar Hill, Bombay, *Graham*. DECCAN: Mahableshwar, *Cooke*!; Sinhagad, *Woodrow*. S. M. COUNTRY: Belgaum, *Ritchie*, 561!, *Stocks*!; Castlerock, *Kanitkar*! GUJARAT: Godra, *Cooke*!; Ankleshwar, *Kanitkar*!—DISTRIB. Throughout India; Ceylon, Malay Archipelago, China, Philippines.

3. **Anisomeles malabarica,** *R. Br. in Bot. Mag.* (1819) t. 2071. Shrubby, erect, 4—6 ft. high, densely tomentose or thickly woolly; stems slightly branched, obtusely quadrangular, clothed with soft white woolly hairs. Leaves very thick, 2½—4 by ¾—1¾ in., oblong-lanceolate, acute, pale above, white below, crenate-serrate, base rounded or shortly cuneate; petioles ½ in. long, stout, softly woolly. Flowers in dense whorls often 1¼ in. in diam., distant below, approximate above, forming a more or less interrupted spicate inflorescence; bracts reaching ½ in. long, linear, acute, densely softly woolly. Calyx ⅜ in. long, densely villous; teeth about ½ as long as the tube, narrowly lanceolate, acute, villous on both sides, ciliate. Corolla purple, ⅞ in. long, slightly pubescent outside; tube ⅓ in. long; upper lip ⅓ in. long, obtuse; lower lip very large and broad, 3-lobed, the lateral lobes small, rounded, the middle lobe deeply divided at the apex into 2 oblong obtuse lobes. Filaments pubescent. Nutlets ⅛—⅙ in. long, ellipsoid, compressed, the inner face slightly angular, the dorsal face rounded, smooth, polished, brown. Fl. B. I. v. 4, p. 673; Grah. Cat. p. 153; Dalz. & Gibs. p. 210; Wight, Icon. t. 864; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362; Watt, Dict. Econ. Prod. v. 1, p. 254.—Flowers: Oct.—Nov. VERN. *Gojibhá.*

Dalzell without locality in Herb. Kew.! *Stocks* without locality in Herb. Kew.! DECCAN: near Pimpalgaon, *Edgeworth*!; Kartriz Ghát, *Cooke*!, *Woodrow*!, *H. M. Birdwood*, *Graham*; Kamatki Ghát, *Law* ex *Graham*. KANARA: *Law*!—DISTRIB. India (W. Peninsula); Penang, Mauritius.

16. SCUTELLARIA, Linn.

Herbs or undershrubs. Inflorescence various. Calyx campanulate, 2-lipped ; lips closed in fruit, at length free to the base, the upper deciduous, furnished on the back with a deciduous scale or pouch, the lower lip persistent. Corolla 2-lipped ; tube long, usually sharply recurved beyond the calyx and ascending, dilated at the throat, not annulate within ; upper lip erect, galeate, entire or notched ; lower lip broad, 3-lobed, the lateral lobes small, often united with the upper lip. Stamens 4, didynamous, the lower longest, ascending under the galeate upper lip ; anthers conniving, ciliate, those of the upper stamens 2-celled, those of the lower 1-celled. Disk elongate. Ovary 4-partite, oblique ; style 2-fid, the upper lobe very short. Fruit of 4 minute subglobose smooth granulate or hispidulous nutlets.—DISTRIB. Widely spread in the N. temperate regions and in mountains in the Tropics ; species about 90.

1. **Scutellaria discolor,** *Coleb. in Wall Pl. As. Rar.* v. 1 (1830) p. 66. Annual, pubescent , stems ascending from a creeping root-stock, 1—2 ft. high, rarely branched, often naked above. Leaves 1½–5 by ¼—3 in (rarely orbicular), often crowded towards the base of the stem, elliptic, obtuse, crenate, pubescent, sometimes purple beneath, base rounded or cordate , petioles 1—3 in. long. Flowers scattered over the pubescent rhachis in slender racemes 2—8 in. long , bracts $\frac{1}{10}$—$\frac{1}{8}$ in long, lanceolate ; pedicels $\frac{1}{10}$ in. long. Calyx in flower ⅛ in long, pubescent. Corolla pale-blue, scarcely pubescent outside, ¼—⅜ in. long ; tube ⅜ in. long, slightly dilated at the throat, sharply recurved near the base ; upper lip galeate, obtuse ; lower lip 3-lobed. Nutlets $\frac{1}{10}$ in. long, scabrid. Fl. B. I. v. 4, p 667 , Dalz & Gibs. p. 210 ; Woodr. in Journ. Bomb Nat. v. 12 (1899) p 362 *Scutellaria indica,* Blume, Bijdr. (1826) p. 839 (*not* of Linn) ; Grah. Cat. p. 152.—Flowers : Sept.—Nov.

DECCAN Mahableshwar, *Gibson ex Graham, H. M. Birdwood.* S. M. COUNTRY . Párva Ghát, *Dalzell & Gibson;* Castlerock, *Cooke* !, *Woodrow* !, *Kanitkar* ! KANARA plentiful, *Dalzell & Gibson*, Kála naddi, *Ritchie,* 1991 !; Falls of Gairsoppa, *Talbot,* 255 !—DISTRIB India (Subtropical Himalaya, Birma, W Peninsula), Java.

17. LEONURUS, Linn

Erect leafy stout herbs. Leaves lobed. Flowers small, in dense-flowered axillary distant whorls. Calyx 5-nerved, turbinate ; teeth 5, spreading, spinescent Corolla 2-lipped ; tube naked or annulate within ; upper lip entire, erect ; lower lip 3-fid, the middle lobe obcordate. Stamens 4, didynamous, the lower pair the longest ; filaments ascending ; anthers conniving, the cells transverse. Disk uniform. Ovary 4-partite ; style 2-fid, the lobes equal, obtuse or subulate. Fruit of 4 triquetrous smooth dry nutlets with truncate apices ; basal scar small.—DISTRIB. Europe, Asia, Africa, America ; species 10.

1. **Leonurus sibiricus,** *Linn. Sp. Pl.* (1753) p. 584. Annual, 2—6 ft. high ; stems obtusely quadrangular, furrowed, usually softly pubescent. Leaves 1½—4 in. long, palmatipartite with linear incised segments, glabrous or nearly so above, pale and more or less pubescent on the veins beneath ; nerves strong below ; petioles reaching 2 in. long. Flowers in axillary whorls ; upper floral leaves usually entire ; bracts ⅛ in. long, spinescent. Calyx ¼—⅓ in. long, glabrous or slightly pubescent, 5-nerved ; tube ⅛ in. long ; teeth spinescent from a triangular base. Corolla red, reaching ½ in. long ; tube about equalling the limb, annulate within ; upper lip obovate, galeate, entire, pubescent ; lower lip about equalling the upper, 3-lobed, the middle lobe obcordate, the 2 lateral lobes smaller, rounded. Nutlets $\frac{1}{10}$ in. long, triquetrous, truncate. Fl. B. I. v. 4, p. 678 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 854 ; Watt, Dict. Econ. Prod. v. 4, p. 625. *Leonurus tataricus,* Roxb. Fl. Ind. v. 3, p. 8 ; Grah. Cat. p. 152 ; Dalz. & Gibs. Suppl. p. 67.—Flowers : Sept.

Doubtfully indigenous. KONKAN : Bombay, *Woodrow* ; Santaveri, *Woodrow.* S. M. COUNTRY : Belgaum (introduced), *Stocks,* 557 ! ; gardens in Belgaum where it is naturalized, *Law* ex *Graham.*—DISTRIB. India (Bengal, Silhet, W. Peninsula) ; Tropical Asia, Africa and America.

18. LEUCAS, R. Br.

Herbs or undershrubs usually woolly or villous. Flowers usually white, in axillary generally distant whorls. Calyx 10-nerved, striate ; mouth equal or oblique, equally or unequally 6—10-toothed. Corolla 2-lipped ; tube included, annulate or naked within ; upper lip erect, concave, externally villous ; lower lip spreading, 3-fid, the midlobe large. Stamens 4, didynamous, the lower pair the longest ; filaments ascending ; anthers conniving, the cells divaricate, at length confluent. Disk entire or lobed, equal or glandular in front. Ovary 4-partite ; style subulate at the apex, the upper lobe obsolete. Fruit of 4 ovoid triquetrous obtuse dry nutlets ; basal scar small.—DISTRIB. Species about 100, chiefly Asiatic and African.

Calyx-mouth oblique.
- Mouth of calyx much produced below ..... 1. *L. urticifolia.*

Mouth of calyx produced above.
- Calyx-teeth very short.
  - Calyx-mouth not villous within.
    - Calyx smooth below, ribbed and hispid above. 2. *L. aspera.*
    - Calyx smooth throughout or nearly so ; calyx-mouth very oblique ..... 3. *L. linifolia.*
    - Calyx-mouth villous within.
      - Leaves linear, less than ¼ in. broad, entire ; whorls less than 1 in. in diam. ; bracts linear, ¼ in. long ..... 4. *L. zeylanica.*
      - Leaves ovate, more than ¼ in. broad, crenate-serrate ; whorls more than 1 in. in diam. ; bracts lanceolate, more than ¼ in. long ..... 5. *L. Cephalotes.*

Calyx-teeth long and slender.
Lower lip of corolla very little longer than the upper; tube annulate within; leaves not exceeding 2 in. long ..... 6. *L. nutans.*
Lower lip of corolla twice as long as the upper; tube not annulate within; leaves exceeding 2 in. long ..... 7. *L. martinicensis.*
Calyx-mouth straight or nearly so.
Calyx-teeth erect.
Whorls 6—many-flowered.
Calyx-teeth long, unequal; flowers solitary in terminal whorls; bracts $\frac{3}{8}$ in. long, rigid ... 8. *L. stricta.*
Calyx-teeth very short; whorls axillary.
Hairs on the stem and branches erect or spreading.
Leaves narrowly linear, entire, not exceeding $\frac{1}{4}$ in. wide; bracts $\frac{1}{16}$ in. long 9. *L. longifolia.*
Leaves ovate, $\frac{1}{2}$ in. or more wide, crenate; bracts $\frac{1}{8}$—$\frac{1}{4}$ in. long ..... 10. *L. lanata.*
Hairs on the stem and branches deflexed.
Suffruticose, erect; stem and branches stout ..... 11. *L. montana.*
A straggling weak (sometimes climbing) herb with slender branches ..... 12. *L. mollissima.*
Whorls 1—4-flowered.
Pubescent all over; pedicels $\frac{1}{20}$—$\frac{1}{8}$ in. long ... 13. *L. biflora.*
Glabrous or nearly so; pedicels $\frac{1}{4}$ in. long ... 14. *L. procumbens.*
Calyx-teeth stellately spreading in fruit; whorls terminal and axillary.
Hairs on the stem erect or speading; calyx $\frac{1}{4}$—$\frac{3}{8}$ in. long ..... 15. *L. stelligera.*
Hairs on the stem deflexed and spreading; calyx $\frac{1}{2}$—$\frac{3}{4}$ in. long ..... 16. *L. ciliata.*

1. **Leucas urticifolia,** *R. Br. Prodr.* (1810) p. 504. A finely tomentose or hoary branched annual. Stems obtusely quadrangular, finely pubescent. Leaves thin, $1\frac{3}{4}$—3 by 1—$1\frac{1}{2}$ in., ovate, acute, coarsely crenate-serrate, more or less pubescent, base acute or rounded; petioles $\frac{1}{2}$—1 in. long. Flowers in many-flowered dense distant globose whorls reaching 1 in. in diam.; bracts $\frac{3}{8}$ in. long, linear-lanceolate, aute, aristate, substipitate, ciliate, reticulately veined. Calyx $\frac{1}{3}$—$\frac{1}{2}$ in. long, cylindric, pubescent or villous; mouth very oblique, about 10-toothed, somewhat 2-lipped, the upper lip very small with minute spinescent teeth, the lower membranous, reticulately veined, much prolonged, the 3 lowest teeth the largest, spinescent from a triangular base. Corolla white; tube $\frac{1}{3}$ in. long, not annulate within; upper lip obovate, concave, externally villous; lower lip 3-lobed, the middle lobe large, 2-fid, the lateral lobes small, obtuse. Nutlets $\frac{1}{12}$ in. long, obovoid-oblong, obtuse, trigonous, obliquely truncate and glandular at the apex, smooth, brown. Fl. B. I. v. 4, p. 680; Dalz. & Gibs. p. 212; Wight, Icon. t. 1451; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362; Prain, Beng. Pl. p. 854.—Flowers: Nov.

Dalzell without locality in Herb. Kew.! DECCAN: widely, *Woodrow.* GUJARAT: Ahmedabad, *Woodrow*; Cambay, *Dalzell & Gibson.* SIND: *Stocks*!; Jemadar ka Landa near Karachi, *Stocks*!—DISTRIB. India (Bengal, Panjáb, W. Peninsula); Beluchistan, Arabia, Abyssinia.

2. **Leucas aspera,** *Spreng. Syst.* v. 2 (1825) p. 743. A variable annual 6—18 in. high ; stem erect, usually much diffusely branched from below, stout, hispid or scabrid ; branches quadrangular, hispid. Leaves subsessile or shortly petiolate, 1—3 by ¼—½ in., linear-oblong or oblong-lanceolate, obtuse, entire or crenate, more or less hairy, base tapering ; petioles ⅒—¼ in. long. Flowers sessile or nearly so, in terminal and axillary whorls reaching 1 in. in diam. ; bracts up to rather more than ¼ in. long, linear, acute, bristle-tipped, ciliate with long slender hairs. Calyx variable, tubular, ⅛—½ in. long ; tube curved, contracted above the nutlets, the lower half usually quite glabrous and membranous, the upper half ribbed, hispid or scabrid ; mouth small, very oblique, not villous, the upper part produced forward ; teeth small, triangular, bristle-tipped, ciliate, the upper tooth the largest. Corolla white, ⅜ in. long ; tube ⅛ in. long, enlarged and pubescent above, annulate about the middle ; upper lip ⅛ in. long, densely-white-woolly ; lower lip about twice as long, the middle lobe obovate, rounded, the lateral lobes small, subacute. Nutlets ⅒ in. long, oblong, subtruncate at the apex ; inner face sharply angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 690 ; Grah. Cat. p. 153 ; Dalz. & Gibs. p. 211 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 854 ; Watt, Dict. Econ. Prod. v. 4, p. 632.—Flowers : Oct.

Stocks without locality in Herb. Kew. 317 *a*! KONKAN : *Law*! ; sea-shore at Ravi, *Stocks*! ; Alibág sea-shore, *Dalzell & Gibson*. DECCAN : *Woodrow*.—DISTRIB. More or less throughout India in the plains; Mauritius, Java, Philippines.

3. **Leucas linifolia,** *Spreng. Syst.* v. 2 (1825) p. 743. Herbaceous, erect, slightly pubescent or tomentose, 1—2½ ft. high, usually branched ; branches quadrangular, pubescent. Leaves 1¾—3½ by ¼—½ in., linear-lanceolate, obtuse, entire or remotely serrate, appressedly pubescent or nearly glabrous, base tapering ; petioles 0—½ in. long. Flowers subsessile or shortly pedicellate, in axillary and terminal whorls ½—¾ in. in diam., towards the ends of the branches ; bracts ⅛—⅛ in. long, narrowly linear-subulate, bristle-tipped, finely pubescent. Calyx ⅜ in. long from the base to top of uppermost tooth, ⅛—⅛ in. long from the base to top of lowest tooth, entirely glabrous or slightly pubescent ; mouth glabrous, very oblique, contracted ; the upper tooth very large, very acute, much produced forwards, the other teeth minute, distant, erect along the oblique margin. Corolla white, nearly ½ in. long ; tube ¼ in. long, annulate inside about the middle ; upper lip ⅛ in. long, white-woolly ; lower lip ¼ in. long, the middle lobe large, obovate, rounded, the lateral lobes small. Nutlets ⅛ in. long, oblong, rounded at the apex, the inner face sharply angular, the dorsal face rounded, brown.

The calyx is quite different from that of any other species of Bombay *Leucas*. Fl. B. I. v. 4, p. 690 ; Grah. Cat. p. 153 ; Dalz. & Gibs. p. 211 ; Prain, Beng. Pl. p. 854 ; Watt, Dict. Econ. Prod. v. 4, p. 633.—Flowers : Sept.—Nov. VERN. *Goma*.

A common plant throughout the Konkan and Deccan in cultivated fields, conspicuous when the crops are off.—DISTRIB. More or less throughout India; Mauritius, Malaya.

4. **Leucas zeylanica,** *R. Br. Prodr.* (1810) p. 504. Annual, erect, 6—18 in. high, hispid with long hairs, much-branched from near the base; branches quadrangular, grooved, hispid with long spreading hairs. Leaves subsessile, variable, 1—3 by $\frac{1}{8}$—$\frac{1}{2}$ in., linear or linear-lanceolate obtuse, the margins often slightly recurved, entire or serrulate, hispid on both sides, ciliate with often bulbous-based hairs, base tapering; midrib conspicuous beneath, hairy. Flowers sessile or nearly so, usually in terminal whorls $\frac{1}{2}$—$\frac{3}{4}$ in. in diam.; bracts $\frac{1}{4}$ in. long, linear, spinous-pointed, ciliate with long bulbous-based hairs. Calyx $\frac{1}{4}$ in. long, turbinate, slightly curved, the lower part glabrous or slightly pubescent outside, the upper part with a few long scattered spreading hairs; mouth broad, oblique, the upper part projecting forward, villous, the villi shorter than the calyx-teeth; upper tooth of calyx longer than the others, $\frac{1}{20}$ in. long, triangular, acute, the other teeth subequal, about $\frac{1}{30}$ in. long, subulate. Corolla white, $\frac{3}{4}$ in. long; tube $\frac{1}{4}$ in. long, the upper part enlarged, pubescent; upper lip $\frac{1}{8}$ in. long, densely white-woolly, the middle lobe broadly obovate, cuneate, rounded or sub-truncate, emarginate, the lateral lobes very small. Nutlets $\frac{1}{8}$ in. long, obovoid-oblong, rounded or truncate at the apex, the inner face sharply angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 689; Wight, Ill. t. 176; Trim. Fl. Ceyl. v. 3, p. 387; Watt, Dict. Econ. Prod. v. 4, p. 634. *Leucas diffusa,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 (*not* of Benth.).—Flowers: Oct.

Rare. S. M. COUNTRY: Badami, *Woodrow*!—DISTRIB. India (Assam, Birma, Chittagong, W. Peninsula); Malaya, Ceylon, China.

5. **Leucas Cephalotes,** *Spreng. Syst.* v. 2 (1825) p. 743. An annual hairy and pubescent herb 2—3 ft. high; stems and branches obtusely quadrangular, hairy with spreading hairs. Leaves 1½—3 by ½—1 in., ovate or ovate-lanceolate, subacute, membranous, more or less pubescent, crenate-serrate, base tapering; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long. Flowers sessile, in large globose dense terminal whorls 1—2 in. in diam.; floral leaves like the cauline, the uppermost coming out from the top of the verticil; bracts imbricate, foliaceous, green, thin, membranous, $\frac{1}{2}$—$\frac{5}{8}$ by $\frac{1}{10}$—$\frac{1}{3}$ in., lanceolate, acute, awned, reticulately veined, ciliate. Calyx tubular, slightly curved, reaching $\frac{5}{8}$ in. long, the lower half of the tube quite glabrous, membranous, and smooth outside, the uper half pubescent outside and inside; mouth oblique, the villi nearly as long as the teeth; teeth subequal, $\frac{1}{20}$ in. long, narrowly triangular-subulate. Corolla $\frac{3}{4}$ in. long, tube less than $\frac{1}{2}$ in. long, obliquely annulate about the middle; upper lip $\frac{1}{8}$ in. long, white-woolly; lower lip nearly twice as long as the upper, the middle lobe large, truncate, the lateral lobes very small. Nutlets $\frac{1}{8}$ in. long, obovoid-oblong, rounded at the apex, the inner face angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 689; Grah. Cat. p. 153; Dalz. & Gibs. p. 211; Wight, Icon.

t. 337 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 855 ; Watt, Dict. Econ. Prod. v. 4, p. 633.—Flowers : Nov.

GUJARAT : coast of Kathiawar, *Dalzell & Gibson*; Ahmedabad common, *Law* ex *Graham*; Chandod, *Woodrow*.—DISTRIB. India (Bengal, Panjáb, Assam, Himalayás, W. Peninsula); Afghanistan.

6. **Leucas nutans,** *Spreng. Syst.* v. 2 (1825) p. 743. A dwarf often straggling annual, sometimes less than 2 in. high in Sind specimens, but reaching 1 ft. high under favorable conditions, diffusely branched from near the base ; stems and branches quadrangular, laxly hirsute with long usually spreading hairs. Leaves 1—2 by ¼—1 in., oblong or oblong-lanceolate, obtuse, subserrate, hairy or nearly glabrous, gland-dotted ; petioles 0—⅛ in. long. Flowers sessile or subsessile, in terminal and axillary dense many-flowered whorls reaching ¾ in. in diam. ; bracts ⅛—⅓ by 1/20—1/16 in., thin, foliaceous, lanceolate, acute, finely spinous-tipped, veined, ciliate with long weak hairs. Fruiting calyx strongly ribbed, ⅜ in. long, hispid, falcately decurved ; tube pubescent within ; mouth slightly oblique, the villi erect, slender not dense, shorter than the teeth ; teeth 10, the uppermost tooth larger than the others, which are subequal and about 1/10 in. long, lanceolate, spinous-tipped, ciliate. Corolla white, exceeding ½ in. long ; tube ⅛ in. long, slender, slightly annulate near the base ; upper lip ⅛ in. long, white-woolly ; lower lip ¼ in. long, the middle lobe large, obovate, rounded. Nutlets ⅛ in. long, narrowly oblong-ellipsoid, rounded at the apex, the inner face angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 688 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 855. *Leucas vestita,* Woodr. in Journ. Bomb. Nat. l. c. (*not* of Benth.).—Flowers : Aug.

S. M. COUNTRY : Karlimatti, *Woodrow*; Badami, *Cooke*! SIND : *Stocks*!; Jemadar ka Landa near Karachi, *Stocks*, 1179!—DISTRIB. India (N. and N.W. Provinces, Behar, Birma, W. Peninsula).

7. **Leucas martinicensis,** *R. Br. Prodr.* (1810) p. 504. A tall stout annual 2—4 ft. high, more or less branched ; stem and branches obtusely quadrangular, grooved, hairy. Leaves 2½—3½ by 1—1¾ in., membranous, ovate or oblong-lanceolate, obtuse, coarsely crenate-serrate, hairy on both sides, base cuneate (rarely rounded) ; petioles ⅜—¾ in. long. Flowers sessile, in numerous distant axillary globose whorls ¾—1¼ in. in diam. ; floral leaves narrower than the cauline ones, often sessile ; bracts green, reaching ⅓ in. long, narrowly linear-lanceolate or subulate, finely spinous-pointed with pale slender awns. Calyx ½ in. long, tubular, sigmoidly curved, pubescent ; tube glabrous and closely reticulately veined within ; mouth oblique, the villi few and short ; teeth lanceolate, finely spinous-tipped, ciliate, the upper tooth large, ⅛ in. long, the other teeth subequal, about 1/10 in. long. Corolla white, ⅓ in. long ; tube ⅛ in. long, not annulate within ; upper lip 1/12 in. long, white-woolly ; lower lip very little longer than the upper, 1/10 in. long, the middle lobe oblong, 2-fid, the lateral lobes large, oblong, rounded. Nutlets 1/10 in. long, obovoid-oblong, obliquely cut at the apex on the ventral

side ; inner face angular, the dorsal rounded, smooth, shining, dark brown. Fl. B. I. v. 4, p. 688 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 855.—Flowers : Oct.—Feb.

Doubtfully indigenous. *Dalzell* without locality in Herb. Kew.! DECCAN : Karli (Poona districts), *Cooke*! ; Poona, *Cooke*!, *Woodrow*. S. M. COUNTRY : Belgaum, *Ritchie*, 560! ; hills N.E. of Belgaum, *Stocks*! ; Badami, *Woodrow*! KANARA : Halyál, *Ritchie*, 560!—DISTRIB. India (Chota Nagpur, Birma, W. Peninsula) ; Tropical Africa and America, W. Indies.

8. **Leucas stricta,** *Benth, in Wall. Cat.* (1828) 2045. Herbaceous, erect, 6—12 in. high, branched from near the base ; branches quadrangular, grooved, hispid with spreading hairs. Leaves 1—2½ by ⅛—½ in., linear-oblong or oblong-lanceolate, obtuse, entire, hispidly hairy, narrowed at the base, green on both sides (the floral leaves like the cauline ones) ; midnerve prominent beneath ; petioles 0—⅛ in. long. Flowers shortly pedicellate, in terminal solitary many-flowered whorls ½—¾ in. in diam. ; bracts ⅜ in. and even more long, linear, acute, rigid, spinous-pointed, ciliate with long stiff often bulbous-based hairs which are sometimes ⅓ in. long ; pedicels $\frac{1}{20}$—$\frac{1}{10}$ in. long. Calyx ⅜ in. long, straight or slightly curved, finely pubescent and also sparsely hispid with long white hairs, glabrous and reticulately veined within ; mouth nearly straight, villous with long erect hairs which project between the teeth but are shorter than them ; teeth unequal, the longest about ⅛ in. long, subulate, ciliate. Corolla white, nearly ¾ in. long ; tube ⅓ in. long, annulate below the middle ; upper lip scarcely ¼ in. long, densely white-villous ; lower lip nearly ½ in. long, the middle lobe large, obovate, rounded, the lateral lobes very short, obtuse. Nutlets ⅛ in. long, oblong, rounded at the apex, the inner face angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 688 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 855.—Flowers : Aug.

S. M. COUNTRY : Sandstone hills N.E. of Belgaum, *Ritchie*, 550! ; Karlimatti, *Woodrow* ; Dharwar, *Woodrow* ; Badami, *Cooke*!—DISTRIB. India (W. Peninsula).

9. **Leucas longifolia,** *Benth. Lab. Gen. & Sp.* (1835) p. 744. An erect rigid herb 10—20 in. high ; stem simple below, branched above ; branches obtusely quadrangular, pubescent with erect or spreading hairs. Leaves ⅜—2½ by $\frac{1}{12}$—¼ in., sessile or shortly petiolate, linear, entire, obtuse or subacute, more or less pubescent, tapering towards the base ; midnerve strong below. Flowers in few-flowered axillary whorls often approximated near the top so as to form a leafy spike ; bracts $\frac{1}{16}$ in. long, subulate, hairy. Calyx ¼ in. long, turbinate, pubescent outside ; mouth truncate, furnished with white erect stiff short hairs which stand up between the teeth ; teeth 10, very small. Corolla ⅜ in. long ; tube ⅛ in. long, annulate with a ring of hairs about the middle ; upper lip ⅛ in. long, densely silky-villous ; lower lip ⅛ in. long, the middle lobe suborbicular, entire. Nutlets $\frac{1}{16}$ in. long, obovoid oblong, trigonous. Fl. B. I. v. 4, p. 684 ; Grah. Cat. p. 153 ; Dalz. & Gibs. p. 210 ; Trim. Fl. Ceyl. v. 3, p. 386 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362. —Flowers : July—Aug. VERN. *Dudháni.*

Dalzell without locality in Herb. Kew.! KONKAN: *Stocks!, Hooker!* DECCAN: widely, *Woodrow*; Poona, *Jacquemont!, Cooke!, Graham, Dalzell & Gibson.*—DISTRIB. India (W. Peninsula); Ceylon.

10. **Leucas lanata,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 61. Whole plant densely softly woolly or subsilky, 2—3 ft. high; rootstock stout, woody, perennial; stem and branches stout, obtusely quadrangular, with erect hairs. Leaves 1—2½ by ½—1¼ in., thick, ovate, obtuse or acute, more or less deeply crenate, rugose, velvety, base rounded or cuneate; petioles 0—¼ in. long. Flowers sessile, in many-flowered axillary whorls; bracts ⅛—¼ in. long, linear, densely hairy and ciliate. Calyx ⅓ in. long, densely silky outside, the upper half of the tube pubescent inside; mouth truncate; teeth small, reaching $\frac{1}{16}$ in. long, triangular-subulate, alternately shorter. Corolla white, rather more than ½ in. long; tube as long as the calyx, annulate above the middle; upper lip densely silky on both sides; middle lobe of lower lip broadly obovate, 2-fid. Nutlets $\frac{1}{16}$ in. long, oblong-obovoid, trigonous, obliquely truncate at the apex. Fl. B. I. v. 4, p. 681. *Leucas collina,* Dalz. in Kew Journ. Bot. v. 2 (1850) p. 338; Dalz. & Gibs. p. 211.—Flowers: Oct.

KONKAN: low hills, *Dalzell!*; S. Konkan, *Dalzell & Gibson.* KANARA, *Law!*—DISTRIB. India (W. Himalaya, Behar, W. Peninsula); S. China.

11. **Leucas montana,** *Spreng. Syst.* v. 2 (1825) p. 742. Suffruticose, densely softly woolly or tomentose; branches woody, the upper tetragonal, densely clothed with deflexed hairs. Leaves 1—2 by ½—1½ in., ovate or ovate-rotundate, obtuse, thick, crenate, usually green and clothed with silky hairs above, velvety-villous beneath, base usually rounded, truncate or subcordate; petioles ⅛—⅜ in. long. Flowers in axillary distant few- or many-flowered whorls; bracts $\frac{1}{10}$—⅛ in. long, linear. Calyx subsessile, ¼—⅓ in. long, straight, silky-villous outside, the upper half finely pubescent inside; mouth truncate; teeth minute, triangular-subulate, the alternate ones shorter. Corolla white, nearly ½ in. long; tube ¼ in. long, annulate within; upper lip densely woolly; middle lobe of lower lip broadly obovate, 2-fid. Fl. B. I. v. 4, p. 682; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362; Prain, Beng. Pl. p. 855.—Flowers: Nov.—Apr.

DECCAN: Purandhar Fort, *Cooke!*, *Woodrow!*; Sinhagad hill, *Woodrow!*; Bhor, *Woodrow.*—DISTRIB. India (Chota Nagpur, Orissa, Behar, W. Peninsula).

12. **Leucas mollissima,** *Wall. Pl. As. Rar.* v. 1 (1830) p. 62. A straggling weak much-branched hoary-tomentose herb, often climbing among bushes (*Ritchie*); stem and branches slender, quadrangular, 3—4 ft. long, pubescent with appressed deflexed hairs. Leaves 1½—2½ by ½—1 in., ovate or ovate-lanceolate, acute (rarely obtuse), serrate, sparsely hairy with appressed hairs above, densely softly hairy beneath with white hairs; petioles 0—¼ in. long. Flowers in distant many-flowered whorls; bracts ⅛—⅓ in. long, linear, hairy. Calyx ¼—⅜ in. long, subsessile, softly silky-villous outside, the upper half inside densely silky-pubescent; teeth 10, triangular-subulate, about $\frac{1}{20}$ in. long, nearly equal or the alternate teeth smaller. Corolla white, ½ in. long; tube annulate within above the middle;

lower lip broadly obovate, 2-fid. Nutlets $\frac{1}{12}$ in. long, obovoid, trigonous, obliquely truncate at the apex, brown. Fl. B. I. v. 4, p. 682 ; Trim. Fl. Ceyl. v. 3, p. 385 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 855 ; Watt, Dict. Econ. Prod. v. 4, p. 634.—Flowers : Aug.—Dec.

KONKAN : *Stocks* !, *Dalzell* ! S. M. COUNTRY : Belgaum hills, *Ritchie*, 559 ! KANARA : Kála naddi, *Ritchie*, 1992 !—DISTRIB. India (Subtropical Himalaya, Behar, Chota Nagpur, W. Bengal, Orissa, W. Peninsula) ; Ceylon, China.

13. **Leucas biflora,** *R. Br. Prodr.* (1810) p. 504. Procumbent, pubescent ; branches long, slender, 1—2 in. long, quadrangular, pubescent with deflexed hairs. Leaves variable, $\frac{5}{8}$—2 by $\frac{1}{4}$—$\frac{7}{8}$ in., ovate or elliptic or oblong, acute or obtuse, coarsely and distantly serrate, pubescent on both sides ; petioles $\frac{1}{4}$—$\frac{3}{8}$ in. long. Flowers in distant axillary whorls of 1—4 (rarely more) very commonly 2 ; pedicels $\frac{1}{30}$—$\frac{1}{8}$ in. long ; bracts small, subulate. Calyx pubescent, reticulately veined, reaching $\frac{3}{8}$ in. long, narrowed at the base ; teeth reaching sometimes $\frac{1}{8}$ in. long, subequal, lanceolate-subulate, ciliate. Corolla white, $\frac{5}{8}$ in. long ; tube $\frac{3}{8}$ in. long, annulate within about the middle ; middle lobe of lower lip emarginate. Nutlets $\frac{1}{12}$ in. long, oblong, trigonous, truncate. Fl. B. I. v. 4, p. 683 ; Grah. Cat. p. 153 ; Dalz. & Gibs. p. 211 ; Trim. Fl. Ceyl. v. 3, p. 386 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362.—Flowers : Oct.

KONKAN : *Dalzel & Gibson, Stocks* ! DECCAN : Dongergaon near Ahmednagar, *Cooke* ! ; Devathan, *Bhiva* ! ; Bhor, *Kanitkar* ! GUJARAT : *Woodrow*.—DISTRIB. India (W. Peninsula) ; Ceylon.

14. **Leucas procumbens,** *Desf. in Mém. Mus. Par.* v. 11 (1824) p. 7, t. 3, f. 2. Procumbent, branched ; rootstock woody ; stems and branches long, slender, quadrangular, reaching 2—3 ft. long, more or less pubescent on the angles. Leaves membranous, $\frac{3}{4}$—$1\frac{3}{4}$ by $\frac{1}{2}$—$\frac{3}{4}$ in., elliptic-lanceolate, acute, serrate, nearly glabrous, base usually acute ; petioles $\frac{1}{4}$—$\frac{1}{2}$ in. long. Flowers in axillary lax whorls of 1—3 pedicellate flowers ; pedicels reaching $\frac{1}{3}$ in. long, filiform ; bracts small, subulate. Calyx $\frac{3}{8}$—$\frac{1}{2}$ in. long, pubescent, nearly glabrous, reticulately veined ; mouth truncate ; base narrowed ; teeth 10, nearly equal, lanceolate, acute, rarely reaching $\frac{1}{10}$ in. long, ciliate. Corolla white, $\frac{5}{8}$ in. long ; tube $\frac{3}{8}$ in. long, annulate about the middle ; middle lobe of lower lip emarginate. Nutlets $\frac{1}{12}$ in. long, obovoid, trigonous, truncate at the apex. Fl. B. I. v. 4, p. 683 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 855.—Flowers : Aug.—Oct.

I cannot find any really *good* specific character to separate this species from *Leucas biflora*. The amount of pubescence seems to be the chief difference. The pedicels in *L. procumbens* are usually longer than those of *L. biflora*. The difference in the length of the calyx-teeth cannot be relied upon as a good distinguishing character.

S. M. COUNTRY : Belgaum, *Ritchie*, 558 ! KANARA : N. Kanara, *Law* ! ; Halyál, *Ritchie*, 558 !—DISTRIB. India (Bengal, W. Peninsula).

15. **Leucas stelligera,** *Wall. Pl. As. Rar.* v. 1 (1830) p. 61. Herbaceous, erect, branched, softly pubescent or villous, 2—3 ft.

high ; stem and branches obtusely quadrangular, hairy with erect and spreading hairs. Leaves 2—4 by ⅜—1 in., elliptic-lanceolate or oblong-lanceolate, obtuse or subacute, obtusely serrate, green above, pale beneath, clothed on both sides with long soft hairs, base tapering into the petiole ; nerves numerous, prominent beneath, impressed above ; petioles ⅛—½ in. long. Flowers sessile, in dense many-flowered terminal and axillary whorls reaching sometimes 1½ in. in diam. ; bracts reaching ¼ in. or more long, linear, revolute at the apex, densely ciliate. Calyx ⅛—⅜ in. long, pubescent or tomentose, glandular ; mouth truncate, densely hairy within with erect hairs ; teeth about 1/16 in. long, linear, soft, densely ciliate, stellately spreading in fruit, the tips revolute. Corolla white, rather less than ½ in. long ; tube rather more than ¼ in. long, annulate below the middle ; lips of limb nearly equal, the upper very densely woolly with long white hairs, the middle lobe of the lower lip suborbicular, shortly 2-fid, the lateral lobes triangular-oblong, obtuse. Nutlets 1/10 in. long, oblong-obovoid, rounded at the apex, the inner face angular, the dorsal face rounded, smooth and shining, brown. Fl. B. I. v. 4, p. 686 ; Dalz. & Gibs. p. 211 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362.—Flowers ; Nov. VERN. *Goma* ; *Burumbi.*

KONKAN : *Stocks* !, *Law* ! ; Matheran, *Cooke* ! ; Wari jungles, *Dalzell* ! DECCAN : Mahableshwar, very common, *Cooke* ! ; Sinhagad, *Gangaram* ! S. M. COUNTRY : Belgaum hills, *Ritchie*, ! ; Rámghát, *Ritchie*, 556 !—DISTRIB. India (W. Peninsula).

16. **Leucas ciliata,** *Benth. in Wall. Pl. As. Rar.* v. 1 (1830) p. 61. Herbaceous or almost suffrutescent, much-branched, 1—3 ft. high ; stem and branches quadrangular, hairy with deflexed and spreading hairs. Leaves with an aromatic and somewhat agreeable odor, 2½—5 by 1—2 in., elliptic-lanceolate, acute, green above, paler below, sparsely clothed above and on the midrib and nerves beneath with short stout often bulbous-based hairs ; petioles ¼—⅝ in. long. Flowers in terminal and axillary many-flowered dense globose whorls 1—1½ in. in diam., crinite from the slender long bracts and calyx-teeth ; bracts ½ in. long, linear or linear-lanceolate, shortly spinous-pointed, ciliate. Calyx more or less hairy outside, ½—¾ in. long ; tube nearly glabrous inside, reticulately veined ; mouth truncate, with a narrow raised hairy ring just below the teeth ; teeth ⅛—⅛ in. long, lanceolate, ciliate, shortly spinous-pointed, stellately spreading in fruit. Corolla reaching ⅞ in. long ; tube ½ in. long, annulate within about the middle ; upper lip ¼ in. long, densely clothed with yellowish-brown hairs ; lower lip ⅜ in. long or more, pure white ; the middle lobe entire or emarginate, the lateral lobes short, broad, oblong, rounded. Nutlets ⅛—⅛ in. long, oblong-obovoid, rounded at the apex, angular on the inner, rounded on the dorsal face, smooth, brown. Fl. B. I. v. 4, p. 687 ; Dalz. & Gibs. p. 211 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362.—Flowers : Oct.—Jan. VERN. *Burumbi.*

KONKAN : N. & S. Konkan, *Law* ! ; Banda in the Wari country, *Stocks* !, *Dalzell & Gibson.* DECCAN : Mahableshwar, abundant, *Cooke* !, *H. M. Birdwood.* KANARA : Yellapur (N. Kanara), *Talbot*, 253 !—DISTRIB. India (Nipal, Sikkim, Khasia Mountains, W. Peninsula).

19. **LEONOTIS,** R. Br.

Herbs or shrubs. Flowers large, scarlet or yellow, in axillary densely many-flowered whorls; bracts numerous, slender. Calyx 10-nerved; tube often incurved; mouth oblique, with 8—10 rigid teeth, the upper tooth the largest. Corolla 2-lipped; tube exserted; upper lip long, concave, with a villous crown; lower lip small, 3-lobed, the middle lobe the largest. Stamens 4, didynamous; lower pair longer, ascending; anthers connivent, the cells divaricate. Disk equal. Ovary 4-partite; style subulate, the upper lobe very short. Fruit of 4 oblong or ovoid or obovoid dry angular obtuse or truncate nutlets; basal scar small.—DISTRIB. Species 12, African, one also Indian and American.

1. **Leonotis nepetifolia,** *R. Br. in Ait. Hort. Kew.* ed. 2 (1811) v. 3, p. 409. A tall erect plant 4—6 ft. high; stem stout, obtusely quadrangular with thickened angles, deeply sulcate, finely pubescent. Leaves 2½—6 by 1½—4 in., membranous, ovate, acute, coarsely crenate-serrate, finely pubescent on both sides, base shortly cuneate, running down into the petiole; petioles 1—4 in. long, winged in the upper part. Flowers in axillary dense globose many-flowered whorls 1½—2½ in. in diam.; floral leaves lanceolate, deflexed; bracts reaching ⅝ by $\frac{1}{16}$ in., linear, strongly spinous-pointed, deflexed, pubescent. Calyx ¾ in. long, ribbed, tubular, incurved, the lower part puberulous, the upper part densely pubescent or villous and also bristly with long white hairs; tube reticulately veined within, not villous at the oblique mouth; teeth 8—9, unequal, the upper much the largest reaching ⅛ in. long, ovate, acute, the others triangular, all with strong sharp spinous points. Corolla 1 in. long, orange-scarlet; tube ½ in. long, glabrous below, densely clothed in the upper part with orange-scarlet hairs, annulate inside with 3 transverse parallel rings of white hairs, the 2 upper rings closer together than the middle and lower rings; upper lip ½ in. long, densely woolly with orange-scarlet hairs; lower lip ⅛—¼ in. long, deeply 3-lobed, the lobes oblong, obtuse, the middle lobe slightly the longest. Nutlets ⅛ in. long, oblong-obovoid, obliquely truncate and with a deep triangular pit at the apex, the inner face sharply angular, the dorsal face rounded, the margins ribbed. I have examined many specimens but cannot find that the corolla-tube is exserted. Fl. B. I. v. 4, p. 691; Grah. Cat. p. 153; Dalz. & Gibs. p. 212 & Suppl. p. 67; Wight, Icon. t. 867; Trim. Fl. Ceyl. v. 3, p. 387; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Prain, Beng. Pl. p. 857; Watt, Dict. Econ. Prod. v. 4, p. 625.—Flowers: Sept.—Oct. VERN. *Dipmál; Matisul.*

Doubtfully indigenous. Common about villages in the Konkan but never at any distance from the habitations of man, also pretty common in hill forts in the Deccan.—DISTRIB. Throughout hotter India cultivated and naturalized; Ceylon, Tropical Asia, Africa, and America.

The ash of the flower-heads mixed with curds is applied to ringworm.

20. **NEPETA,** Linn.

Erect or prostate herbs. Leaves opposite. Flowers usually blue or white (rarely yellow); whorls axillary or terminal. Calyx

tubular, 15-nerved ; limb equally 5-toothed, or sub-bilabiate with the 2 lower teeth narrower than the 3 upper. Corolla 2-lipped ; tube not annulate within ; throat inflated ; upper lip straight, notched or 2-fid ; lower 3-fid, the middle lobe the largest. Stamens 4, didynamous, the upper pair the longest ; anther-cells diverging. Disk uniform or enlarged in front. Ovary 4-partite ; style shortly 2-fid ; lobes subequal, subulate. Fruit of 4 ovoid or compressed obtuse dry smooth or granulate nutlets ; basal scar small or oblique.—DISTRIB. Temperate Europe, N. and S. Africa, Asia ; species about 120.

Upper calyx-teeth narrowly triangular, aristate..... 1. *N. ruderalis.*
Upper calyx-teeth broadly triangular, not aristate..... 2. *N. bombaiensis.*

1. **Nepeta ruderalis,** *Buch.-Ham. MS. ex Hook. f. Fl. B. I.* v. 4 (1885) p. 661. Annual, 6—18 in. high, branched from the base ; branches erect or ascending, obtusely quadrangular, grooved, softly pubescent, often floriferous almost throughout their entire length. Leaves ½—2 by ⅜—1½ in., broadly ovate or suborbicular, obtuse, crenate-serrate, green or hoary, base cordate or truncate ; petioles ¼—1¼ in. long. Flowers pedicellate, in dense axillary many-flowered pedunculate, often 2-branched cymes, the flowers lateral on the cyme-branches ; peduncles of lower cymes often 1 in. or more long, those of the upper cymes short ; bracts ⅛—¼ in. long, linear-lanceolate, acute, densely ciliate ; pedicels $\frac{1}{16}$ in. long. Calyx in flower ⅛ in. long, pubescent and glandular, 2-lipped ; upper lip $\frac{1}{16}$ in. long with 3 triangular aristate teeth, the middle lobe $\frac{1}{16}$ in. long ; lower lip $\frac{1}{16}$ in. long, with 2 subulate teeth. Corolla bluish-purple, pubescent outside, exserted ; tube inflated at the throat ; upper lip $\frac{1}{16}$ in. long, oblong, 2-fid with obtuse lobes ; lower lip ⅛ in. long, 3-lobed, the middle lobe broad, emarginate, crenulate, much larger than the 2 small rounded lateral ones. Nutlets mucilaginous when moistened, $\frac{1}{20}$—$\frac{1}{16}$ by $\frac{1}{16}$ in., oblong-ellipsoid, with a white V-shaped hilum on the inner face near the base, brown, obscurely granulate with whitish spots which show when wetted. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 857 ; Watt, Dict. Econ. Prod. v. 5, p. 346.—Flowers : Nov.

KONKAN : *Stocks* ! ; Bassein, *Ryan* ! DECCAN : Purandhar, *Dr. Barnes* !

VAR. *Woodrowii.* Calyx larger, ¼ in. long in flower ; corolla scarcely exserted ; nutlets $\frac{1}{16}$—$\frac{1}{12}$ in. long, narrowly ellipsoid, smooth, brown, with white spots and mucilaginous when wetted.

More abundant than the type in W. India. Sir J. D. Hooker (Fl. B. I. l. c.) mentions that he had received from Mr. Woodrow from Poona a specimen (now in Herb. Kew. n. 476) with the habit of *N. ruderalis* but with a larger calyx and with the nutlets of *N. bombaiensis.*

I have recently received from Mr. Gammie of the College of Science at Poona several specimens collected by Mr. Bhide, the Herbarium-Keeper of that Institution, from the hill fort of Sinhagad (4000 ft.) 12 miles from Poona as well as from Panchgani (4000 ft.) close to Mahableshwar.

The 2 teeth of the lower lip of the calyx seem to be more triangular than those of *N. ruderalis* proper which are subulate.

2. **Nepeta bombaiensis,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 208. Herbaceous, branched, 1 ft. high ; stem obtusely quadrangular, clothed with soft white hairs. Leaves 1½—2 by

1½—1⅝ in., rounded-ovate, crenate, more or less pubescent on both sides, base cordate or subtruncate ; petioles ½—1⅛ in. long. Flowers pedicellate, in axillary pedunculate 6—8-flowered cymes ; peduncles reaching 1 in. long ; pedicels ⅛—⅜ in. long ; bracts elliptic-lanceolate, acuminate. Fruiting calyx ⅛ in. long, pubescent ; upper lip longer than the lower, with 3 broadly triangular acute (not aristate) teeth, the middle tooth 1/12 by 1/10 in. ; lower lip with 3 subulate teeth. Corolla small, pale-blue with purple spots (*Dalzell*). Nutlets 1/16 in. long, narrowly ellipsoid, dark-brown, smooth, dotted with white dots. Fl. B. I. v. 4, p. 661 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362.—Flowers : July—Aug.

KONKAN : on old walls in Shivnar Fort east of Bombay, *Dalzell* ! There is but one scrap of the plant in Herb. Kew. I have seen no others.—DISTRIB. Apparently endemic in the Bombay Presidency.

21. **SALVIA,** Linn.

Herbs, undershrubs, or shrubs of various habit. Flowers small, or large and showy ; whorls usually racemose or spicate ; bracts small or large, sometimes colored. Calyx tubular or campanulate, 2-lipped ; throat naked ; upper lip entire or 3-toothed ; lower lip 2-fid. Corolla 2-lipped ; tube naked or annulate within ; upper lip erect ; lower 3-lobed, the middle lobe usually broader, entire or emarginate. Perfect stamens 2 (the lower) ; filaments short, articulate with a slender connective, sometimes produced beyond the joint ; connective linear, transverse, the upper arm ascending and bearing a linear fertile cell, the lower arm straight or deflexed, bearing a fertile or emptly cell or naked ; upper stamens represented by 2 small staminodes or obsolete. Disk usually enlarged in front. Ovary 4-partite ; style shortly 2-fid, the lobes subulate, equal or the lower longer, sometimes flattened. Fruit of 4 ovoid somewhat triquetrous smooth nutlets ; basal scar small.—DISTRIB. Cosmopolitan ; species 450.

An erect herb; leaves 2—4 in. long; upper lip of calyx entire	1 *S. plebeia.*
A low straggling undershrub; leaves less than 2 in. long; upper lip of calyx 3-toothed	2. *S. ægyptiaca.*

1. **Salvia plebeia,** *R. Br. Prodr.* (1810) p. 501. An erect herb 6—20 in. high ; stems hoary-pubescent, obtusely quadrangular, grooved. Leaves 2—4 by ¾—1¾ in., oblong-lanceolate, obtuse or subacute, irregularly crenate, sparsely hairy or nearly glabrous, base usually acute, often decurrent into the petiole ; petioles 1—2 in. long. Flowers in paniculate (often somewhat compactly arranged) interrupted pubescent spicate racemes ; floral leaves 1/10 in. long, broadly ovate, subacute, shortly petiolate ; bracts small, linear-spathulate. Calyx pedicellate, hairy, 1/10—⅛ in. long in flower, ⅛—¼ in. long in fruit, 2-lipped ; upper lip obtuse, entire, shorter than the lower, reflexed ; lower lip 2-fid, the lobes triangular, acute or subacute. Corolla ⅛ in. long ; tube ⅛ in. long ; upper lip oblong, obtuse ; lower lip 3-lobed, the middle lobe much larger than the short obtuse lateral ones. Nutlets 1/12 in. long, ovoid, the inner face slightly

angular, the dorsal face rounded, smooth, brown. Fl. B. I. v. 4, p. 655 ; Dalz. & Gibs. p. 209 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 859 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 451.—Flowers : Sept.—Feb.

KONKAN : *Law* ! ; island of Karanja, *Dalzell & Gibson.* DECCAN : Khandala, *Dalzell & Gibson;* Poona, *Cooke* !, *J. G. Woodrow* ! ; Kolvan (Máwal taluka), *Bhiva* ! ; Mahableshwar, in the ravine below the cemetery, *Cooke* ! SIND : *Stocks* !—DISTRIB. Throughout India; China, Malay Islands, Australia.

2. **Salvia ægyptiaca,** *Linn. Sp. Pl.* (1753) p. 23. A low much-branched straggling undershrub ; branches divaricate, rigid, hairy, quadrangular. Leaves variable, ¼—1½ by $\frac{1}{10}$—⅛ in., subsessile or shortly petiolate, linear-lanceolate, acute, rigid, crenate, much wrinkled, hairy ; nerves and veins prominent. Flowers in long racemes ; whorls 2—4-flowered, distant ; floral leaves small, ovate-lanceolate. Calyx in flower ⅛—⅙ in. long, glandular-hairy, in fruit twice as long, nodding, pedicellate ; upper lip with 3 short connivent acute teeth ; lower lip with 2 lanceolate acute lobes. Corolla ¼ in. long ; tube annulate within ; upper lip oblong, subquadrate, notched ; lower lip 3-lobed, the middle lobe emarginate, larger than the obtuse lateral ones. Nutlets $\frac{1}{12}$ in. long, oblong-ellipsoid, the inner face very slightly angular, the dorsal face rounded, bluish-black, smooth. Fl. B. I. v. 4, p. 656 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 450.

Dalzell without locality in Herb. Kew. ! SIND : Boogta hills, *Vicary* !—DISTRIB. India (Panjáb plains, Sind) ; Afghanistan, W. Asia, N. Africa to the Cape Verde Islands.

VAR. *pumila,* Hook. f. Fl. B. I. v. 4 (1885) p. 656. More scabrid and hispid ; leaves very rigid and rugose ; calyx villous with long white hairs. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 450.—Flowers : Nov.—Dec. VERN. *Tukam.*

DECCAN : Junnar, *Woodrow.* GUJARAT : Rajkot, *Cooke* !, *Woodrow* ! SIND : *Dalzell,* 660 !, *Stocks,* 442 ! ; Karachi, *Woodrow;* hills at the Hub near Karachi, *Bhola Puran* ! ; Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (Panjáb plains, W. Peninsula) ; Afghanistan, Baluchistan.

Salvia coccinea, Juss. ex Murr. in Commentat. Gotting. v. 1 (1779) p. 86, t. 1. A slender herb 1—3 ft. high with many quadrangular ascending stems, ovate or cordate acute crenate leaves, and scarlet pedicellate flowers in distant whorls, a native of Central and South America, is often grown in gardens. Dalz & Gibs. Suppl. p. 67 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 859. *Salvia pseudococcinea,* Grah. Cat. p. 151 ; Dalz. & Gibs. Suppl. p. 67.

Salvia involucrata, Cav. Icon. v. 2 (1793) p. 3, t. 105. An undershrub 3—4 ft. high or more with ovate acuminate crenate-serrate leaves 2—3 in. long, rosy flowers with a long swollen corolla-tube and subequal lobes, a native of Mexico, is often grown in

gardens. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 & Gard. in Ind. ed. 5, p. 424.

Salvia farinacea, Benth. Lab. Gen. & Sp. (1833) p. 274. Native of Mexico ; stems numerous, in a cluster ; leaves ovate-lanceolate ; calyx densely white-tomentose ; corolla violet-blue. A useful bedding plant in Deccan gardens, flowering abundantly from September to May. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 & Gard. in Ind. ed. 5, p. 423.

Salvia officinalis, Linn. Sp. Pl. (1753) p. 23. *The true Sage,* a native of the South of Europe, is occasionally grown in the gardens of Europeans in the Presidency, but in the Indian climate it is a very delicate plant and its cultivation requires care. The dried leaves are often imported into India from Europe. Grah. Cat. p. 151 ; Watt, Dict. Econ. Prod. v. 6, part 2, p. 451.

The following not belonging to any of the foregoing genera are more or less cultivated :—

Meriandra bengalensis, Benth. in Bot. Reg. (1829) sub. t. 1282 and in Wall. Pl. As. Rar. v. 1 (1830) p. 29. A large straggling shrub, a native of Abyssinia, cultivated throughout India and known as the *Bengal Sage.* The leaves have a strong camphoraceous odor and are employed in native medicine and for preventing the attacks of insects on cloth. Fl. B. I. v. 4, p. 653 ; Grah. Cat. p. 151 ; Dalz. & Gibs. Suppl. p. 66 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 362 ; Prain, Beng. Pl. p. 858 ; Watt, Dict. Econ. Prod. v. 5, p. 235.—VERN. *Káfurkapát.*

Origanum Majorana, Linn. Sp. Pl. (1753) p. 590. *The Marjoram.* An aromatic herb 1—2 ft. high with ovate-oblong petiolate leaves and purplish or white flowers. A native of S. Europe, N. Africa, and Asia Minor, extensively cultivated in India. Fl. B. I. v. 4, p. 648 ; Watt, Dict. Econ. Prod. v. 5, p. 493.—VERN. *Murva.*

Thymus Serpyllum, Linn. Sp. Pl. (1753) p. 590. The well-known *Thyme,* a plant with a woody rootstock, small leaves and rose-purple flowers, occasionally though not very successfully, grown in gardens in the plains. Firminger (Man. Gard. ed. 2, p. 162) says that the plants are with difficulty kept alive through a single hot season. Fl. B. I. v. 4, p. 649 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Watt, Dict. Econ. Prod. v. 6, part 4, p. 48.

Mentha viridis, Linn. Sp. Pl. ed. 2 (1763) p. 804. The common *Green Mint* or *Spearmint.* A well-known herb growing about 2 ft. high with subsessile ovate-lanceolate serrate glabrous leaves and purplish flowers, commonly grown in gardens throughout the plains of India. Fl. B. I. v. 4, p. 647 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Watt, Dict. Econ. Prod. v. 5, p. 231.—VERN. *Pudina.*

Mentha arvensis, Linn. Sp. Pl. (1753) p. 577. *The Marsh Mint.* A herb of the W. Himalaya, very common in Indian gardens, with ovate acute serrate leaves. Fl. B. I. v. 4, p. 648 ; Grah. Cat.

p. 151 ; Dalz. & Gibs. Suppl. p. 68 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Watt, Dict. Econ. Prod. v. 5, p. 228.—VERN. *Pudina.*

Mentha piperita, Linn. Sp. Pl. (1753) p. 576. *Peppermint.* A herb 1—2 ft. high with a reddish branched stem, ovate-oblong petiolate leaves, and purple flowers in short obtuse loose spikes, grown sometimes in gardens. Fl. B. I. v. 4, p. 647 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Watt, Dict. Econ. Prod. v. 5, 229.

Hyptis suaveolens, Poit. in Ann. Mus. Par. v. 7 (1806) p. 472, t. 29, fig. 2. A rigid erect annual 2—3 ft. high, a native of Tropical America and the W. Indies, with petiolate ovate (or the lower cordate) serrate leaves and blue flowers, is grown in gardens or sometimes found as an escape. Fl. B. I. v. 4, p. 630 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 361 ; Prain, Beng. Pl. p. 848.

ORDER XCIX. PLANTAGINACEÆ.

Scapigerous annual or perennial herbs. Leaves usually radical. Scapes axillary. Flowers small, greenish, spicate, often dimorphic, bracteate. Sepals 4, imbricate in bud, persistent. Corolla scarious, hypogynous ; lobes 4, short, imbricate in bud. Stamens 4, inserted on the corolla-tube ; filaments filiform, persistent ; anthers large, pendulous, versatile. Ovary superior, 1—4-celled ; ovules 1—8 in each cell. Capsule 1—4-celled, circumscissilely dehiscent, membranous, 1- or more-seeded. Seed usually attached by the centre ; testa thin, mucilaginous ; albumen fleshy ; embryo cylindric, transverse ; radicle inferior.—DISTRIB. Genera 3 ; species scarcely 100.

1. PLANTAGO, Linn.

Characters of the Order.

Corolla-lobes glabrous.	
Cells of capsule 4—8-seeded	1. *P. major.*
Cells of capsule 1—2-seeded.	
Corolla-lobes acute.	
Leaves usually 3-nerved, shortly petiolate; bracts acute, shorter than the calyx	2. *P. Stocksii.*
Leaves 5-nerved, sheathing at the base; bracts obtuse, as long as or longer than the calyx...	3. *P. amplexicaulis.*
Corolla-lobes obtuse	4. *P. ovata.*
Corolla-lobes hirsute; leaves oblanceolate	5. *P. ciliata.*

1. **Plantago major,** *Linn. Sp. Pl.* (1753) p. 112. A perennial herb with an erect stout rootstock. Leaves alternate, radical, 1—5 in. long, of variable width, ovate or ovate-oblong, obtuse or subacute, entire or toothed, nearly glabrous, base tapering and decurrent into the petiole 3—7 (commonly 5)-nerved ; petioles usually longer than the leaf-blade, broad, sheathing at the base. Flowers scattered or crowded in long slender rather lax spikes 2—6 in. long ; bracts

$\frac{1}{16}$—$\frac{1}{12}$ in. long, shorter than the calyx, broadly ovate-oblong, obtuse, with scarious margins. Calyx $\frac{1}{8}$ in. long, glabrous; sepals oblong, obtuse or subacute, obtusely keeled on the back and with broad scarious margins. Corolla $\frac{1}{8}$ in. long, glabrous; lobes lanceolate, acute, reflexed. Capsules ovoid, $\frac{1}{8}$—$\frac{1}{6}$ in. long, glabrous, dehiscing circumscissilely a little above the base, the top coming off as a conical lid tipped with the remains of the style. Seeds 4—8, angled, rugulose, dull-black, $\frac{1}{50}$ in. long. Fl. B. I. v. 4, p. 705; Trim. Fl. Ceyl. v. 3, p. 389; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Watt, Dict. Econ. Prod. v. 6, part 1, p. 285.—Flowers: Sept.—Feb. VERN. *Bártang.*

Rare. KONKAN: Bombay, *Stocks*! DECCAN: Mahableshwar along the banks of the Yenna River, *Cooke*!, *H. M. Birdwood*; Poona, *Woodrow*!—DISTRIB. India (temperate and alpine Himalaya, Assam, Birma, W. Peninsula); Ceylon, Malaya, Afghanistan, and westwards to the Atlantic; wild or introduced in these and many other countries.

The seeds are used in Indian medicine, having the same properties ascribed to them as to those of *P. ovata*. They are largely imported from Persia. See Watt, Dict. Econ. Prod. l. c.

2. **Plantago Stocksii,** *Boiss. in DC. Prodr.* v. 13, part 1 (1852) p. 720. Annual or perennial, cobwebby or subsilky with white hairs. Leaves 1½—4 by $\frac{3}{8}$—$\frac{7}{8}$ in., shortly petiolate, lanceolate, long-acuminate, entire, usually 3 (rarely 5)-nerved, tapering at the base into a short often obscure petiole. Flowers on slender scapes which are longer than the leaves; spikes short and few-flowered, or long with many distant flowers; bracts $\frac{1}{8}$ in. long, broadly ovate, acute, with broad scarious margins. Calyx $\frac{1}{8}$ in. long, glabrous; sepals ovate-oblong, obtuse, with broad scarious margins. Corolla-lobes nearly $\frac{1}{10}$ in. long, narrowly ovate-lanceolate, very acute, reflexed. Capsules $\frac{1}{4}$ in. long, 2-seeded, ovoid, subobtuse, tipped with the style-base, smooth, brown, the top coming off as a conical lid. Seeds $\frac{1}{8}$ in. long, 1 in each cell, oblong, boat-shaped, black. Fl. B. I. v. 4, p. 706; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363. *Plantago remotiflora,* Stocks, in Kew Journ. Bot. v. 4 (1852) p. 179. —Flowers: Mar.

Rare. *Dalzell* without locality in Herb. Kew. SIND: Kirthár Mountains, *Sir E. James* ex *Woodrow.*—DISTRIB. N. W. India, Beluchistan, Afghanistan.

3. **Plantago amplexicaulis,** *Cav. Icon.* v. 2 (1793) p. 22, t. 125. Annual or perennial, more or less hairy, stemless or with a short stem, often branched above. Leaves 3—6 by ½ in., narrowly lanceolate, acuminate, 5-nerved, narrowed and sheathing at the base, entire or very distantly toothed. Scapes numerous, axillary, terete, glabrous, usually exceeding the leaves. Flowers in ovoid spikes ½—1½ in. long; bracts $\frac{1}{8}$ in. long, cucullate, broadly ovate-oblong, obtuse, membranous except the green midrib. Calyx $\frac{1}{8}$—$\frac{1}{6}$ in. long; sepals ovate-oblong, subacute, all membranous except the midrib which in the inner sepals is very narrow, sometimes almost 0. Corolla glabrous; tube $\frac{1}{8}$ in. long; lobes $\frac{1}{8}$ by $\frac{1}{16}$ in., ovate, acute, concave. Capsules $\frac{1}{4}$ in. long, 2-seeded, ovoid, subobtuse, pale-brown, smooth, the top coming off as a conical lid. Seeds $\frac{1}{8}$ in. long, oblong, boat-shaped, nearly black. Fl. B. I. v. 4, p. 706; Woodr.

in Journ. Bomb. Nat. v. 12 (1899) p. 363; Watt, Dict. Econ. Prod. v. 6, part 1, p. 284.—VERN. *Gajpipali.*

Rare. SIND: Boogta hills, *Vicary!*—DISTRIB. India (Panjáb plains, Malwa); westwards to Egypt and Greece.

4. **Plantago ovata,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 31. A stemless or nearly stemless softly hairy or woolly annual. Leaves 3—9 in. long, scarcely reaching ¼ in. broad, narrowly linear or filiform, finely acuminate, entire or distantly toothed, attenuated at the base, usually 3-nerved. Scapes longer or shorter than the leaves, glabrous or pubescent. Flowers in ovoid or cylindric spikes ½—1½ in. long; bracts ⅛ in. long and about as broad as long, broadly ovate or suborbicular, concave, membranous except the narrow midrib, glabrous. Calyx ⅛ in. long, usually glabrous; sepals elliptic, obtuse, concave, scarious except the midrib which is as broad (or nearly so) in the inner as in the outer sepals. Corolla-lobes rounded, ⅛ in. long, concave, obtuse, apiculate, glabrous. Capsules ⅛ in. long, ellipsoid, obtuse, the upper half coming off as a blunt conical lid, membranous, glabrous. Seeds ⅛ in. long, ovoid-oblong, boat-shaped, smooth, yellowish-brown. Fl. B. I. v. 4, p. 707; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Watt, Dict. Econ. Prod. v. 6, part 1, p. 285. *Plantago Ispaghula,* Roxb. Fl. Ind. v. 1 (1832) p. 404.—VERN. *Ispaghul.*

Doubtfully indigenous in SIND. Stocks says it occurs in gardens near Karachi.—DISTRIB. India (Panjáb plains and low hills from the Sutlej westwards; in other parts cultivated); westwards to Spain and the Canary Islands. Under the name *Ispaghul* or *Spogel,* the seeds are largely imported into Bombay from Persia, and valuable medicinal properties are ascribed to them. They form with boiling water a rich tasteless mucilage which is employed as a remedy for diarrhœa and dysentery and generally as a demulcent. See Watt, Dict. Econ. Prod. l. c.

5. **Plantago ciliata,** *Desf. Fl. Atlant.* v. 1 (1798) p. 137, t. 39. Annual or perennial, often dwarf, stemless or very shortly caulescent, densely silky or woolly. Leaves 1—4 by ⅛—⅓ in., usually oblanceolate, mucronate, densely silky or villous, entire or slightly and irregularly toothed, base tapering into a long or short petiole which is often obscure owing to the decurrence of the leaf-blade. Scapes stout, numerous, softly woolly, shorter or longer than the leaves. Flowers in ovoid or cylindric spikes ½—1¾ in. long; bracts ⅛—⅓ in. long, ovate-oblong, obtuse, hairy and ciliate with long slender hairs, membranous except the green midrib. Calyx ⅛ in. long; sepals oblong-obovate, membranous, with a green midrib (that of the inner sepals very narrow), hairy on the back with long slender hairs. Corolla-tube ⅛ in. long, glabrous; lobes $\frac{1}{10}$ in. long, ovate-lanceolate, acuminate, finely pointed, silky-hairy on the back. Capsules subglobose, ⅛ in. long, 2-seeded, the top coming off as a subhemispherical lid. Seeds $\frac{1}{10}$ in. long, broadly ovoid, boat-shaped, with membranous margins, smooth. Fl. B. I. v. 4, p. 707; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363.

SIND: Kirthár Mountains, *Sir E. James* ex *Woodrow.*—DISTRIB. India (Panjáb hills); westwards to Arabia and Egypt.

ORDER C. NYCTAGINACEÆ.

Herbs, shrubs or trees. Leaves usually opposite, entire; stipules 0. Flowers hermaphrodite (rarely unisexual), regular, sometimes dimorphous; inflorescence various; bracts often involucrate, free or connate. Perianth monosepalous, usually small, petaloid; tube persistent, enveloping the fruit; limb 3—5-lobed, persistent or deciduous, the lobes plicate in bud. Stamens 1—30, hypogynous, sometimes unilateral; filaments small, unequal, inflexed in bud; anthers included or exserted, dorsifixed, didymous. Ovary 1-celled, free; ovule solitary, basal, erect; style filiform, involute in bud; stigma small, simple or multifid. Fruit membranous, indehiscent, enclosed in the coriaceous perianth-tube. Seed erect; testa adherent; albumen soft or floury; embryo straight with convolute cotyledons or incurved; radicle inferior.—DISTRIB. Genera 22; species about 220 in tropical and warm regions.

Embryo hooked; radicle long; limb of perianth plicate	1. BOERHAAVIA.
Embryo straight, radicle short; limb of perianth induplicatovalvate	2. PISONIA

1. BOERHAAVIA, Linn.

Erect or diffuse often divaricately branched herbs. Leaves opposite, often in unequal pairs. Flowers small, paniculate, umbellate or subcapitate, articulated with the pedicel; bracteoles small, often deciduous, rarely whorled and involucrate. Perianth-tube long or short, ovoid below, narrowed above the ovary; limb funnel-shaped with 5-lobed margin, the lobes plicate. Stamens 1 or 2—5, connate below, exserted; filaments capillary, unequal. Ovary oblique, stipitate; ovule erect; stigma peltate. Fruit enclosed in the ovoid, turbinate or clavate, obtuse or truncate perianth-tube, round, 5-ribbed or 5-angled, viscidly glandular. Seeds with adherent testa; embryo hooked; cotyledons thin, broad, the outer the larger, enclosing a soft scanty albumen.—DISTRIB. Tropical and Subtropical; species about 30.

Herbaceous, diffuse or subscandent.	
Fruit glandular along the ribs not at the crown.	
Flowers pink or purple, in small umbels, sessile or with very short pedicels; opposite pairs of leaves very unequal, obtuse	1. *B. diffusa.*
Flowers pink, in umbels with pedicels ¼—½ in. long; opposite pairs of leaves nearly equal, acute	2. *B. repanda.*
Fruit with large glands at the crown; flowers in whorls, white; leaves obtuse	3. *B. verticillata.*
Shrubby, erect.	
Leaves ovate, acute, petiolate; stem and branches stout, densely clothed with viscid glandular hairs; fruit glandular along the ribs	4. *B. fruticosa.*
Leaves linear-oblong, obtuse, sessile; stem and branches slender, glabrous; fruit not glandular along the ribs	5. *B. elegans.*

1. **Boerhaavia diffusa,** *Linn. Sp. Pl.* (1753) p. 3. Herbaceous, diffuse; root large, fusiform; stems prostrate or ascending, reaching

2—3 ft. long, divaricately branched, slender, cylindric, thickened at the nodes, minutely pubescent or nearly glabrous, often purplish. Leaves at each node in unequal pairs, the larger 1—1½ in., the smaller ½—¾ in. long, both nearly as broad as long, broadly ovate or suborbicular, rounded at the apex, green and glabrous above, usually white with minute scales beneath, the margins entire, often colored pink, somewhat undulate, base rounded or subcordate ; petioles nearly as long as the blade, slender. Flowers very small, shortly stalked or nearly sessile, 4—10 together, in small umbels arranged in slender long-stalked corymbose, axillary and terminal panicles ; bracteoles small, lanceolate, acute. Perianth ⅛ in. long ; ovarial part of tube ⅒ in. long, contracted above the ovary, glandular-viscid ; limb funnel-shaped, dark-pink, with 5 narrow vertical bands outside. Stamens 2 or 3, slightly exserted. Fruit ⅛ in. long, clavate, rounded, broadly and bluntly 5-ribbed, very glandular. Dalz & Gibs. p. 213 ; Trim. Fl. Ceyl. v. 3, p. 390 ; Watt, Dict. Econ. Prod. v. 1, p. 485. *Boerhaavia repens,* Linn. Sp. Pl. (1753) p. 3 ; Hook. f. Fl. B. I. v. 4, p. 709 ; Dalz. & Gibs. p. 213 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Prain, Beng. Pl. p. 862. *B. repens,* vars. *diffusa & procumbens,* Hook. f. Fl. B. I. v. 4, p. 709. *B. procumbens,* Roxb. Fl. Ind. v. 1, p. 146 ; Grah. Cat. p. 167 ; Wight, Icon. t. 874.—Flowers : Nov. VERN. *Vasu ; Ghetuli.*

A troublesome weed, very abundant throughout the Presidency especially in the Deccan and Gujarat. It is a Protean plant changing its appearance according to soil and situation.—DISTRIB. Throughout India; Ceylon; Tropical and subtropical Asia, Africa and America.

The leaves are eaten as a pot-herb and the root is employed in medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Boerhaavia repanda,** *Willd. Sp. Pl.* v. 1 (1797) p. 22. A diffuse subscandent glabrous or pubescent herb ; branches 3—6 ft. long, with long internodes, cylindric, glabrous or nearly so. Leaves 1½—2¾ by 1¼—2 in., deltoid-ovate, acute or acuminate, repand-sinuate, glabrous above, pubescent beneath, the opposite nearly equal, base usually cordate or truncate ; petioles ⅜—1¼ in. long, slender. Flowers in 3—8-flowered umbels on long slender peduncles 1—2¼ in. long ; bracteoles beneath the umbels ⅒—⅛ in. long, lanceolate, acute ; pedicels ½—¾ in. long, very slender. Perianth pink, rather less than ½ in. long ; ovarial part of the tube ⅛ in. long, the petaloid portion narrow below ; lobes of the limb emarginate. Stamens 4 or 5, much exserted. Fruit ¼ in. long, clavate, faintly ribbed, rough with glandular knobs. Fl. B. I. v. 4, p. 709 ; Dalz. & Gibs. p. 213 ; Wight, Icon. t. 1766 ; Trim. Fl. Ceyl. v. 3, p. 390 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Prain, Beng. Pl. p. 862.—Flowers : Oct.—Dec. or more or less throughout the year. VERN. *Punarnavá ; Pungali.*

KONKAN : *Stocks* ! DECCAN : *Woodrow;* Dongergaon near Ahmednagar, *Cooke* ! GUJARAT : in hedges at Surat, *Dalzell & Gibson.*—DISTRIB. Throughout India; Ceylon, Beluchistan.

3. **Boerhaavia verticillata,** *Poir. Encyc. Méthod.* v. 5 (1804) p. 56. Decumbent or climbing among bushes ; branches long, pale, terete, glabrous. Leaves thick, 1½—2¼ in. long, nearly as broad

or sometimes broader than long, broadly ovate or suborbicular (rarely oblong), obtuse, mucronate, usually glabrous with sinuate margins, base usually cordate ; petioles ½—¾ in. long, stout. Flowers in long-pedunculate racemes arranged in few-flowered distant whorls along a slender rhachis ; bracteoles small, ovate-oblong, acute, deciduous ; pedicels very variable in length, ¼—¾ in. long, slender. Perianth ⅛ in. long, usually white ; ovarial part of tube 1/12 in. long, much narrowed above the ovule, the petaloid portion funnel-shaped ; lobes of the limb 2-fid. Stamens not much exserted. Fruit ⅛ in. long, clavate, furnished with large semi-globose glands round the crown. Fl. B. I. v. 4, p. 710 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363. *Boerhaavia stellata,* Wight, Icon. t. 875 ; Dalz. & Gibs. p. 213. *B. scandens,* Grah. Cat. p. 167 (*not* of Linn.).—Flowers : Aug.—Dec. VERN. *Sátura.*

Stocks without locality in Herb. Kew. ! ; *Dalzell* without locality in Herb. Kew ! KONKAN : *Woodrow* ! DECCAN : *Woodrow* ; Deccan hills, *Woodrow,* 8 ! ; Dhavaleshvar hill near Rájvádi Railway Station, S. M. Railway, *Kanitkar* ! GUJARAT : Kathiawar, *Woodrow, Dalzell & Gibson.* SIND : *Dalzell,* 75 ! *Stocks,* 51 !—DISTRIB. India (Panjáb, W. Peninsula) ; Afghanistan, Beluchistan, and westward to Syria and Tropical Africa.

4. **Boerhaavia fruticosa,** *Dalz. in Dalz. & Gibs. Bo. Fl.* (1861) p. 213. Shrubby, erect, the whole plant clothed with viscid glandular hairs ; stem near the base 1½ in. in diam. or more ; branches stout, terete. Leaves 1¼—2 by ⅝—1½ in., ovate or deltoid-ovate, acuminate, glandular-hairy on both sides, base usually truncate ; petioles ¼—⅝ in. long, stout, glandular-hairy. Flowers in umbels which are usually solitary on the top of the peduncle, but sometimes superposed ; peduncles ½—1¾ in. long, stout, glandular-hairy ; bracteoles ⅛ in. long, linear-lanceolate, acute ; pedicels ¼—⅛ in. long, 6—8 in an umbel, stout, glandular-hairy. Perianth rather more than ⅛ in. long, pink ; ovarial portion of the tube 1/10 in. long. Stamens 3 (*Dalzell*), much exserted. Fruit ⅛ in. long, clavate, ribbed, furnished with a row of glands along the ribs.

Dalzell in his description (*l. c.*) describes the pedicels as nearly as long as the peduncle, which is an error. Fl. B. I. v. 4, p. 710 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363.

Rare. KONKAN : *Stocks* ! Shivnar Fort and Ghâts to the east of Bombay, *Dalzell & Gibson.* Sir J. Hooker (Fl. B. I. l. c.) is of opinion that this is probably an African species.

5. **Boerhaavia elegans,** *Choisy, in DC. Prodr.* v. 13, part 2 (1849) p. 453. Shrubby below ; rootstock woody, much divided ; branches erect, 1—2 ft. long, glabrous, twiggy, terete. Leaves subsessile, curiously mottled with white when dry, 1—1¾ by ⅛—⅜ in., linear-oblong or oblong-lanceolate, obtuse, often mucronulate, fleshy, rugose and canescent beneath ; petioles 0—⅛ in. long. Flowers in very large lax much-branched trichotomous glabrous leafless panicles, sometimes reaching 10 by 8 in. ; branches of the panicle slender ; bracts at the forks 1/10 in. long, lanceolate, acute ; bracteoles beneath the flowers (when present) about 1/25 in. long, lanceolate, acute, deciduous ; pedicels ¾—1½ in. long, very slender. Fruit ⅛—⅛ in. long, clavate, with 5 obtuse strong quite glabrous ribs, minutely

hairy between the ribs. Fl. B. I. v. 4, p. 710 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363.

In the Bombay Presidency confined to Sind. SIND : *Stocks*, 814!—DISTRIB. India (Panjáb) ; Beluchistan, S. Arabia.

2. PISONIA, Linn.

Trees or shrubs unarmed or with axillary spines. Leaves opposite or alternate, entire. Flowers small, usually dicœcious, in paniculate subsessile or pedunculate cymes ; bracteoles 2—3, not involucrate. MALE FLOWERS : Perianth campanulate ; limb 5-lobed or 5-toothed, the segments induplicato-valvate. Stamens 6—10, exserted ; filaments connate below into a tube or ring ; anthers oblong or didymous. FEMALE FLOWERS : Perianth tubular, usually enlarged at the base. Ovary elongate, ovoid, sessile ; ovule solitary ; style included or exserted ; stigma capitellate, peltate or lacerate. Fruit cylindric, compressed, or 5-angled, with 5 viscid ribs or with rows of viscid stipitate glands ; utricle elongate, membranous. Seed with a hyaline testa adnate to the pericarp ; embryo straight ; albumen scanty, soft ; radicle inferior.—DISTRIB. Species 60, all tropical.

1. **Pisonia aculeata,** *Linn. Sp. Pl.* (1753) p. 1026. A large scandent shrub with many curved axillary nearly opposite sharp stout spines ; trunk reaching 6 in. in diam. ; branches numerous, subopposite, terete, slightly striate, finely pubescent or nearly glabrous. Leaves 1—3 by ½—1½ in., elliptic or elliptic-lanceolate, obtuse, entire, glabrous or nearly so, base tapering ; petioles ¼—¾ in. long. Flowers in small dense cymose pubescent clusters, combined into small pedunculate axillary panicles ; bracts and bracteoles scarcely $\frac{1}{20}$ in. long, ovate-oblong, obtuse, hairy ; pedicels short, pubescent, the fruiting pedicels much elongated. MALE FLOWERS : Perianth campanulate, $\frac{1}{10}$ in. long, pubescent outside, and with 5 deep triangular acute teeth. Stamens 6—10, much exserted. FEMALE FLOWERS : Perianth tubular, $\frac{1}{10}$ in. long, shortly 5-toothed ; style rather stout ; stigma lacerate. Fruit oblong or clavate, with long pedicels, 5-ribbed, pubescent between the ribs, each rib muricate with 1 or 2 vertical rows of stalked viscous glands. Fl. B. I. v. 4, p. 711 ; Grah. Cat. p. 167 ; Wight, Icon. tt. 1763-1764 ; Trim. Fl. Ceyl. v. 3, p. 391 ; Talb. Trees, Bomb. ed. 2, p. 275 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 268.—Flowers : Jan.—Mar.

Rare. *Dalzell* without locality in Herb. Kew.! KONKAN : *Law*! KANARA : near Bunwasi (Sirsi subdivision of N. Kanara), *Talbot*—DISTRIB. India (coast forests of Birma, the Andaman Islands, W. Peninsula) ; Ceylon, Tropical Asia, Africa, Australia, and America.

Pisonia morindifolia, R. Br. in Wall. Cat. (1828) 7130. A large branched unarmed shrub or small tree, found sparingly in the Andamans and the Malay Islands, known to Anglo-Indians as the *Lettuce Tree*. Leaves lettuce-green, the young ones almost white. Grown in tubs about bungalows in Bombay. The leaves of the male

plant are of a darker green than those of the female, which latter is therefore the more commonly cultivated. Dalz & Gibs. Suppl. p. 72 ; Wight, Icon. v. 5, part 2, p. 1, t. 1765 (name in the plate curiously misspelt) ; Trim. Fl. Ceyl. v. 3, p. 392 ; Woodr. Gard. in Ind. ed. 5, p. 425. *Pisonia alba,* Spanog. in Linnæa, v. 15 (1841) p. 342 ; Hook. f. Fl. B. I. v. 4, p. 711 ; Talb. Trees, Bomb. ed 2, p. 276 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Watt, Dict. Econ. Prod. v. 6, part 1, p. 268.—VERN. *Chinai-salit.*

The following not belonging to either of the foregoing genera, all natives of Tropical America, are commonly grown in gardens :—

Mirabilis Jalapa, Linn. Sp. Pl. (1753) p. 177. *The Marvel of Peru.* A large herbaceous plant grown in gardens throughout India and often found as an escape. It is continually in bloom with *Ipomœa*-like flowers, some dark crimson, some yellow or white, and some crimson striped with white or yellow. Grah. Cat. p. 167 ; Dalz. & Gibs. Suppl. p. 72 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Prain, Beng. Pl. p. 862 ; Watt, Dict. Econ. Prod. v. 5, p. 253.—Flowers : Aug.—Dec. VERN. *Gul-abbas.*

Bougainvillæa spectabilis, Willd. Sp. Pl. v. 2 (1799) p. 348 (*Buginvillæa*). A large thorny extensively climbing shrub, a native of Brazil, with pubescent branches and leaves, bearing in the hot season a profusion of small pale yellow flowers supported by large purple or magenta-colored bracts which render the plant a most conspicuous object, a perfect blaze of color in the hot weather. The plant was introduced from Bengal by Sir E. Perry and is now common in gardens as a covering to trellises, archways, and the like. Dalz. & Gibs. Suppl. p. 72 ; Woodr. Gard. in Ind. ed. 5, p. 424 ; Prain, Beng. Pl. p. 863.

A variety (*lateritia*) with brick-red bracts is sometimes grown.

Bougainvillæa glabra, Choisy, in DC. Prodr. v. 13, part 2 (1849) p. 437. A plant a native of Brazil, very like the former but of more weakly growth, with glabrous branches and leaves, and almost, if not entirely, free from spines. Flowers more or less throughout the year, while *B. spectabilis* only flowers in the hot season. Woodr. Gard. in Ind. ed. 5, p. 424 ; Prain, Beng. Pl. p. 863.

ORDER CI. ILLECEBRACEÆ.

Annual or perennial herbs. Leaves usually opposite ; stipules scarious. Flowers minute, usually hermaphrodite, cymose, often with scarious bracts. Perianth herbaceous or coriaceous, persistent and often indurated after flowering, 4—5-lobed or 4—5-partite. Petals 0. Stamens as many as the segments of the perianth (rarely fewer or more) and opposite to them, perigynous (rarely hypogynous) ; filaments short ; anthers didymous. Ovary free, 1-celled ; ovule solitary in each cell, erect, or pendulous from a basal funicle ; style 2—5-fid. Utricle enclosed in the perianth. Seed globose,

lenticular or reniform ; testa smooth ; albumen floury ; embryo straight, curved or annular ; cotyledons oblong ; radicle inferior.—DISTRIB. Genera 17 ; species about 70 in most warm dry regions.

1. COMETES, Linn.

Low annular branched herbs. Leaves opposite, sessile or narrowed into a short petiole, mucronate, entire ; stipules minute, setaceous. Flowers 3 together, the central flower only perfect, surrounded by ferruginous feathery many-partite at length elongate and squarrose bracts. Perianth herbaceous, 5-partite ; segments erect, linear-oblong, awned at the back below the apex. Stamens 5, perigynous, alternating and united with 5 membranous staminodes forming a cup below ; anthers didymous. Ovary ovoid-lanceolate, attenuated into a filiform curved style with 3 minute stigmas ; ovule erect. Utricle enclosed in the perianth, obovoid. Seed obovoid, erect ; testa membranous, with a large lateral chalaza ; embryo large, on one side of scanty albumen ; cotyledons oblong, plano-convex ; radicle inferior. —DISTRIB. N. Africa and Orient (chiefly W. India) ; species 2.

1. **Cometes surattensis,** *Burm. Fl. Ind.* (1768) p. 39, t. 15, fig. 5. A low herb 4—10 in. high, much-branched from near the base, woody below ; branches numerous, erect, terete, pale, glabrous or the young ones slightly pubescent. Leaves ½—1 by ⅛—½ in., elliptic, acute, mucronate, glabrous, base acute, decurrent into a short often obscure petiole $\frac{1}{10}$—¼ in. long. Flowers 3 together in heads ½—¾ in. in diam. (including the bracts), surrounded by numerous pinnatipartite feathery yellowish-red bracts whose ultimate segments are needle-like, which close and interlace over the fruit preventing the escape of the seed and causing it to germinate in the head. Stamens longer than the staminodes. Fl. B. I. v. 4, p. 712 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363.—Flowers : Nov.—Jan.

Rare ; in the Bombay Presidency confined to Sind. SIND : *Stocks,* 500 ! *Dalzell,* 72 ! ; hills at the Hub near Karachi, *Bhola Puran* !—DISTRIB. Beluchistan, Wazaristan, and westwards to S. Arabia.

The specific name of the plant is a misnomer as it is not found at Sur-

ORDER CII. AMARANTACEÆ.

Herbs (rarely shrubs), erect or with climbing branches. Leaves opposite or alternate ; stipules 0. Flowers usually hermaphrodite (rarely polygamous or dioecious), small, usually in terminal simple or paniculate spikes, cymes or clusters (the outer flowers of a cluster sometimes deformed) ; bracts hyaline or scarious, never leafy ; bracteoles 2, scarious. Perianth usually of 5 free or slightly connate hyaline or scarious persistent sepals, imbricate in bud. Stamens 1—5, opposite the sepals, usually included ; filaments usually connate below or united with intervening membranous staminodes in a hypogynous cup ; anthers 1- or 2-celled. Ovary 1-celled, ovoid, ellipsoid or globose ; ovules 1 or more, amphitropous, erect or pendent

from short or long free basal funicles; style sometimes simple or obsolete with capitellate or small stigma, sometimes 2—3-fid with acute stigmas; or styles 2 or 3 papillosely stigmatic on the lower face, erect or recurved. Fruit a membranous utricle, rarely a circumscissilely or irregulaly rupturing capsule, very rarely a berry, inclosed in or supported by the persistent perianth. Seed inverted or erect, orbicular, ovate or reniform, compressed; testa crustaceous; embryo horseshoe-shaped or annular, surrounding a floury albumen.—DISTRIB. Genera 48; species about 500, tropical and sub-tropical.

Leaves alternate; staminodes 0.
- Ovary 2-many-ovulate ..... 1. CELOSIA.
- Ovary 1-ovulate.
  - Ovules erect.
    - Flowers 2-sexual.
      - Flowers capitate; fruit a circumscissile capsule; seed arillate..... 2. ALLMANIA.
      - Flowers spicate; fruit a crustaceous nut; seed not arillate..... 3. DIGERA.
    - Flowers 1-sexual ..... 4. AMARANTUS.

Leaves alternate or fascicled or with opposite and alternate mixed (never all opposite); stamens with interposed staminodes; ovules suspended from a basal funicle ..... 5. ÆRUA.

Leaves all opposite, not fascicled; ovary 1-celled; ovules suspended from a basal funicle.
- Anthers 2-celled.
  - Flowers all perfect, spicate.
    - Staminodes 0.
      - Stamens 5 ..... 6. PSILOSTACHYS.
      - Stamens 2 ..... 7. NOTHOSÆRUA.
    - Stamens with interposed staminodes; bracts and bracteoles hard, spinous..... 8. ACHYRANTHES.
  - Flowers clustered 1—3 perfect surrounded by deformed ones.
    - Stamens with interposed staminodes..... 9. CYATHULA.
    - Staminodes 0 ..... 10. PUPALIA.
- Anthers 1-celled ..... 11. ALTERNANTHERA.

1. CELOSIA, Linn.

Herbs usually annual. Leaves alternate. Flowers hermaphrodite, in dense terminal and axillary spikes, sessile or shortly pedicellate, white or colored; bracts scarious; bracteoles 2, scarious. Perianth of 5 segments slightly connate below, scarious, oblong or lanceolate, acute or obtuse, striate, erect in fruit. Stamens 5; filaments connate below in a membranous hypogynous cup; anthers 2-celled; staminodes 0. Ovary 1-celled, ovoid or subglobose; ovules 2 or more, on long funicles; style 0 or short or long, sometimes elongating in fruit; stigmas simple or 2 or 3, subulate. Fruit a circumscissilely dehiscent capsule membranous or sometimes corky or coriaceous. Seeds 2 or more, erect, lenticular; testa crustaceous, black, shining or dull; embryo annular, surrounding floury albumen; cotyledons linear; radicle descending or ascending. DISTRIB. Tropical Asia, Africa and America; species 35.

Flowers in dense spikes 1—6 in. long.....	1. *C. argentea.*
Flowers in distant small clusters on a spicate inflorescence.	
Leaves more than 1 in. long, narrowly ovate; branches, rhachis of the spike, and petioles glabrous	2. *C. pulchella.*
Leaves less than 1 in. long, broadly ovate; branches, rhacis of the spike, and petioles hairy.	3. *C. polygonoides.*

1. **Celosia argentea,** *Linn. Sp. Pl.* (1753) p. 205. Annual, 1—3 ft. high, glabrous ; stem erect, simple or ascending ; branches grooved. Leaves variable, 1—4 by ½—1¼ in., linear or linear-lanceolate (rarely ovate), acute, entire, glabrous, base much tapering into a short petiole or leaves sessile. Flowers at first pinkish, afterwards glistening white, crowded and imbricate, in close cylindric blunt or acuminate terminal spikes 1—6 by ¾—1 in., sometimes branching at the apex in a cock's-comb form ; bracteoles ⅛—¼ in. long, linear-lanceolate, scarious. Perianth ⅛ in. long or more ; sepals linear-lanceolate, acute, scarious, with 3 close parallel slender striæ on the back. Stamens short ; filaments connate into a cup. Style filiform, elongate after flowering, sometimes exserted in fruit. Capsules ⅛—¼ in. long, ellipsoid, tapering at the apex into the style, circumscissile about the middle. Seeds 4—8, subreniform, compressed, 1/16 in. in diam., black, polished, shining. Fl. B. I. v. 4, p. 714 ; Grah. Cat. p. 167 ; Dalz. & Gibs. p. 215 ; Wight, Icon. t. 1767 ; Trim. Fl. Ceyl. v. 3, p. 393 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Prain, Beng. Pl. p. 867 ; Watt, Dict. Econ. Prod. v. 2, p. 240.—Flowers : Oct.—Dec. VERN. *Kurdu.*

A very variable plant (doubtfully indigenous, although its native country is uncertain) which assumes very different appearances according to the soil or situation in which it may be found (*Graham*). Common everywhere in fields at the close of the rains in the Bombay Presidency and also throughout India, Ceylon, Tropical Asia, Africa and America, cultivated or introduced.

2. **Celosia pulchella,** *Moq. in DC. Prodr.* v. 13, part 2 (1849) p. 238. Slender, diffusely branched, 1—3 ft. high, glabrous ; stem more or less woody below. Leaves 1½—2½ by ¾—1¼ in., ovate, acute, apiculate, entire, glabrous, base rounded, shortly cuneate ; petioles ½—¾ in. long, glabrous. Flowers small, 2 or 3 together in distant clusters, in elongate simple slender glabrous terminal spikes ; bracteoles 1/16 in. long, ovate-lanceolate, acute, scarious. Perianth 1/16 in. long, white ; sepals ovate, acute, scarious. Capsules ⅛—¼ in. long, ovoid, bluntly pointed, thickened at the top, exserted, circumscissile below the middle ; style short, stout ; stigmas usually 2, recurved. Seeds 8—12, reniform, 1/24 in. long, minutely rugose, dull-black. Fl. B. I. v. 4, p. 715 ; Wight, Icon. t. 1768 ; Trim. Fl. Ceyl. v. 3, p. 393 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363.—Flowers : Dec.

Rare. KANARA : *Talbot* ex *Woodrow.* I have seen no specimens from Kanara; there are none in Herb. Kew.—DISTRIB. India (W. Peninsula); Ceylon.

3. **Celosia polygonoides,** *Retz. Obs. Bot.* fasc. 2 (1781) p. 12. Perennial, 6—20 in. high ; rootstock woody ; stem diffusely branched ; branches hairy. Leaves ½—1 by ⅜—⅞ in., broadly ovate,

obtuse or subacute, entire, glabrous above, pubescent on the nerves beneath, base rounded, subcordate or shortly cuneate; petioles ¼—½ in. long, hairy. Flowers 2 or 3, in small distant clusters on erect slender terminal spikes with a hairy rhachis; bracteoles $\frac{1}{16}$ in. long, ovate, acute, scarious. Perianth $\frac{1}{12}$ in. long, white; sepals oblong-lanceolate, acute. Capsules nearly ⅛ in. long, flask-shaped, obtuse, with a much thickened head, circumscissile below the middle; style very short; stigmas 2, recurved. Fl. B. I. v. 4, p. 715; Trim. Fl. Ceyl. v. 3, p. 394; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363.—Flowers: Nov.

Rare. S. M. COUNTRY: Badami, *Bhiva*!, *Woodrow*.—DISTRIB. India (W. Peninsula); Ceylon.

Celosia cristata, Linn. Sp. Pl. (1753) p. 205. This, which seems scarcely if at all separable from *Celosia argentea*, is grown in gardens and found as an escape. As the well known *Cock's-comb* it develops under cultivation monstrous and curiously branched heads. Fl. B. I. v. 4, p. 715; Grah. Cat. p. 168; Dalz. & Gibs. p. 215; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Prain, Beng. Pl. p. 867; Watt, Dict. Econ. Prod. v. 2, p. 241.—VERN. *Murgha-ka-phul*.

2. **ALLMANIA**, R. Br.

Erect or diffuse herbs. Leaves alternate, narrow, entire. Flowers hermaphrodite, in terminal and axillary sessile or pedunculate heads; bracteoles 2, scarious. Perianth-segments 5, free or nearly so, scarious, oblong-lanceolate, erect in fruit. Stamens 5; filaments dilated at the base, connate in a membranous hypogynous cup; anthers 2-celled. Ovary 1-celled, ovoid, narrowed into a long straight style; ovule solitary, erect. Fruit a subglobose or ovoid circumscissilely dehiscent capsule. Seed erect, subglobose; testa black with a basal cup-shaped aril; embryo annular, surrounding copious albumen; cotyledons linear; radicle inferior.—DISTRIB. Tropical Asia; species about 3.

1. **Allmania nodiflora,** *R. Br. in Wall. Cat.* (1828) 6890. VAR. **aspera,** *Hook. f. Fl. B. I.* v. 4 (1885) p. 717. A much-branched herb 1—2 ft. high; branches slender, angular, hairy. Leaves 1¾—3 by ⅛—⅓ in., linear-lanceolate, acute, apiculate, more or less pubescent, base tapering; petioles 0 or obscure. Flowers in globose sessile or shortly stalked axillary and terminal heads ¼—⅝ in. in diam.; bracteoles exceeding the sepals, ¼ in. long, linear-lanceolate, with a long capillary awn, hairy along the keel on the back. Perianth ⅛—⅓ in. long; sepals oblong-lanceolate, acuminate, very acute, apiculate, with a strong midnerve which is often pubescent on the back. Capsules ⅛ in. in diam., membranous, subglobose, circumscissile about the middle. Seed $\frac{1}{16}$ in. in diam., subglobose, black, smooth, with a large membranous cup-shaped aril. *Allmania nodiflora*, Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363. *Chamissoa aspera*, Wight, Icon. t. 1772.

DECCAN: Purandhar Fort, *Bhiva*! S. M. COUNTRY: Badami, *Woodrow*.—DISTRIB. India (W. Peninsula).

3. DIGERA, Forsk.

Annual herbs with angular branches. Leaves alternate, entire, petiolate. Flowers in axillary pedunculate spikes, ternate, the 2 outer reduced to crested scales, the central perfect; bracts and bracteoles persistent. Perianth-segments 5, slightly connate below, oblong, erect, the 2 outer larger. Stamens 5, hypogynous; filaments free, filiform; anthers 2-celled; staminodes 0. Ovary 1-celled, truncate; ovule solitary, erect; style filiform; stigmas 2, recurved. Fruit a subglobose compressed crustaceous nut included in the perianth. Seed erect, globose; testa thin, adhering to the albumen; embryo annular; cotyledons linear; radicle descending.—DISTRIB. Throughout India; Ceylon, Afghanistan, Beluchistan, Arabia, N. Africa; species 1.

1. **Digera arvensis,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 65. An annual herb (becoming perennial, *Hook. f.*), 1—2 ft. high; branches glabrous, spreading. Leaves ¾—3 by ½—1¾ in., variable, thin, ovate or elliptic, acute or rounded at the apex, sometimes with reddish margins, glabrous; petioles ½—1 in. long. Flowers sessile, in threes in lax axillary pedunculate spikes 1—5 in. long; bracts and bracteoles $\frac{1}{10}$ in. long, ovate-lanceolate, acute, submembranous, persistent. Perianth ⅛ in. long, rose-colored; sepals ovate-oblong, acute. Stigmas 2, recurved. Fruit $\frac{1}{10}$—⅛ in. in diam., globose, somewhat compressed, margined, muriculate. Seed yellowish-brown. Fl. B. I. v. 4, p. 717; Dalz. & Gibs. p. 218; Trim. Fl. Ceyl. v. 3, p. 395; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Prain, Beng. Pl. p. 868; Watt, Dict. Econ. Prod. v. 3, p. 112. *Desmochæta muricata,* DC. Cat. Hort. Monsp. (1813) p. 103; Wight, Icon. t. 732; Grah. Cat. p. 168.—Flowers: Sept.—Nov.

Common after the rains more or less throughout the Presidency. DECCAN: *Woodrow;* Poona, *Cooke*!; Dhulia, *Woodrow*! GUJARAT: *Woodrow.* SIND: *Woodrow.*—DISTRIB. India (Bengal, N.W. Provinces, W. Peninsula); Ceylon, Afghanistan, Beluchistan, Arabia, N. Africa.

4. AMARANTUS, Linn.

Annuals. Leaves alternate. Flowers small, monœcious or polygamous, in axillary clusters or dense terminal and axillary spikes or panicles; bracteoles 2. MALE FLOWERS: Perianth of 5 (rarely 1—3) membranous equal or subequal ovate-lanceolate segments. Stamens 5 (rarely 1—3); filaments free, subulate or filiform; anthers 2-celled; staminodes 0. FEMALE FLOWERS: Perianth-segments oblong or spathulate, erect in fruit. Ovary ovoid, compressed, 1-celled; ovule solitary, subsessile, erect; styles 1—3 or 0. Fruit an orbicular or ovoid compressed utricle, or a circumscissile membranous or coriaceous capsule. Seed erect, orbicular, compressed; testa crustaceous; embryo annular, enclosing floury albumen; cotyledons linear; radicle inferior.—DISTRIB. Tropical and subtropical; species undetermined, a large proportion known only in cultivation. Several species are

grown in the Bombay Presidency as pot-herbs, and some of them make a very excellent spinach; one species is grown for its farinaceous seed.

Stamens 5; sepals 5.	
Leaf-axils with spines	1. *A. spinosus.*
Leaf-axils not spinous	2. *A. paniculatus.*
Stamens 3; sepals 3.	
Clusters of flowers axillary and in terminal spikes.	
Fruit circumscissile.	
Stem branching near the middle; yielding only 1 crop annually	3. *A. gangeticus.*
Stem branching near the base; yielding several crops annually	*A. gangeticus* var. *tristis.*
Fruit indehiscent.	
A low much-branched herb	4. *A. viridis.*
A tall succulent herb	5. *A. Blitum* var. *oleracea.*
Clusters of flowers all axillary; a prostrate annual; fruit usually circumscissile, sometimes indehiscent	6. *A. polygamus.*
Stamens 2; sepals 2	7. *A. tenuifolius.*

1. **Amarantus spinosus,** *Linn. Sp. Pl.* (1753) p. 991. An erect glabrous herb 1—2 ft. high; stems hard, often reddish, with many grooved branches and with sharp divaricate spines, often exceeding ½ in. long, in the leaf-axils. Leaves 1¼—3 by ½—1½ in., ovate or lanceolate, obtuse, spinous-apiculate, entire, glabrous above, sometimes scurfy beneath; main nerves numerous, slender, conspicuous below; petioles ¾—2½ in. long. Flowers very numerous, sessile, in dense axillary clusters and in terminal and axillary dense or interrupted spikes; bracteoles linear, bristle-pointed, usually longer than the sepals. Perianth of male flowers 1/10—⅛ in. long; sepals 5, ovate, acute, bristle-pointed. Perianth of female flowers scarcely 1/16 in. long; sepals 5, oblong, obtuse, apiculate. Stamens 5. Capsule 1/16 in. long; ovoid, thickened at the top, circumscissile about the middle, membranous, rugose; styles 2, divaricate, pubescent. Fl. B. I. v. 4, p. 718; Grah. Cat. p. 169; Dalz. & Gibs. p. 216; Wight, Icon. t. 513; Trim. Fl. Ceyl. v. 3, p. 396; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Prain, Beng. Pl. p. 869; Watt, Dict. Econ. Prod. v. 1, p. 215.—Flowers: Sept. VERN. *Kánte-Máth.*

Widely distributed throughout the Presidency in waste places, rubbish-heaps, and fields.—DISTRIB. Throughout India; Ceylon, many tropical countries.

The leaves make a fairly good spinach, though difficult to pick owing to the axillary spines. The root has considerable repute in native medicine. See Watt, Dict. Econ. Prod. l. c.

2. **Amarantus paniculatus,** *Linn. Sp. Pl.* ed. 2 (1763) p. 1406. A tall handsome plant 4—6 ft. high or more; stem stout, grooved and striate, glabrous or slightly pubescent. Leaves 2—6 by 1—3 in., elliptic-lanceolate, acute or acuminate, base cuneate; main nerves numerous, slender, prominent beneath; petioles 1—4 in. long. Flowers numerous, in dense thyrsoid gold-colored or red spikes, the central spikes the longest; bracteoles ⅛—¼ in. long, acicular,

exceeding the sepals. Perianth $\frac{1}{10}$—$\frac{1}{8}$ in. long ; sepals 5, oblong-lanceolate, acute, shortly awned. Stamens 5. Capsules $\frac{1}{8}$ in. long, ovoid, narrowed at the tip, circumscissile about the middle ; styles 3, short. Seeds $\frac{1}{20}$—$\frac{1}{16}$ in. in diam., subglobose, white, red or black. Fl. B. I. v. 4, p. 718 ; Dalz. & Gibs. p. 215 ; Duthie, Field & Gard. Crops, part 3, p. 23, t. 68 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Prain, Beng. Pl. p. 869. *Amarantus frumentaceus,* Buch.-Ham. in Roxb. Fl. Ind. v. 3 (1832) p. 609 ; Wight, Icon. t. 720 ; A. DC. Orig. Pl. Cult. ed. 3 (1886) p. 282 ; Watt, Dict. Econ. Prod. v. 1, p. 211.—VERN. *Rájgira.*

Cultivated for its farinaceous grain, which forms the staple food of the poorer classes of the hill tribes in many parts of India.—DISTRIB. Cultivated or as an escape in E. and W. Asia and Africa.

3. **Amarantus gangeticus,** *Linn. Syst. Nat.* ed. 10 (1759) p. 1268. An erect herb 2—4 ft. high ; stem stout, branching above the middle, often tinged with purple, grooved and striate, glabrous or nearly so. Leaves variable, 2—6 by 1—4 in., rhomboid-ovate or lanceolate or deltoid-ovate, obtuse, finely apiculate, often notched at the tip, glabrous, base long-tapering, decurrent on the petiole ; main nerves numerous, prominent beneath ; petioles 1—3 in. long. Flowers clustered in the axils and forming a long terminal more or less interrupted spike ; braceoles $\frac{1}{8}$ in. long, narrowly lanceolate-subulate, with a slender awn, membranous. Perianth $\frac{1}{8}$ in. long ; sepals 3, lanceolate, with a long capillary awn, membranous. Stamens 3. Capsules $\frac{1}{10}$ in. long, ovoid, suddenly narrowed at the apex, circumscissile about the middle, rugose, membranous ; styles 3, distinct. Seed $\frac{1}{16}$ in. in diam., lenticular, smooth and shining, black. Fl. B. I. v. 4, p. 719 ; Trim. Fl. Ceyl. v. 3, p. 396 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363 ; Prain, Beng. Pl. p. 869 ; Watt, Dict. Econ. Prod. v. 1, p. 212. *Amarantus oleraceus,* Willd. Sp. Pl. v. 4 (1805) p. 386 (*not* of Linn.) ; Roxb. Fl. Ind. v. 3, p. 605 ; Grah. Cat. p. 169 ; Wight, Icon. t. 715 ; Watt, Dict. Econ. Prod. v. 1, p. 214. Prain (Beng. Pl. l. c.) unites with this, *A. lanceolatus,* Roxb., *A. atropurpureus,* Roxb., *A. tricolor,* Willd., *A. melancholicus,* Willd., and *A. lividus,* Roxb.

Cultivated as a pot-herb and sometimes found as an escape.—DISTRIB. Throughout India; Ceylon, Tropical Asia, Africa, and America.

VAR. *tristis,* Prain, Beng. Pl. p. 869. An annual herb with many prostrate branches from near the base of the stem. The plant is cut down several times, a new crop of shoots springing up. Roxburgh (Fl. Ind. v. 3, p. 604) points out that it differs from *A. gangeticus* (*A. oleraceus,* Roxb.) in this particular as well as in its branching from the base and not from the middle of the stem as the type *A. gangeticus* does. *A. tristis* (sp.), Willd. Sp. Pl. v. 4 (1805) p. 385 ; Roxb. Fl. Ind. v. 3, p. 604 ; Grah. Cat. p. 169 ; Dalz. & Gibs. p. 215 ; Wight, Icon. t. 713 ; Watt, Dict. Econ. Prod. v. 1, p. 216. *A. polygamus,* Willd. Sp. Pl. v. 4 (1805) p. 384 (*not* of Linn.) ; Roxb. Fl. Ind. v. 3, p. 603 ; Wight, Icon. t. 714 ; Grah. Cat. p. 169.

Cultivated as a pot-herb.

4. **Amarantus viridis,** *Linn. Sp. Pl.* ed. 2 (1763) p. 1405. An erect much-branched glabrous herb 1—2 ft. high ; branches grooved, glabrous, often purplish. Leaves 1—3 by ½—2 in., ovate or deltoid-ovate, obtuse, usually notched at the apex, glabrous, base truncate or cuneate ; petioles ½—2 in. long. Flowers shortly pedicellate, pale green, in small axillary clusters and in slender tapering terminal and axillary paniculate spike-like racemes ; bracteoles ovate-oblong, acute, with a green keel, shorter than the sepals. Sepals 3, ovate-oblong, $\frac{1}{20}$—$\frac{1}{16}$ in. long, membranous, with a strong green keel. Utricle $\frac{1}{12}$ in. long, indehiscent, suborbicular, compressed, pointed, rugose ; styles 2 or 3, short. Seed $\frac{1}{25}$ in. in diam., lenticular, smooth, shining, black. Fl. B. I. v. 4, p. 720 ; Grah. Cat. p. 169 ; Trim. Fl. Ceyl. v. 3, p. 397 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 869 ; Watt, Dict. Econ. Prod. v. 1, p. 216.

A common weed in gardens and cultivated ground, *Graham.*

I have seen no specimens from the Bombay Presidency; there are none in Herb. Kew. Dalzell & Gibson do not include the plant in their Bombay Flora, while Woodrow, though including it in his list, assigns it no habitat. The plant is very common in Ceylon (*Trimen*).—DISTRIB. Throughout India in waste places and cultivated ground; Ceylon, all tropical countries.

5. **Amarantus Blitum,** *Linn. Sp. Pl.* (1753) p. 990. VAR. **oleracea,** Hook f. Fl. B. I. v. 4 (1885) p. 721. A tall erect succulent herb ; stem stout, pale, grooved and striate, glabrous. Leaves 1½—4½ by ⅜—2 in., ovate, obtuse, usually notched at the tip, glabrous, base cuneate ; main nerves slender, prominent beneath ; petioles 1—2½ in. long. Flowers in axillary clusters and in terminal simple or branched spikes ; bracteoles shorter than the sepals. Perianth $\frac{1}{16}$ in. long ; sepals 3, linear-oblong, obtuse or acute. Utricle $\frac{1}{10}$ in. long, broadly ovate, acute, indehiscent ; styles 3, very short. Seeds $\frac{1}{16}$ in. in diam., lenticular, smooth, shining, brown-black. Trim. Fl. Ceyl. v. 3, p. 398 ; Prain, Beng. Pl. p. 869. *Amarantus Blitum,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364. *A. oleraceus* (sp.), Linn. Sp. Pl. ed. 2 (1763) p. 1403. *Euxolus oleraceus,* Moq. in DC. Prodr. v. 13, part 2, p. 273 ; Dalz. & Gibs. p. 216.—VERN. *Tandulja.*

Cultivated in India and elsewhere in warm regions.

6. **Amarantus polygamus,** *Linn. Amœn. Acad.* v. 4 (1759) p. 294. A prostrate glabrous annual ; stems striate. Leaves ⅛—1 by ¼—½ in., obovate, obtuse, often notched at the tip, base tapering ; petioles ⅛—½ in. long. Flowers in axillary clusters ; bracteoles shorter than the sepals, lanceolate-oblong, awned, membranous, with a strong midnerve. Perianth $\frac{1}{20}$—$\frac{1}{16}$ in. long ; sepals 3, ovate-oblong, acute, membranous, awned and with a strong midnerve. Capsules $\frac{1}{16}$—$\frac{1}{12}$ in. long, ovoid, tapering towards the apex, usually circumscissile about the middle, rugose ; styles 3, distinct, sometimes recurved at the apex. Seeds $\frac{1}{20}$ in. in diam., lenticular, smooth and shining, black. Fl. B. I. v. 4, p. 721 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 869 ; Watt, Dict. Econ. Prod. v. 1, p. 214. *Amaranthus polygonoides,* Willd. Sp. Pl. v. 4 (1805) p. 389 ; Roxb. Fl. Ind. v. 3 (1832) p. 602 ; Wight, Icon. tt. 512 & 719 ; Trim.

Fl. Ceyl. v. 3, p. 397. *Amblogyna polygonoides*, Dalz. & Gibs. Bo. Fl. p. 218.—Flowers: Dec.—Mar. VERN. *Chavlái*; *Tándulja*.

A common weed in cultivated lands.—DISTRIB. Throughout India; Ceylon, most hot countries.

7. **Amarantus tenuifolius,** *Willd. Sp. Pl.* v. 4 (1805) p. 381. A prostrate glabrous herb; branches many from the root, 6—18 in. long, spreading. Leaves ½—1 by ⅛—¼ in., oblong or oblanceolate-oblong, rounded and usually notched at the apex, glabrous, base much tapered into the petiole; nerves prominent beneath; petioles ¼—½ in. long, often obscure owing to the decurrent leaf-blade. Flowers in small axillary clusters (the smallest clusters of the Indian species, *Hook. f.*); bracteoles shorter than the sepals, ovate-lanceolate, obtuse, with a green midnerve. Perianth $\frac{1}{20}$ in. long; sepals 2, ovate-oblong, subacute, concave. Stamens 2. Utricle $\frac{1}{30}$ in. in diam., orbicular, compressed, membranous, indehiscent. Seed $\frac{1}{30}$ in. in diam., lenticular, shining, brown. Fl. B. I. v. 4, p. 722; Grah. Cat. p. 169; Wight, Icon. t. 718; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364; Prain, Beng. Pl. p. 869; Watt, Dict. Econ. Prod. v. 1, p. 216. *Mengea tenuifolia*, Moq. in DC. Prodr. v. 13, part 2, p. 271; Dalz. & Gibs. p. 218.—VERN. *Ghol*; *Chavlái*.

A common weed; leaves used as a pot-herb.—DISTRIB. India (Bengal, Panjáb, W. India); Tropical Africa.

Amarantus caudatus, Linn. Sp. Pl. (1753) p. 990. *Love-lies-bleeding*, a well known plant of English gardens with drooping tail-like spikes of crimson flowers, is often cultivated in gardens in the Presidency. Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 363; Prain, Beng. Pl. p. 869; Watt, Dict. Econ. Prod. v. 1, p. 211.

Amarantus hypochondriacus, Linn. Sp. Pl. (1753) p. 991. *The Prince's Feather*, a very beautiful plant with crimson stems, leaves, and flowers, is cultivated as an ornamental plant in gardens. Watt, Dict. Econ. Prod. v. 1, p. 213.

5. ÆRUA, *Forsk.* (*Ærva*).

Herbs or undershurbs, erect, prostrate or climbing. Leaves alternate, or opposite, or fascicled. Flowers hermaphrodite or polygamous, in simple or panicled spikes; bracts and 2 bracteoles small. Perianth 5 (rarely 4)-lobed; sepals equal or the outer broader, all or only the 3 inner woolly. Stamens 5 (rarely 4); filaments connate, with short or long intervening staminodes, in a short hypogynous cup; anthers 2-celled. Ovary ovoid or sub-globose, 1-celled; ovule solitary, pendulous from a long basal funicle; style simple, short or long; stigma capitellate, or stigmas 2. Fruit a membranous utricle or circumscissile capsule with coriaceous crown. Seed inverse; testa coriaceous; embryo annular, surrounding floury albumen; cotyledons linear; radicle superior.—DISTRIB. Tropical Asia and Africa; species about 15. The oldest name for

the genus is *Ouret* (Adans. Fam. Pl. v. 2 (1763) p. 268). This has been adopted by Hiern [Cat. Welw. Afr. Pl. v. 1, part 4 (1900) p. 893].

Sepals 5.
Spikes axillary and terminal.
Erect; leaves alternate; flowers unisexual, dicœcious ..... 1. *Æ. javanica.*
Climbing; leaves alternate and opposite; flowers bisexual ..... 2. *Æ. scandens.*
Spikes all axillary; leaves alternate; flowers unisexual and bisexual..... 3. *Æ. lanata.*
Sepals 4; leaves filiform, fascicled; flowers bisexual. 4. *Æ. Monsoniæ.*

1. **Ærua javanica,** *Juss. in Ann. Mus. Par.* v. 2 (1803) p. 131. Suffruticose, hoary-tomentose, 2—3 ft. high ; stem terete, branched, as thick as a goose-quill, covered with a thick, easily detachable stellate tomentum. Leaves alternate, variable, 1—2½ by ⅛—⅝ in., sessile or nearly so, linear-oblong or oblong-spathulate, obtuse and slightly retuse, or acute, densely tomentose. Flowers unisexual, usually dicœcious, dull-white, sessile in linear or oblong spikes 1—6 in. long arranged in naked terminal panicles ; bracteoles broadly ovate, acute, white, hyaline. MALE FLOWERS : Perianth rather more than $\frac{1}{16}$ in. long ; sepals elliptic-oblong, subobtuse, woolly at the back. Rudimentary ovary ovoid, acute, usually shortly stipitate with a short style and minutely bifid stigma. FEMALE FLOWERS : Perianth $\frac{1}{16}$ in. long ; sepals oblong, subacute, apiculate ; style about $\frac{1}{32}$ in. long ; stigmas 2, as long as the style. Utricle orbicular-ovoid, very thin. Seed $\frac{1}{32}$ in. in diam., lenticular, shining, brown-black.

I have examined a large number of female flowers, but have not found the ring of staminodes depicted in Wight's Icon. t. 876, fig. 4. Fl. B. I. v. 4, p. 727 ; Dalz. & Gibs. p. 216 ; Wight, Icon. t. 876 ; Trim. Fl. Ceyl. v. 3, p. 402 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Watt, Dict. Econ. Prod. v. 1, p. 124.—Flowers : Aug.—Nov. VERN. *Buwádo* (Sindi).

DECCAN : Bijapur, *Cooke* ! SIND : Shikarpur, *Cooke* ! ; Ruk Junction near Railway Station, *Cooke* !—DISTRIB. India (Panjáb, Central India, Birma, W. Peninsula) ; Ceylon, Arabia, Tropical Africa, Cape de Verde Islands.

Very close to if really distinct from *Ærua tomentosa,* Lam. Mr. C. B. Clarke, who has been recently studying the African species, informs me that in his opinion the African plant is distinct from the Indian one.

2. **Ærua scandens,** *Wall. Cat.* (1828) 6911. A climbing undershrub ; branches straggling, more or less pubescent or tomentose, terete, striate. Leaves alternate and opposite, 1½—4 by ½—1½ in., elliptic-lanceolate, acute, finely mucronate, pubescent, base tapering into a short petiole ¼—½ in. long. Flowers bisexual, in ovoid or cylindric axillary and terminal subsessile solitary or twin woolly spikes ¼—1 in. long, sometimes forming a lax terminal panicle ; bracteoles ovate acuminate, membranous, shorter than the sepals. Perianth $\frac{1}{16}$ in. long ; sepals lanceolate, acuminate, silky on the back. Stamens 5 (rarely 4) ; filaments subulate, usually unequal, connate at the base into a short (rarely elongate) cup with interspersed short or long staminodes. Ovary glabrous, broadly ovoid ; style short, about $\frac{1}{32}$ in. long ; stigma capitate. Utricle broadly

ovate, acute, very thin, indehiscent. Seed $\frac{1}{30}$ in. in diam., lenticular, smooth, shining, black. Fl. B. I. v. 4, p. 727 ; Dalz. & Gibs. p. 217 ; Wight, Icon. t. 724 (utricle and seed incorrectly shown) ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 873 ; Watt, Dict. Econ. Prod. v. 1, p. 125.—Flowers : Dec.

KOKNAN : *Stocks* ! ; Bombay, *Dalzell & Gibson* ; Revadanda, *Kanitkar* ! ; Marmagão, *Woodrow*. DECCAN : Sinhagad, *Woodrow*, 338 ! KANARA : on the Kála naddi, common, *Ritchie*, 12.18.—DISTRIB. India [Bengal, Assam, Panjáb, Himalaya (lower hills), Central India, Behar, W. Peninsula] ; China, Malay Islands, Philippines, Tropical Africa.

3. **Ærua lanata,** *Juss. in Ann. Mus. Par.* v. 2 (1803) p. 131. Erect or prostrate with a long tap-root, branched from near the base ; branches many, terete, pubescent or woolly-tomentose, striate. Leaves alternate, $\frac{3}{4}$—1 by $\frac{3}{8}$—$\frac{5}{8}$ in. on the main stem, $\frac{1}{4}$—$\frac{3}{8}$ by $\frac{1}{8}$—$\frac{1}{4}$ in. on the branches, elliptic or obovate, or suborbicular, obtuse or acute, entire, pubescent above, more or less white with cottony hairs beneath ; petioles $\frac{1}{8}$—$\frac{1}{4}$ in. long, often obscure. Flowers greenish-white, very small, sessile, often bisexual, in small dense subsessile axillary heads or spikes $\frac{1}{4}$—$\frac{1}{2}$ in. long, often closely crowded and forming globose clusters ; bracteoles $\frac{1}{20}$ in. long, membranous, broadly ovate, concave, apiculate. Perianth $\frac{1}{16}$—$\frac{1}{20}$ in. long ; sepals oblong, obtuse, sometimes apiculate, silky-hairy on the back. Utricle broadly ovoid, acute ; stigmas 2. Seed $\frac{1}{30}$ in. in diam., smooth and polished, black. Fl. B. I. v. 4, p. 728 ; Grah. Cat. p. 168 ; Dalz. & Gibs. p. 217 ; Trim. Fl. Ceyl. v. 3, p. 402 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 873 ; Watt, Dict. Econ. Prod. v. 1, p. 124. *Ærua floribunda,* Wight, Icon. v. 6, t. 1776 *bis*, fig. A, and v. 5, t. 1776 (analyses only).—Flowers : Aug.—Oct. VERN. *Kapuri-maduri.*

A tolerably common weed. DECCAN : *Woodrow* ! ; Kothrud near Poona, *Kanitkar* ! ; Poona, *Woodrow* ! S. M. COUNTRY : Badami, *Woodrow* !—DISTRIB. Throughout India ; Ceylon, Arabia, Tropical Africa, Java, Philippines.

4. **Ærua Monsoniæ,** *Mart. in Nov. Act. Acad. Cæs. Leop.-Carol.* v. 13 (1826) p. 291 (*Beitr. Amarant.* p. 83). Perennial with a long twisted tap-root, branched from the base ; branches numerous, prostrate or ascending, subquadrangular, grooved, woolly (very densely so at the nodes). Leaves sessile, opposite and in fascicles at the nodes, $\frac{1}{4}$—$\frac{3}{4}$ in. long, narrowly linear, spinous-pointed, glabrous or sometimes slightly woolly, the midrib prominent beneath. Flowers pale-pink, bisexual, crowded in numerous dense cylindric silky-villous spikes $\frac{1}{2}$—1 in. long, terminating short lateral branches, racemosely arranged along the main branches ; bracteoles $\frac{1}{20}$—$\frac{1}{16}$ in. long, lanceolate, acute, aristate. Perianth $\frac{1}{16}$ in. long ; sepals 4, lanceolate, very acute, sightly villous on the back. Utricle ovoid, thinly membranous, enclosed in the staminal cup. Seed ellipsoid, $\frac{1}{40}$ in. long, pale-brown, polished. Fl. B. I. v. 4, p. 728 ; Dalz. & Gibs. p. 217 ; Wight, Icon. t. 725 ; Trim. Fl. Ceyl. p. 403 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 873. *Celosia Monsonia,* Retz. Obs. fasc. 2, p. 13 ; Grah. Cat. p. 168.—Flowers : Oct.—Jan.

Dalzell without locality in Herb. Kew.! S. M. COUNTRY: **Belgaum**, *Ritchie*, 1998!, *Stocks*!; Badami, *Woodrow*!, *Kanitkar*!, *Bhiva*!—DISTRIB. India (Bengal, Central India, Birma, W. Peninsula).

6. **PSILOSTACHYS,** Hochst.

Slender dichotomously branched herbs. Leaves opposite, petiolate. Flowers minute, in branched pedunculate cymes spicately arranged near the ends of the filiform branches of the cyme. Perianth 5-partite, coriaceous; the 2 or 3 outer sepals strongly 3-nerved, broader than the inner. Stamens 5, free; anthers 2-celled; staminodes 0. Ovary subglobose or ovoid, 1-celled; ovule solitary; style slender; stigma capitellate. Utricle indehiscent. Seed inverse, orbicular or subglobose; testa coriaceous, exarillate; embryo hooked; cotyledons linear, thin, obtuse, broader than the slender ascending radicle.—DISTRIB. India, Arabia and Africa; species 3.

1. **Psilostachys sericea,** *Hook. f. in Benth. & Hook. Gen. Plant.* v. 3 (1880) p. 32. Herbaceous, erect, whole plant silky; root-stock woody; stem hard below and, as well as the branches, clothed rather thinly with long silky hairs which sometimes exceed ¼ in. long. Leaves ⅜—1 by ⅜—¾ in., broadly ovate, acute, sparsely silky-hairy above, densely so beneath; petioles very short. Flowers in 3-branched pedunculate cymes, laxly spicately arranged near the tops of the cyme-branches; peduncles axillary, 1½—2½ in. long; branches of the cyme capillary, ¼—2 in. long; flowers 2—8, sessile or very shortly pedicellate; bracts below the origin of the cyme-branches small, ovate-lanceolate, aristate, often surrounded by tufts of silky hairs; bracteoles below the flowers $\frac{1}{30}$ in. long, ovate-lanceolate, very acute. Perianth ⅛ in. long, divided to within $\frac{1}{30}$ in. of the base; sepals 5, of equal length, the 3 outer ovate-oblong, acute, strongly 3-nerved, hairy and ciliate, the 2 inner sepals narrower than the outer. Utricle closely enclosed by the perianth, thinly membranous, subglobose; style short. Seed $\frac{1}{10}$ in. in diam., subglobose, smooth, shining, brown. Fl. B. I. v. 4, p. 726; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364. *Achyranthes sericea,* Koen. in Roxb. Fl. Ind. v. 1 (1832) p. 675; Wight, Icon. t. 726. *Psilotrichum sericeum,* Dalz. & Gibs. Bo. Fl. (1861) p. 216.—Flowers: Jan.

GUJARAT: Perim Island at the mouth of the Narbada River, *Cooke*!, *Raoji*!; coast of Kathiawar, *Dalzell*!—DISTRIB. Apparently endemic.

7. **NOTHOSÆRUA,** Wight.

An annual herb with opposite brachiate branches. Leaves opposite. Flowers minute, woolly, hermaphrodite, in axillary solitary or clustered spikes, bracteate and 2-bracteolate. Perianth hyaline; sepals 3—5, obtuse, 1-nerved. Stamens 1—2, hypogynous; filaments free; staminodes 0; anthers 2-celled. Ovary oblong, compressed; ovule solitary, pendulous from a long funicle; style short; stigma capitellate. Fruit a membranous oblong compressed utricle enclosed in the perianth. Seed inverse, lenticular; testa crustaceous; embryo

hooked, surroundings floury albumen ; cotyledons linear ; radicle superior.—DISTRIB. Asia and Tropical Africa ; species 1.

1. **Nothosærua brachiata,** *Wight Icon.* v. 6 (1853) p. 1. An erect slender herb 6—20 in. high, glabrous or nearly so ; stem branched from the base ; branches spreading, usually glabrous. Leaves ¾—1½ by ⅜—¾ in., elliptic-lanceolate, acute or subobtuse, thinly membranous, green, glabrous or minutely puberulous, base tapering into a short often obscure petiole. Flowers sessile, crowded in small dense axillary subsessile, solitary or clustered, white cylindric spikes ⅛—½ in. long ; bracts and bracteoles hyaline, acute, persistent. Perianth $\frac{1}{30}$ in. long ; sepals acute or subacute, hyaline. Seeds minute, shining, black. Fl. B. I. v. 4, p. 726 ; Trim. Fl. Ceyl. v. 3, p. 401 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364. *Ærua brachiata,* Mart. Beitr. Amarant. p. 83, n. 3 ; Dalz. & Gibs. p. 217. *Pseudanthus brachiatus,* Wight, Icon. v. 5, t. 1776 (exclud. analyses), and vol. 6, t. 1776 *bis,* fig. B.

In Wight's Icones, v. 5, t. 1776, the draughtsman has made the mistake (which Wight subsequently explained [Icon. v. 5, part 2, p. 2]) of showing the analyses of *Ærva floribunda* (*Ærua lanata,* Juss.) under the drawing, the body of which is *Pseudanthus* (afterwards changed by Wight to *Nothosærua* [Icon. v. 6, p. 1]) *brachiatus.* Wight rectifies this mistake in t. 1776 *bis,* vol. 6, the figure A in which represents *N. brachiata.*—Flowers : Nov.

KONKAN : *Law* ! GUJARAT : Surat, *Woodrow.* SIND : *Stocks* !, *Cooke* !; Jemadar ka Landa near Karachi, *Stocks,* 1191 !—DISTRIB. India (Birma, W. Peninsula) ; Ceylon, Mauritius, Tropical Africa.

8. ACHYRANTHES, Linn.

Herbs. Leaves opposite, petiolate, entire. Flowers hermaphrodite, in slender simple or panicled spikes, soon deflexed ; bracts and bracteoles spinescent. Perianth of 4—5 rigid lanceolate-subulate aristate shining segments, ultimately becoming hardened and ribbed. Stamens 2—5 ; filaments filiform, subulate, connate at the membranous base, with as many quadrate staminodes which are toothed or with a toothed scale on the back ; anthers 2-celled. Ovary oblong, subcompressed, 1-celled ; ovule solitary, pendulous from a long basal funicle ; style filiform ; stigma capitellate. Fruit an oblong or ovoid utricle. Seed inverse, oblong ; testa coriaceous ; embryo annular, surrounding floury albumen ; cotyledons linear or lanceolate ; radicle erect.—DISTRIB. Species about 15, tropical and subtropical.

1. **Achyranthes aspera,** *Linn. Sp. Pl.* (1753) p. 204. Erect, 1—3 ft. high ; stem stiff, not much branched ; branches terete or obsoletely quadrangular, striate, pubescent. Leaves few, usually thick,, 1½—2½ by 1—1¾ in., elliptic or obovate, sometimes nearly orbicular, usually rounded (rarely subacute) at the apex, finely and softly pubescent on both sides, entire ; petioles ¼—⅝ in. long. Flowers greenish-white, numerous, stiffly deflexed against the woolly-pubescent rhachis, in elongate terminal spikes which are at first

short but soon lengthen, reaching as much as 20 in. long in fruit; bracts $\frac{1}{8}$ in. long, broadly ovate, acuminate, membranous, aristate, persistent; bracteoles $\frac{1}{8}$ in. long, broadly ovate, concave, with a spine as long as the blade, hard in fruit, falling off with the fruiting perianth. Perianth $\frac{1}{8}$—$\frac{1}{4}$ in. long, glabrous and shining; sepals subequal, ovate-oblong, finely pointed, with narrow white membranous margins. Stamens 5; staminodes truncate, fimbriate. Utricle oblong-cylindric, truncate at the apex, thinly membranous, enclosed in the hardened perianth, smooth, brown, rather more than $\frac{1}{10}$ in. long. Seed subcylindric, truncate at the apex, rounded at the base, brown.

The hardened perianth containing the fruit disarticulates from the rhachis above the bract, carrying away with it the spinous bracteoles by the aid of which the perianth clings to the skins of cattle and the like and is transported. Fl. B. I. v. 4, p. 730; Grah. Cat. p. 168; Dalz. & Gibs. p. 218; Wight, Icon. t. 1777; Trim. Fl. Ceyl. v. 3, p. 404; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364; Prain, Beng. Pl. p. 874; Watt, Dict. Econ. Prod. v. 1, p. 81. —Flowers: Nov.—Jan. VERN. *A'ghâda.*

A common weed. KONKAN: *Law*! DECCAN: *Woodrow*; Mahableshwar, *Cooke*!, *H. M. Birdwood*; Poona, *Cooke*! SIND: *Woodrow.*—DISTRIB. Throughout India; Ceylon, Tropical Asia, Africa, Australia, and America.

EXCLUDED SPECIES.

ACHYRANTHES BIDENTATA, Blume, Bijdr. (1825) p. 545. This plant does not appear to have been found in the Bombay Presidency. The specimen in Herb. Kew. marked "Konkan, *Stocks*" is from the Nilghiri hills, where it was apparently collected by Mr. Foulkes. The other specimen from Stocks's herbarium has no locality assigned to it. Woodrow in his list (Journ. Bomb. Nat. v. 12 (1899) p. 364) remarks that the plant has not yet been found in the Bombay Presidency and it is not included in Dalzell & Gibson's Bombay Flora. Fl. B. I. v. 4, p. 730.

9. **CYATHULA,** Lour.

Herbs or undershrubs. Leaves opposite, petiolate, entire. Flowers small, in large or small bracteate and bracteolate spicate or capitate fascicles with 1—2 flowers perfect and the rest imperfect; perianth-segments of imperfect flowers ultimately converted into rigid hooked awns. Perianth-segments of perfect flowers 5, scarious, 1-nerved, acuminate or with hooked awns. Stamens 5; filaments connate below with intervening lacerate or 2—3-fid staminodes into a hypogynous membranous cup; anthers 2-celled. Ovary obovoid, 1-celled; ovule solitary, pendulous from a long basal funicle; style simple, filiform; stigma capitellate. Fruit an ovoid membranous utricle enclosed in the perianth, its apex areolate. Seeds inverse, oblong; testa coriaceous; embryo annular; cotyledons linear, flat; radicle erect.—DISTRIB. Tropical Asia, Africa, and America; species 10.

1. **Cyathula prostrata,** *Blume, Bijdr.* (1825) p. 549. Stem prostrate below, thickened and rooting at the lower nodes, more or

less hairy, purplish ; branches erect or ascending, 1—2 ft. long. Leaves 1—2½ by ½—1¼ in., elliptic-rhomboid or ovate, subacute, hairy on both sides, sometimes with a pink tinge beneath ; petioles very short. Flowers pale-violet, in small solitary drooping clusters laxly arranged in terminal spicate pedunculate racemes 4—6 in. long ; rhachis slender, hairy ; pedicels very short, about $\frac{1}{80}$ in. long ; bracts ovate, acuminate, shortly aristate, pubescent ; bracteoles as the bracts. Perianth of perfect flowers $\frac{1}{12}$—$\frac{1}{10}$ in. long ; sepals oblong, shortly apiculate, pubescent. Staminodes 2—3-fid. Ovary obovoid, glabrous ; style $\frac{1}{40}$—$\frac{1}{80}$ in. long. Utricle thinly membranous, ovoid, enclosed in the perianth. Seed $\frac{1}{20}$ in. long, oblong-ellipsoid, yellowish-brown, smooth, shining. Fl. B. I. v. 4, p. 723 ; Dalz. & Gibs. p. 219 ; Trim. Fl. Ceyl. v. 3, p. 398 ; Prain, Beng. Pl. p. 872. *Desmochæta prostrata*, DC. Cat. Hort. Monsp. (1813) p. 102 ; Wight, Icon. t. 733 ; Grah. Cat. p. 168.

Rare. *Stocks* without locality in Herb. Kew. !—DISTRIB. India (Bengal, Sikkim, Khasia Mountains, W. Peninsula) ; Ceylon.

10. **PUPALIA,** Juss.

Herbs or undershrubs. Leaves opposite, petiolate. Flowers fascicled in simple or paniculate spikes ; fascicles with 1 perfect flower, the rest imperfect ; perianth of imperfect flowers ultimately converted into stellately spreading hooked awns. Perianth-segments of perfect flowers 5, almost equal, lanceolate, acuminate, 3—5-nerved. Stamens 5 ; filaments subulate, shortly connate at the base ; anthers 2-celled ; staminodes 0. Ovary 1-celled ; ovule solitary, pendulous from a long basal funicle ; style simple ; stigma capitellate. Fruit an ovoid membranous utricle enclosed in the perianth, its top areolate. Seed inverse, rostellate ; testa thinly coriaceous ; embryo annular ; cotyledons linear, flat ; radicle ascending.—DISTRIB. Species 5, Asiatic and African.

Leaves ovate or elliptic, reaching 4 in. long.
- Herbaceous; leaves glabrous or nearly so; bracts and bracteoles pungent; awns purple ..... 1. *P. atropurpurea.*
- Shrubby; leaves tomentose; outer bract of the flower-clusters very broad, membranous; awns yellow ..... 2. *P. lappacea.*

Leaves suborbicular, not reaching 1½ in. long; awns brown ..... 3. *P. orbiculata.*

1. **Pupalia atropurpurea,** *Moq. in DC. Prodr.* v. 13, part 2 (1849) p. 331. Biennial or annual, 2—5 ft. ; branches long, straggling or semi-scandent, cylindric, glabrous or pubescent, slightly striate, often tinged with purple. Leaves 1—4 by ⅜—2 in., ovate or elliptic-lanceolate, acuminate, mucronate, glabrous or nearly so, suddenly contracted at the base ; petioles ¼—¾ in. long. Flowers in sessile clusters in lax pedunculate terminal spikes 1—10 in. long, the imperfect flowers reduced to hooked purple awns ; bracts $\frac{1}{10}$—⅛ in. long, broadly ovate, pungent, persistent ; bracteoles as the bracts. Perianth ⅛—⅕ in. long ; sepals ovate-lanceolate, aristate, clothed with cottony wool, 3-nerved. Utricle thinly membranous. Seed $\frac{1}{10}$ by $\frac{1}{12}$ in., oblong-ellipsoid with subtruncate ends. Fl. B. I. v. 4, p. 723 ;

Dalz. & Gibs. p. 219 ; Trim. Fl. Ceyl. v. 3, p. 399 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 872. *Desmochæta atropurpurea*, DC. Cat. Hort. Monsp. (1813) p. 102 ; Wight, Icon. t. 731 ; Grah. Cat. p. 168.

GUJARAT : common, *Dalzell & Gibson*.—DISTRIB. India (Nipal, Bengal, W. Peninsula) ; Malaya, Ceylon, Java, Madagascar, S. Africa, Philippines.

2. **Pupalia lappacea,** *Moq. in DC. Prodr.* v. 13, part 2 (1849) p. 331. A large straggling undershrub ; branches terete, tomentose. Leaves 1¼—4 by ⅝—2 in., elliptic or ovate, acute or acuminate, finely apiculate, tomentose on both sides, ciliate, base rounded or shortly cuneate ; main nerves numerous, conspicuous beneath ; petioles ⅒—¼ in. long. Flowers in close or distant clusters forming terminal spikes 4—10 in. long ; rhachis tomentose, with a number of ovate acuminate pungent villous bracts ⅛—⅓ in. long, which remain on the rhachis after the flowers fall ; outer bracteole beneath the cluster ⅓ by ⅛ in., membranous, broad, concave, ovate-oblong, apiculate ; imperfect flowers reduced to a number of unequal glabrous hooked awns, enlarged, stellately spreading and yellow in fruit, each cluster of awns during the flowering period supported by a lanceolate acute 3-nerved aristate bracteole nearly ⅛ in. long. Perianth ⅓ in. long ; sepals lanceolate, aristate, 3-nerved, densely clothed with white wool. Utricle membranous, very thin, oblong, suddenly and shortly tapering at the apex into the style. Seed ⅒ by ⅛ in., ellipsoid, compressed, smooth and shining, black. Fl. B. I. v. 4, p. 724 ; Dalz. & Gibs. p. 219 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 872.—Flowers : Aug.—Nov.

DECCAN : Dongergaon near Ahmednagar, *Cooke* ! S. M. COUNTRY : Badami, *Cooke* !, *Woodrow* ! ; Belgaum, *Ritchie*, 626 ! GUJARAT : Kathiawar, *Dalzell & Gibson* ; Champanir, *Woodrow* ! ; Dakor, *Kanitkar* ! SIND : Jemadar ka Landa near Karachi, *Stocks* !—DISTRIB. India (Behar, Panjáb, W. Tropical Himalaya, W. Peninsula) ; Tropical Asia and Africa.

3. **Pupalia orbiculata,** *Wight, Icon.* (1852) t. 1783. Stem woody at the base, often prostrate, stout, with long opposite branches, pubescent. Leaves rather thick, ¾—1¼ in. in diam., broadly elliptic or orbicular, obtuse, very shortly apiculate, sometimes notched, more or less hairy, suddenly tapering into the petiole which is short or obscure. Flowers in distant clusters forming stout spikes 4—8 in. long ; rhachis pubescent, with persistent lanceolate acute aristate bracts ⅛ in. long ; outer bracteole of the flower-cluster ⅓ by ⅙ in., ovate, acute, villous, 3-nerved ; imperfect flowers reduced to hooked glabrous awns, which are enlarged, spreading, and pale-brown in fruit, each cluster of awns at flowering time supported by a rigid lanceolate spinous-pointed narrow glabrous bracteoles ⅛—⅓ in. long. Perianth ⅓ in. long ; sepals lanceolate, shortly aristate, clothed with white wool, and with 3 broad nerves. Utricle oblong, obtuse, suddenly and very shortly attenuated into the style at the very apex, very thinly membranous. Seeds ⅒ by ⅙ in., oblong-ellipsoid, compressed, smooth and shining, black. Fl. B. I. v. 4, p. 724 ; Dalz. & Gibs. p. 219 ; Trim. Fl. Ceyl. v. 3, p. 400 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364.

KONKAN: The Ghâts, *Dalzell & Gibson.* SIND: *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon.

11. **ALTERNANTHERA,** Forsk.

Herbs, usually prostrate. Leaves opposite. Flowers hermaphrodite, small, white, in axillary often clustered heads, bracteate and 2-bracteolate. Perianth-segments 5, unequal, the 2 lateral innermost and concave. Stamens 2—5; filaments short, connate in a cup with or without intervening staminodes; anthers 1-celled. Ovary suborbicular or ovoid; ovule solitary, pendulous from a long basal funicle; style very short; stigma capitellate (rarely 2-fid). Fruit a compressed orbicular or obcordate utricle often with thickened or winged margins. Seed inverse, lenticular; testa crustaceous; embryo annular, surrounding floury albumen; cotyledons narrow; radicle superior.—DISTRIB. Species about 16, tropical and subtropical, abundant in Australia and Tropical America.

1. **Alternanthera triandra,** *Lam. Encyc. Méthod.* v. 1 (1783) p. 95. Herbaceous, much-branched from the root; branches 6—20 in. long, often purplish, prostrate or ascending, often rooting at the lower nodes, glabrous, the younger ones with 2 opposite lines of hairs. Leaves ½—2 by ⅛—¾ in. (in wet places sometimes reaching 4 by 1 in.), somewhat fleshy, linear-oblong, lanceolate or elliptic, obtuse or subacute, sometimes obscurely denticulate, shortly petiolate, glabrous. Flowers sessile, white, shining, in small axillary sessile heads; bracteoles 1/20 in. long, ovate, scarious. Perianth 1/10—⅛ in. long; sepals ovate, acute, scarious, 1-nerved. Ovary obcordate, broader than long, compressed; style very short; stigma capitellate. Utricle 1/16—1/12 by 1/10—⅛ in., obcordate, compressed, with thickened margins. Seed 1/20—1/16 in. in diam., suborbicular. Trim. Fl. Ceyl. v. 3, p. 405. *Alternanthera sessilis,* R. Br. Prodr. (1810) p. 417; Hook. f. Fl. B. I. v. 4, p. 731; Grah. Cat. p. 168; Dalz. & Gibs. p. 220; Wight, Icon. t. 727; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364; Prain, Beng. Pl. p. 875; Watt, Dict. Econ. Prod. v. 1, p. 199. *Achyranthes triandra,* Roxb. Fl. Ind. v. 1, p. 678.—Flowers: July—Dec. VERN. *Kanchri; Jaljamba.*

Common throughout the Presidency in damp places.—DISTRIB. Throughout the warmer parts of India; Ceylon and all warm countries.

The following plants not belonging to any of the foregoing genera are commonly cultivated in gardens:—

Telanthera ficoidea, Moq. in DC. Prodr. v. 13, part 2 (1849) p. 363, a native of Brazil, is a favorite edging in gardens, and is known to gardeners as *Alternanthera amabilis.* Its leaves take a fine crimson color in the Deccan from July to September. The plant is propagated readily by cuttings and makes an excellent edging for small beds, being easily kept in order by clipping.

Gomphrena globosa, Linn. Sp. Pl. (1753) p. 224. The *Globe Amaranth,* probably originating in America, is largely cultivated and

often found as an escape. It is a tall branched annual with elliptic or obovate-oblong, acute or obtuse leaves and large globose yellowish-white or crimson heads of flowers 1—1½ in. in diam. with leafy bracts and pinkish-purple bracteoles. Fl. B. I. v. 4, p. 732 ; Grah. Cat. p. 169 ; Dalz. & Gibs. Suppl. p. 72 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 876 ; Watt, Dict. Econ. Prod. v. 1, p. 208.—Flowers : Aug.—Mar. VERN. *Jáfri-gundi.*

ORDER CIII. CHENOPODIACEÆ.

Herbs or shrubs. Leaves alternate (rarely opposite) ; stipules 0. Flowers small, usually green, hermaphrodite or 1-sexual ; bracts 1 or 0 ; bracteoles 0 or 2. Perianth simple, sepaline ; segments 3—5, free or connate, imbricate in bud (in female flowers sometimes 0). Stamens usually 5, opposite the perianth-segments, hypogynous or perigynous ; filaments usually free, sometimes with intervening staminodes ; anthers 2-celled. Ovary ovoid, globose or depressed, 1-celled ; ovule solitary, basal or lateral, campylotropous ; style terminal, short or long, stigma capitate, 2—3-lobed ; or styles 2—3 ; or stigmas 2—5 free or slightly united, sessile. Fruit usually a utricle enclosed in the often enlarged fleshy perianth (when perianth is present). Seed erect, inverse or horizontal ; testa crustaceous, coriaceous or membranous ; albumen fleshy or floury or 0 ; embryo curved, annular, or spiral.—DISTRIB. Widely dispersed throughout the world ; genera 80 ; species about 520.

Stems not twining; bracteoles free from the perianth; anthers erect or incurved in bud.
- Embryo annular or horseshoe-shaped.
  - Stems leafy, not jointed.
    - Fruiting perianth not winged; albumen copious.
      - Flowers all similar, hermaphrodite (sometimes polygamous in *C. ambrosioides*); leaves flat ..... 1. CHENOPODIUM.
      - Flowers dimorphic, the males ebracteolate with 3—5 sepals, the females 2-bracteolate without sepals ..... 2. ATRIPLEX.
    - Fruiting perianth with transverse wings; albumen scanty ..... 3. KOCHIA.
  - Stems jointed, fleshy; leaves 0.
    - Flowers in the scales of cone-like spikes; embryo horseshoe-shaped; albumen fleshy... 4. ARTHROCNEMUM.
    - Flowers sunk in cavities in successive joints; embryo conduplicate; albumen 0 ..... 5. SALICORNIA.
- Embryo spiral; albumen 0.
  - Anthers not appendiculate.
    - Sepals not winged ..... 6. SUÆDA.
    - Sepals transversely winged.
      - Stem jointed ..... 7. HALOXYLON.
      - Stem not jointed ..... 8. SALSOLA.
  - Anthers appendiculate; sepals not winged..... 9. HALOCHARIS.

Stems twining to the right; bracteoles 2, broad, adnate to the face of the perianth; anthers versatile. 10. BASELLA.

1. CHENOPODIUM, Linn.

Annual or perennial erect or prostrate herbs. Leaves alternate, entire, lobed or toothed. Flowers minute, hermaphrodite (rarely polygamous), clustered, forming axillary and terminal simple or branched spikes or racemes; bracts and bracteoles 0. Perianth usually 5 (rarely fewer)-lobed; segments concave, incurved, not altered in fruit. Stamens 5 or fewer, hypogynous or almost perigynous; anthers 2-celled. Disk 0 or annular. Ovary depressed-globose (rarely ovoid); ovule solitary; style usually 0; stigmas 2—5. Fruit a membranous utricle, enclosed in the perianth. Seed horizontal (rarely erect); testa crustaceous; embryo nearly or quite annular, surrounding floury albumen.—DISTRIB. Species about 50, throughout the world.

Scentless or slightly fœtid eglandular herbs; stigmas 2; embryo perfectly annular; margin of seed acute.
A tall scentless herb, sometimes 10 ft. high; seeds smooth, shining ..... 1. *C. album.*
A low slightly fœtid herb 6—15 in. high; seeds rugose, dull ..... 2. *C. murale.*
A strongly aromatic glandular herb; stigmas 5; embryo incompletely annular; margin of seed obtuse. 3. *C. ambrosioides.*

1. **Chenopodium album,** *Linn. Sp. Pl.* (1753) p. 219. Herbaceous, 1—10 ft. high, erect or ascending, mealy or green or reddish, inodorous; stems often striped. Leaves very variable in size and shape, reaching in cultivated plants sometimes 6 in. long (the upper leaves smaller and more entire than the lower), oblong, rhombic, deltoid or lanceolate, obtuse or acute, entire, toothed or irregularly lobulate; petioles long, slender. Flowers in clusters forming complex or lax paniculate often mealy spikes, which in cultivated forms become thyrsoid. Sepals $\frac{1}{16}$—$\frac{1}{12}$ in. long, oblong-lanceolate, keeled, closing over the thinly membranous utricle. Stigmas 2. Seed $\frac{1}{16}$ in. in diam., orbicular, compressed, with an acute margin, smooth, shining; embryo completely annular. Fl. B. I. v. 5, p. 3; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364; Prain, Beng. Pl. p. 878; Watt, Dict. Econ. Prod. v. 2, p. 265. *Chenopodium viride,* Linn. Sp. Pl. (1753) p. 219; Grah. Cat. p. 171.—Flowers: Nov. VERN. *Chákvat.*

A weed occurring chiefly in cultivated ground, very common in the Deccan, also cultivated as a pot-herb.—DISTRIB. Ubiquitous.

2. **Chenopodium murale,** *Linn. Sp. Pl.* (1753) p. 219. Herbaceous, 6—15 in. high, erect or ascending, branched, glabrous or nearly so, somewhat fœtid. Leaves bright-green, $1\frac{1}{4}$—4 by $\frac{7}{8}$—3 in., deltoid-ovate, acute or obtuse, irregularly lobulate and toothed (often sharply), base cuneate; petioles $\frac{3}{4}$—3 in. long. Flowers clustered, in short dense or lax cymes forming axillary racemes or panicles. Sepals $\frac{1}{16}$ in. long, oblong, subacute, closing over the fruit, scarcely keeled. Stigmas 2. Seed orbicular, $\frac{1}{16}$ in. in diam., with an acute margin, compressed, rugose, dull-black; embryo completely annular. Fl. B. I. v. 5, p. 4; Fl. Dan. v. 12 (1834) t. 2048; Trim. Fl. Ceyl.

v. 3, p. 407 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Watt, Dict. Econ. Prod. v. 2, p. 268.—Flowers : Aug.

Scarcely indigenous in the Bombay Presidency. DECCAN : Poona, along the Railway bank of the S. M. Railway, *Cooke* ! S. M. COUNTRY : Dharwar, *Woodrow*.—DISTRIB. Ubiquitous.

3. **Chenopodium ambrosioides,** *Linn. Sp. Pl.* (1753) p. 219. A tall erect much-branched highly aromatic herb with a camphoraceous odor, puberulous and glandular, not mealy ; stem and branches striate, more or less glandular-pubescent. Leaves often with glands, 1½—3¼ by ¼—1 in., oblong-lanceolate, obtuse or acute, sinuate-dentate, the upper leaves almost entire, base tapering, running down into a short often obscure petiole. Flowers minute, clustered, forming slender axillary and terminal simple or paniculate leafy spikes, sometimes polygamous. Sepals orbicular-ovate, concave, obtuse, not keeled, closing over the fruit. Stigmas usually 5. Utricle membranous. Seed $\frac{1}{30}$ in. in diam., orbicular, smooth, shining, with an obtuse margin. Fl. B. I. v. 5, p. 4 ; Wight, Icon. t. 1786 ; Dalz. & Gibs. Suppl. p. 73 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 ; Prain, Beng. Pl. p. 879 ; Watt, Dict. Econ. Prod. v. 2, p. 267.—Flowers : Aug.—Apr.

A weed usually occurring in cultivated ground, scarcely indigenous in the Bombay Presidency, but apparently so in S. India. DECCAN : Poona, a weed in gardens, *Cooke* !, *Woodrow* !, *Kanitkar* !—DISTRIB. India (Bengal, Silhet, S. India) ; widely spread in the Old World.

2. ATRIPLEX, Linn.

Herbs or shrubs usually mealy. Leaves alternate (rarely opposite). Flowers small, monœcious or polygamo-dioecious, clustered, the sexes often mixed, in axillary sessile fascicles or in simple or panicled spikes ; bracts 0 ; bracteoles in male flowers 0, in female flowers 2, flat, accrescent, dilated in fruit and forming a 2-valved covering to it. MALE FLOWERS : Perianth 3—5-partite ; sepals oblong or obovate, obtuse. Stamens 3—5, inserted at the base of the perianth ; filaments free or connate below ; anthers didymous. Ovary rudimentary or 0 (rarely perfect). FEMALE FLOWERS : Perianth 0. Disk 0. Ovary ovoid or depressed-globose ; ovule oblique or vertical ; stigmas 2, subulate or filiform, connate below. Fruit a membranous utricle rarely adnate to the seed, enclosed in the enlarged bracteoles. Seed erect or inverted, suspended from a long funicle or rarely (in hermaphrodite flowers only) horizontal ; embryo surrounding floury albumen.—DISTRIB. Species about 100, in most temperate and tropical regions.

1. **Atriplex Stocksii,** *Boiss. Diagn.* Ser. 2, No. 4 (1859) p. 73. Shrubby, perennial, 8—20 in. high, monœcious, much branched, prostrate or suberect ; stem and branches woody, terete, glabrous, white. Leaves ½—1 by ¼—¾ in., rather fleshy, elliptic, oblong, orbicular or somewhat obovate, obtuse, smooth, glabrous, whitish or glaucous, base acute ; petioles ⅛ in. long. Male flowers in axillary clusters or short spikes. Fruiting bracteoles of female flowers reaching

⅜ in. in diam., orbicular or broadly ovate, labyrinthically veined, cuneate at the base, swollen and thickened above the utricle. Seed suborbicular, compressed, pale-brown, smooth. Fl. B. I. v. 4, p. 7; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364. *Atriplex repens,* Aitch. Pb. & Sind Pl. p. 125 (*not* of Roth). *Obione Stocksii,* Wight, Icon. t. 1789; Dalz. & Gibs. p. 212.—Flowers: Dec.—Jan.

GUJARAT: common near the sea, *Dalzell & Gibson*; Broach Collectorate, *Dalzell*!; Verawal, *Woodrow*! SIND: *Stocks,* 452!; *Bhola Puran*!; Karachi, *Vicary*!, *Cooke*!; Hydrabad, *Cooke*!—DISTRIB. India (W. Peninsula).

Atriplex hortensis, Linn. Sp. Pl. (1753) p. 1053. A stout erect polygamous succulent annual often tinged with red or purple. Leaves not mealy, the lower deltoid, the upper usually ovate-lanceolate. Fruiting bracteoles thin, nearly free, elliptic or orbicular, reticulately veined, obtuse, sometimes mucronate.

The origin of the plant is unknown, it being found only under cultivation or in cultivated ground. It is cultivated as a spinach more or less throughout India and also in Europe, where it is known as *Orache* or *Mountain Spinach.* Fl. B. I. v. 5, p. 6; Grah. Cat. p. 171; Dalz. & Gibs. Suppl. p. 73; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364; Prain, Beng. Pl. p. 880; Watt, Dict. Econ. Prod. v. 1, p. 350.—VERN. *Suraka; Chandanbatva.*

3. **KOCHIA,** Roth.

Herbs or undershrubs usually villous or pubescent, stems slender. Leaves alternate, sessile, narrow, entire. Flowers axillary, solitary or clustered, hermaphrodite or female (rarely only male); bracts 0. Perianth subglobose; lobes 5, coriaceous, incurved, closing over the utricle, girt by 5 free or confluent horizontal wings. Stamens 5, usually exserted, inserted at the bottom of the perianth; anthers large, ovate. Ovary depressed-globóse; style slender; stigmas 2—3, capillary. Utricle depressed, membranous. Seed horizontal, ovoid, or orbicular; testa membranous; albumen scanty; embryo annular.—DISTRIB. Europe, temperate Asia, N. & S. Africa, N.W. America; species about 20.

1. **Kochia indica,** *Wight, Icon.* (1852) t. 1791. A tall erect branched annual; stem and branches more or less woolly, white, triate. Leaves ¼—1½ by $\frac{1}{10}$—¼ in., linear-lanceolate, sessile, acute, pubescent or villous on both sides, base tapering. Flowers axillary, solitary or 2 together. Perianth woolly, about $\frac{1}{10}$ in. across when spread out, divided about ¼ the way down; segments hooded, mucronate, incurved; wing broadly ovate, scarious. Utricle thinly membranous; stigmas 2, filiform, $\frac{1}{10}$ in. long. Seed $\frac{1}{10}$ in. in diam., orbicular or ovoid, black. Fl. B. I. v. 5, p. 11; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364; Watt, Dict. Econ. Prod. v. 4, p. 567.—Flowers: Sept.

SIND: Sibi, *Vaidya*!—DISTRIB. India (N. W.; W. Peninsula); Afghanistan.

Woodrow in his list of Bombay Plants published in the Journal of the Bombay Nat. Hist. Soc. v. 12 (1899) p. 364, gives *Kochia scoparia* as occurring at Sibi.—I have seen no specimens from that locality, and there is only 1 sheet of the plant at present in Herb. Kew. contributed by Royle, but without any habitat assigned to it.

4. **ARTHROCNEMUM,** Moq.

Fleshy leafless jointed branching shrubs or herbs. Flowers minute, hermaphrodite, 2—3 together in the axils of scaly bracts, forming sessile cone-like spikes ; bracteoles 2. Perianth ventricose, usually 3—4-gonous, truncate or 3—5-toothed at the apex, at length spongy. Stamen 1 ; anther oblong. Ovary ovoid, narrowed to the tip ; ovule solitary, sub-sessile ; stigmas 2, shortly connate below, subulate. Fruit an ovoid compressed utricle with hardened pericarp, enclosed in the swollen perianth. Seed erect, ovoid, compressed ; testa membranous, smooth ; albumen farinaceous ; embryo dorsal, comma-shaped ; radicle stout, inferior.—DISTRIB. Saline places in temperate and tropical regions ; species 7 or 8.

1. **Arthrocnemum indicum,** *Moq. Chenopod. Enum.* (1840) p. 113. Perennial, suffruticose, diffuse, glaucous-green ; stems usually prostate ; branches numerous, with a woody core, erect or ascending, jointed, very fleshy, the joints short, clavate, thick, spongy, truncate, dilated and usually 2-toothed at the top. Flowers in cylindric blunt spikes $\frac{1}{2}$—$\frac{3}{4}$ in. long ; bracteoles spongy. Anthers large, oblong-ovoid, $\frac{1}{30}$—$\frac{1}{25}$ in. long. Seed trigonous, much compressed ; testa thin, crustaceous, yellow. Fl. B. I. v. 5, p. 12 ; Dalz. & Gibs. p. 212 ; Trim. Fl. Ceyl. v. 3, p. 407 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365 ; Prain, Beng. Pl. p. 881 ; Watt, Dict. Econ. Prod. v. 1, p. 328. *Salicornia indica,* Willd. in Ges. Naturf. Fr. Neue Schr. v. 2 (1799) p. 111, t. 4, fig. 2 ; Wight, Icon. t. 737 ; Grah. Cat. p. 171. *Arthrocnemum glaucum,* Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365 (*not* of Ung.).—Flowers : Dec. VERN. *Machur.*

Common on salt-ground near the coast, *Dalzell & Gibson.* KONKAN : Bassein, abundant, *Graham.* SIND : Karachi, *Cooke!, Woodrow.* Graham says it is pickled by the natives.—DISTRIB. India (Bengal, W. Peninsula) ; Ceylon, Tropical Africa.

5. **SALICORNIA,** Linn.

Fleshy jointed leafless branched shrubs or herbs. Flowers minute, hermaphrodite, 3-nate, in the axils of scaly bracts sunk in superposed and decussately opposite cavities of the internodes, forming sessile conelike spikes ; bracteoles 2. Perianth obpyramidal. Stamen 1 ; anther oblong. Ovary ovoid, narrowed to the tip ; ovule subsessile ; stigmas 2, subulate. Fruit an ovoid compressed utricle with membranous pericarp, enclosed in the spongy perianth. Seed erect, compressed ; testa hispid with hooked hairs ; albumen 0 ; embryo conduplicate ; radicle inferior, parallel to the folds of the cotyledons,—DISTRIB. Temperate and tropical regions ; species 8.

1. **Salicornia brachiata,** *Roxb. Fl. Ind. ed. Carey & Wall.* v. 1 (1820) p. 82. Shrubby, more or less erect, much branched; branches rather slender, opposite, the joints ¼—½ in. long, slightly dilated and 2-toothed. Flowers in slender cylindric spikes 1—3 in. long. Utricle membranous, ovoid, subacute. Seed pale-brown, hispid with white hairs. Fl. B. I. v. 5, p. 12; Wight, Icon. t. 738; Trim. Fl. Ceyl. v. 3, p. 408; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Prain, Beng. Pl. p. 881; Watt, Dict. Econ. Prod. v. 6, part 2, p. 387.—Flowers: Nov.-Dec. VERN. *Machul.*

GUJARAT: Nausari, *Kanitkar*!; Porbandar, *Woodrow*; Dwarka, *Bhiva*!; Balsar, *Kanitkar*!—DISTRIB. India (Bengal, W. Peninsula); Ceylon.

The natives pickle the young shoots and sometimes use them as a pot-herb.

6. SUÆDA, Forsk.

Herbs or shrubs usually growing in saline places. Leaves fleshy, ternate, terete (rarely flattish). Flowers minute, axillary, usually hermaphrodite, bracteate and 2-bracteolate. Perianth short, globose or urceolate, 5-lobed or 5-partite; segments equal or unequal, simple, gibbous or almost winged. Stamens 5; filaments short; anthers large. Ovary ovoid or orbicular, usually sessile, with a wide base, adnate below to the perianth, rounded or truncate at the apex; ovule solitary, subsessile; style 0; stigmas 2—5, minute, subulate, recurved, papillose throughout. Fruit a small membranous or spongy utricle included in the perianth. Seed erect, horizontal or oblique; testa coriaceous or crustaceous; albumen 0 or scanty; embryo slender, somewhat spiral.—DISTRIB. Species about 40 on saline shores and in deserts.

Perennial; seed usually erect.	
Flowers hermaphrodite; stigmas 3.	
Usually erect; flowers axillary, 1—3-nate; bracteoles with entire or slightly toothed margins...	1. *S. fruticosa.*
Diffusely branched; leaves glaucous-green; flowers in dense many-flowered clusters; bracteoles with pectinate margins	2. *S. nudiflora.*
Flowers polygamous; stigmas 2—5; bracteoles with entire margins	3. *S. monoica.*
An annual erect herb; stigmas 2; seed usually horizontal	4. *S. maritima.*

1. **Suæda fruticosa,** *Forsk. Fl. Ægypt.-Arab.* (1775) p. 70. Shrubby, usually erect, much-branched; stem pale, glabrous. Leaves fleshy, subsessile, ½-terete, variable, ⅛—⅝ by $\frac{1}{16}$—⅛ in., linear-oblong or ellipsoid or somewhat obovate, obtuse, narrowed at the base, the floral leaves short. Flowers hermaphrodite, axillary, solitary or 2—3-nate; bracteoles membranous, about $\frac{1}{20}$ in. long, ovate, acute, entire or with slightly denticulate margins. Perianth in fruit subglobose, $\frac{1}{10}$ in. long; segments thick, oblong, concave, obtuse, incurved. Utricle obovoid, thickened at the top; stigmas 3, short, spreading. Seed $\frac{1}{12}$ in. long, obliquely ovoid, somewhat beaked, slightly compressed, smooth and shining, black when ripe. Fl. B. I. v. 5, p. 13; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Watt, Dict. Econ. Prod. v. 6, part 3, p. 386. *Salsola*

fruticosa, Linn. Sp. Pl. ed. 2 (1762) p. 324 ; Grah. Cat. p. 170. *Salsola Láná,* Edgew. in Hook. Journ. Bot. v. 2 (1840) p. 286.—Flowers: Nov.—Dec. VERN. *Moras ; Ushuk-láni.*

GUJARAT : Dwarka (Kathiawar), *Woodrow*; Bhavnagar (Kathiawar), *Woodrow.* SIND : *Cooke* !—DISTRIB. India (North-west, Panjáb, W. Peninsula); Africa, America.

The plant is eaten by camels, and crude soda is prepared from it in Sind.

2. **Suæda nudiflora,** *Moq. in Ann. Sc. Nat.* v. 23 (1831) p. 316. A diffusely branched woody perennial undershrub ; stems prostrate, much-branched, smooth, yellowish. Leaves numerous, soon falling, ¼—½ by $\frac{1}{12}$—⅛ in., elliptic-oblong or linear-obovate, very obtuse, rigid, glabrous, at first flattish, afterwards ½-terete, glaucous-green (*Trimen*), base narrowed. Flowers hermaphrodite, axillary, in dense globose many-flowered clusters, forming dense spikes leafless in the upper part ; bracteoles ovate, acute, membranous, with pectinate margins. Perianth $\frac{1}{10}$ in. long, obovoid ; segments oblong, obtuse. Utricle ovoid ; stigmas 3. Seed erect, about $\frac{1}{15}$ in. in diam., lenticular, smooth, shining, black. Fl. B. I. v. 5, p. 14 ; Dalz. & Gibs. p. 213 ; Trim. Fl. Ceyl. v. 3, p. 409 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365 ; Prain, Beng. Pl. p. 878 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 386. *Suæda indica,* Moq. in Ann. Sc. Nat. v. 23 (1831) p. 316 ; Wight, Icon. t. 1796 ; Dalz. & Gibs. p. 213. *Salsola nudiflora,* Willd. Sp. Pl. v. 1 (1797) p. 1313 ; Grah. Cat. p. 170.—VERN. *Moras.*

Dalzell & Gibson without locality. KONKAN : salt-marshes in Salsette, *Graham.*—DISTRIB. India (Orissa on the sea-coast; W. Peninsula); Ceylon.

The green leaves are eaten by the natives wherever the plant occurs.

3. **Suæda monoica,** *Forsk. Fl. Ægypt.-Arab* (1775) p. 70. A small erect bush ; branches numerous, ascending, marked with prominent leaf-scars, pale, glabrous. Leaves sessile, ½—1 by $\frac{1}{20}$—$\frac{1}{10}$ in., linear, obtuse or subacute, sometimes apiculate, bright-green. Flowers polygamous, in slender lax spikes, the clusters distant, each in the axil of a short leaf ; bracteoles minute, ovate, acute, entire. Perianth $\frac{1}{10}$ in. long ; segments oblong, obtuse. Stigmas 2—5, short. Seed vertical, ovoid, smooth, shining, black. Fl. B. I. v. 5, p. 13 ; Wight, Icon. t. 1792 ; Trim. Fl. Ceyl. v. 3, p. 408 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365.—Flowers: Nov.—Dec.

KONKAN : Dharamtar (Colaba districts), *Woodrow* ! SIND : Karachi, *Woodrow.*—DISTRIB. India (W. Peninsula); Ceylon, Arabia, Tropical Africa.

4. **Suæda maritima,** *Dumort. Fl. Belg.* (1827) p. 22. Annual ; stems woody at the base, erect, 1½—2 ft. high, with numerous very slender erect branches. Leaves numerous, ⅜—1 by $\frac{1}{40}$—$\frac{1}{16}$ in., narrowly linear (sometimes filiform), fleshy, subacute, the floral leaves very small. Flowers in small few-flowered globose clusters forming very slender elongate, lax spikes ; bracteoles ovate, membranous, entire. Perianth scarcely $\frac{1}{30}$ in. long ; segments rounded, covering the utricle. Stigmas 2, long, slender. Seed obliquely ovoid or suborbicular, $\frac{1}{25}$ in. long, smooth, shining, black. Fl. B. I. v. 5, p. 14 ; Trim. Fl. Ceyl. v. 3, p. 409 ; Woodr. in Journ. Bomb.

Nat. v. 12 (1899) p. 365 ; Prain, Beng. Pl. p. 878 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 386. *Salsola indica,* Willd. Sp. Pl. v. 1 (1797) p. 1317 ; Grah. Cat. p. 170. *Chenopodina indica,* Wight, Icon. t. 1793.—Flowers : May (*Woodrow*). VERN. *Láná ; Láni.*

KONKAN : salt-marshes in Salsette, *Graham.* SIND : *Woodrow.*

I have not seen a specimen from either locality.—DISTRIB. India (Panjáb, Bengal, W. Peninsula), Ceylon, N. W. Asia, N. Africa, Europe, N. America.

The green leaves are eaten and considered a wholesome vegetable. The plant is also incinerated to produce an impure sodium carbonate.

7. HALOXYLON, Bunge.

Shrubs or small trees with opposite jointed branches. Leaves opposite, triangular and short, or elongate and terete. Flowers small, hermaphrodite, solitary or spicate ; bracteoles 2. Perianth 5-partite ; segments concave, accrescent, horizontally winged. Stamens 5 or fewer, on the margin or base of a cupular disk with alternating round or square staminodes ; filaments linear-subulate ; anthers ellipsoid, obtuse. Utricle subglobose or depressed, enclosed in the perianth ; stigma 2-lobed, or stigmas 3—4, recurved. Seed horizontal ; testa membranous ; albumen 0 ; embryo green, plano-spiral.—DISTRIB. S. Europe, N. Africa, Western and Central Asia, India ; species 8—10.

Leaves distinct ..... 1. *H. recurvum.*
Leaves reduced to the dilated tips of the joints..... 2. *H. salicornicum.*

1. **Haloxylon recurvum,** *Bunge, ex Boiss. Fl. Orient.* v. 4 (1879) p. 949. A straggling bush turning black in drying, glabrous, pruinose, with divaricate spreading straight or recurved branches. Leaves ⅛—⅓ in. long, trignous or ½-terete, ovate-subulate or ellipsoid, obtuse or acute, spreading or recurved. Flowers axillary, forming strict spikes 1—6 in. long ; floral leaves $\frac{1}{10}$ in. long, rotund-ovate, fleshy, with membranous margins ; bracteoles $\frac{1}{10}$ by $\frac{1}{10}$ in., elliptic-oblong, concave, fleshy, with membranous margins. Perianth-segments somewhat fleshy, ⅛—⅓ in. long, ovate, subobtuse, closing over the utricle ; wing membranous, finely veined, about $\frac{1}{12}$ in. long, orbicular, attached at the middle of the back of the segment. Seed $\frac{1}{10}$ in. in diam., orbicular, flattened ; embryo spirally coiled. Fl. B. I. v. 5, p. 15 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365 ; Watt, Dict. Econ. Prod. v. 4, p. 199. *Haloxylon Stocksii,* Hook. f. in Hook. & Benth. Gen. Pl. v. 3, p. 70. *Caroxylon indicum,* Wight, Icon. t. 1794.—Flowers : Nov. VERN. *Khári-láni ; Káro.*

SIND : *Stocks,* 438! ; Sukkur, *Cooke!*—DISTRIB. India (Panjáb, Sind, Coimbatore, Birma) ; Afghanistan, Yunnan.

The plant is used as fodder for camels in the Panjáb and Sind. It is also extensively employed for the manufacture of crude sodium carbonate (*Sajji-khár*).

2. **Haloxylon salicornicum,** *Bunge, ex Boiss. Fl. Orient.* v. 4 (1879) p. 949. An erect much-branched leafless shrub ; stem and branches pale-yellow, not drying black, the joints produced into 2 long triangular points which take the place of leaves and are woolly within. Flowers in erect spikes ; braceoles $\frac{1}{16}$ in. long,

nearly as broad as long, elliptic or obovate, rounded at the top, very thick, with woolly axils and membranous margins. Perianth-segments in flower $\frac{1}{12}$ in. long; wing $\frac{1}{16}$ in. long, orbicular-obovate, veined, membranous, attached to the back of the segment above the middle. Seed horizontal, $\frac{1}{16}$ in. in diam., flattened, orbicular. Fl. B. I. v. 5, p. 16; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365.—Flowers: Oct.

Rare. There is 1 specimen in Herb. Kew. from Dalzell which is ticketed "Scinde" in Dalzell's handwriting, and which appears to have been sent to him by Stocks. Woodrow in his list of Bombay Plants (Journ. Bomb. Nat. l. c.) gives Sibi (Upper Sind) as the habitat of the plant, but I have seen no specimens from that locality. Mr. Drummond informs me that it is very abundant in the Panjáb.—DISTRIB. India (Panjáb); Beluchistan, Afghanistan.

8. **SALSOLA,** Linn.

Herbs or shrubs; branches not jointed. Leaves usually alternate, sessile or amplexicaul, often pungent at the tip. Flowers hermaphrodite, axillary, solitary or fascicled; bracteoles 2. Perianth 5 (rarely 4)—partite; segments concave, accrescent in fruit, usually furnished with a broad scarious horizontal wing attached above the middle completely embracing the utricle. Stamens 5 or fewer, usually hypogynous. Utricle ovoid or subglobose, fleshy or membranous; stigmas 2—3, subulate or linear. Seed usually horizontal; testa membranous; albumen 0; embryo spiral.—DISTRIB. Europe, N. & S. Africa, temperate Asia, Australia, N. America; species about 40.

1. **Salsola fœtida,** *Del. Fl. Ægypt. Illustr.* (1812) n. 310. A large excessively branched pale hoary shrub, reaching 4 ft. or more in height (*Aitchison*); branches numerous, slender, twiggy. Leaves minute, suborbicular, fleshy, the floral leaves imbricate, forming very short cylindrical spikes; bracteoles $\frac{1}{20}$ in. long, broadly ovate or orbicular, fleshy. Perianth scarcely $\frac{1}{20}$ in. long, oblong, rounded at the apex; wings horizontal, attached about the middle of the back of the perianth, $\frac{1}{10}$ in. long, obovate, rounded, flat, thinly membranous, subtransparent, white, shining. Ovary ovoid or subglobose; stigmas 2, large, recurved. Fl. B. I. v. 5, p. 18; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365; Watt, Dict. Econ. Prod. v. 6, part 2, p. 392. *Salsola spinescens,* Wight, Icon. t. 1795 (*not* of Moq.).—Flowers: Dec. VERN. *Lánan, Ellakura.*

SIND: *Stocks*; Sukkur, *Cooke*!

The branches often bear globose fulvous-villous galls, the work of insects, surrounded by linear or linear-lanceolate fulvous-villous leaves which resemble somewhat the involucre of a Composite. I find in a note made by me when I collected the plant in Sukkur in 1891, that the fresh flowers had an odor of rotten-fish.—DISTRIB. India (Panjáb, W. Peninsula); Beluchistan, Persia, Arabia, N. Africa.

9. **HALOCHARIS,** Moq.

Annual usually small herbs, prostrate or suberect, hispidulous; branches often verticillate, not jointed. Leaves alternate, sessile, fleshy, tipped with rigid hairs. Flowers hermaphrodite, axillary,

solitary; bracteoles 2. Perianth-segments 5, lanceolate, membranous, hyaline, nerveless, unaltered in fruit. Stamens inserted on a fleshy disk; filaments linear; anthers linear, the cells narrow, parallel, separate, the connective produced into a sessile or stipitate flattened or inflated appendage; staminodes 0. Utricle included in the perianth, broadly ovoid or orbicular, compressed, membranous, rugulose; stigmas 2, elongate, subulate. Seed inverse, lenticular, compressed; testa membranous; albumen 0; embryo plano-spiral.—DISTRIB. Persia, Afghanistan, Beluchistan, India; species 5.

1. **Halocharis sulphurea,** *Moq. in DC. Prodr.* v. 13, part 2 (1849) p. 201 *in part.* An erect branched herb of a peculiar bluish-grey color (*Aitchison*), 3—18 in. high, hispid with long bristles. Leaves ¼—⅜ in. long, linear, subtrigonous, ciliate with long hairs. Flowers white (*Woodrow*) or light-purple (*Aitchison*), in capitate clusters which are spicate on short branches; bracteoles linear or linear-lanceolate, keeled, very hirsute, as long as the perianth-segments. Perianth-segments ⅛ in. long, lanceolate, membranous, the outer densely woolly. Anther-cells separate, $\frac{1}{16}$ in. long; pollen yellow; appendage as long as and broader than the anther-cells, erect, ovoid-oblong, inflated, white (*Woodrow*) or sulphur-yellow (*Boissier*).

Woodrow, who has had an opportunity of examining the *fresh* plant which he collected at Sibi (Upper Sind) and of which there are 2 sheets in Herb. Kew., describes the flowers and the appendage of the anthers as white. Fl. B. I. v. 5, p. 19; Boiss. Fl. Orient. v. 4, 975; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365.—Flowers: Sept—Oct.

SIND: Rendli (Sibi districts), *Woodrow*!—DISTRIB. India (Panjáb); Persia, Assyria.

10. BASELLA, Linn.

A much-branched twining fleshy glabrous herb. Leaves alternate, broad, entire. Flowers hermaphrodite, sessile, spicate; bracts minute, caducous; bracteoles 2, connate in a 2-lipped cup and adnate to the perianth. Perianth fleshy, 5-fid, becoming at length berry-like in fruit; lobes short, incurved. Stamens 5, inserted on the mouth of the perianth-tube; filaments short, erect in bud; anthers versatile. Ovary globose; ovule subsessile; styles 3, connate at the base; stigmas linear-clavate, papillose within. Fruit a globose utricle, included in the fleshy perianth; pericarp thin, adnate to the seed. Seed erect, subglobose; testa crustaceous; albumen scanty; embryo plano-spiral; cotyledons large, thin, convolute.—DISTRIB. Asia and Tropical Africa, elsewhere cultivated in the Tropics; species 2.

A new species, *Basella paniculata*, a native of German East Africa, has recently been described by Volkens (Engl. Bot. Jahr. v. 38 [1905] p. 81).

1. **Basella rubra,** *Linn. Sp. Pl.* (1753) p. 272. A perennial herb; stem very long; slender, twining to the right, succulent,

glabrous, much-branched. Leaves 2—5 by 1—3 in. (often larger under cultivation), broadly ovate, acute or acuminate, thick, apiculate, entire, base often cordate, narrowed into the petiole ; petioles ½—1 in. long. Flowers white or red, sessile, few, in lax pedunculate spikes 1—6 in. long ; bracts small, apiculate ; bracteoles rather longer than the perianth, oblong, obtuse. Perianth divided about ½-way down ; segments elliptic, obtuse. Fruit of the size of a pea, red, white or black. Fl. B. I. v. 5, p. 20 ; Trim. Fl. Ceyl. v. 3, p. 410 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 365 ; Prain, Beng. Pl. p. 882 ; Watt, Dict. Econ. Prod. v. 1, p. 404. *Basella alba*, Linn. Sp. Pl. (1753) p. 272 ; Wight, Icon. t. 896 ; Grah. Cat. p. 170 ; Dalz. & Gibs. Suppl. p. 73 ; Watt, Dict. Econ. Prod. v. 1, p. 403.—Flowers : Oct.—Dec. VERN. *Velbondi* ; *Mayál-ki-báji*.

Very extensively grown and used as a pot-herb. The form with white stems is to be seen climbing over native houses in and about villages, where it supplies both shade and food. It is a very wholesome vegetable and makes a good spinach.—DISTRIB. Throughout India, wild or cultivated; Ceylon, Tropical Asia and Africa.

DOUBTFUL GENUS.

CHENOLEA SEDOIDES. Hook. f. Fl. B. I. v. 5 (1886) p. 10. A plant of which there are 2 sheets in Herb. Kew. without flowers has been doubtfully included in the genus *Chenolea* by Sir J. D. Hooker. The locality (Sind) ascribed to the plant rests on somewhat doubtful evidence, and it does not appear to have been found by any of the collectors who have recently worked in Sind. The attention of local botanists is invited.

The following non-indigenous plants not belonging to any of the foregoing genera are grown in gardens :—

Beta vulgaris, Linn. Sp. Pl. (1753) p. 222. *The Beet*, cultivated throughout the Presidency and much used by Europeans as a salad. Fl. B. I. v. 5, p. 5 ; Grah. Cat. p. 171 ; Dalz. & Gibs. Suppl. p. 73 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 & Gard. in Ind. ed. 5, p. 428 ; Prain, Beng. Pl. p. 879. *Beta maritima*, Watt, Dict. Econ. Prod. v. 1, p. 488.—VERN. *Pálak*.

Spinacia oleracea, Linn. Sp. Pl. (1753) p. 1027. *Spinach*, cultivated in gardens. Native country unknown. Fl. B. I. v. 5, p. 6 ; Grah. Cat. p. 171 ; Dalz. & Gibs. Suppl. p. 73 ; Woodr. in Journ. Bomb. Nat. v. 12 (1899) p. 364 & Gard. in Ind. ed. 5, p. 429 ; Prain, Beng. Pl. p. 880 ; Watt, Dict. Econ. Prod. v. 6, part 3, p. 330.—VERN. *Pálak*.

Boussingaultia baselloides, H. B. & K. Nov. Gen. et Sp. v. 7 (1825) p. 199, t. 645 *bis*. An ornamental climber, a native of S. America, with perennial roots and annual twining stems which produce tubercles by which the plant may be propagated. It has alternate smooth, shining, elliptic leaves and produces during June and July racemes of numerous small white fragrant flowers. The plant thrives well in Poona in a rich soil on a slightly shaded trellis. Woodr. Gard. in India. ed. 5, p. 427.

INDEX TO ORDERS, GENERA, SPECIES AND SYNONYMS.

The Synonyms and the names of introduced (non-indigenous) plants are in this Index printed in italics.

	Page
ACANTHACEÆ	414
Acanthodium grossum, Wt.	426
Acanthus, *L.*	426
ilicifolius, *L.*	427
Achillea Millefolium, L.	126
Achimines hirsuta, DC.	399
Skinneri, Gordon	399
tubiflora, Britton	400
Achras elengoides, Bedd.	150
Sapota, L.	156
tomentosa, Bedd.	150
Achyranthes	580
aspera, *L.*	580
bidentata, Bl.	581
sericea, Kœn.	579
triandra, Roxb.	584
Acrocephalus	524
capitatus, *Bth.*	525
Acroclinium roseum, Hk.	124
Adenema hyssopifolium, Don.	255
Adenium obesum, R. & S.	206
Adenoon	64
indicum, *Dalz.*	64
Adenosma pinnatifida, Anders.	423
Adenostemma	69
latifolium, Don.	69
rivale, Dalz.	69
viscosum, *Forst.*	69
Adhatoda	493
arenaria, Nees	487
ramosissima, Nees	486
trinervia, Nees	487
Vasica, *Nees*	493
wynaadensis, Nees	488
Adina	7
cordifolia, *Bth. & Hk f.*	7
Ægiceras	147
corniculata, Blanc.	148
floridum, R. & S.	147
fragrans, Kœn.	148
majus, *Gært.*	147
Æginetia	384
indica, *L.*	384
Ærua	576
brachiata, Mart.	580
floribunda, Wt.	578
javanica, *Juss.*	577
lanata, *Juss.*	578
Monsoniæ, *Mart.*	578
scandens, *Wall.*	577
Æschynanthus	395
ceylanica, Wt.	395
grandiflorus, Grah.	395
Perottetii, *DC.*	395
Ætheilema reniforme, Nees	437
Aganosma	203
caryophyllata, Don.	203
concanensis, Hk.	198
cymosa, *Don.*	203
Doniana, Wt.	203
elegans, Don.	203
Ageratum	69
conyzoides, *L.*	70
Alangium	1
Lamarckii, *Thw.*	1
decapetalum, Lam.	2
Allamanda Aubletii, Pohl	207
cathartica, L.	207
neriifolia, Hk.	207
Allmania	571
nodiflora, *Br.*	571
nodiflora, Woodr.	571
Aloysia citriodora, Ort.	517
Alstonia	194
scholaris, *Br.*	194
venenata, *Br.*	195
Alternanthera	584
sessilis, Br.	584
triandra, *Lam.*	584
AMARANTACEÆ	568
Amarantus	572
atropurpureus, Roxb.	574
Blitum, *L.*	575
Blitum, Woodr.	575
caudatus, L.	576
frumentaceus, B.-Ham.	574
gangeticus, *L.*	574
hypochondriacus, L.	576
lanceolatus, Roxb.	574
lividus, Roxb.	574
melancholicus, Willd.	574
oleraceus, L.	575
oleraceus, Roxb.	574
oleraceus, Willd.	574
paniculatus, *L.*	573
polygamus, *L.*	575
polygamus, Willd.	574
polygonoides, Willd.	575
spinosus, *L.*	573
tenuifolius, *Willd.*	576
tricolor, Willd.	574
tristis, Willd.	574
viridis, *L.*	575
Amberboa indica, DC.	113
Amblogyna polygonoides, Dalz.	576
Anagallis	139
arvensis, *L.*	139
cærulea, Lam.	139
Anaphalis cutchica, Clke.	85
Anarrhinum pedicellatum, Anders.	355
Andrographis	450
echioides, *Nees*	451
paniculata, *Nees*	451
Aniseia	299
calycina, Chois.	311
martinicensis, Chois.	300
uniflora, *Chois.*	300

Page

Anisochilus . . 531
adenanthus, Dalz. 533
carnosus, *Wall.* . 532
decussatus, Dalz. 532
eriocephalus, Bth. 532
verticillatus, *Hk. f.* 532
Anisomeles . . 542
Heyneana, *Bth.* . 543
malabarica, *Br.* . 544
ovata, *Br.* . . 543
Anodendron . . 204
paniculatum, *DC.* 204
Anotis . . . 19
carnosa, *Bth. & Hk. f.* . . 21
fœtida, *Bth. & Hk. f.* . . 22
lancifolia, *Hk. f.* . 20
Leschenaultiana, *Bth. & Hk. f.* . 20
Montholoni, *Hk. f.* 22
quadrilocularis, *Hk. f.* . . 22
Rheedei, *Bth. & Hk. f.* . . 21
Ritchiei, *Hk. f.* . 23
Anthocephalus . 5
Cadamba, Miq. . 6
indicus, *Rich.* . 6
morindæfolius, Korth. . . 6
Anticharis . . 351
arabica, Aitch. . 352
glandulosa, *Asch.* 351
linearis, *Hochst.* . 352
Antirrhinum
glaucum, Stks. . 355
majus, L. . . 382
maurandioides, Gray. . . 382
Aphelandra
cristata, Br. . 496
APOCYNACEÆ . . 184
Ardisia . . . 145
elliptica, Bedd. . 146
humilis, DC. . 146
parviflora, *Talb.* . 146
solanacea, *Roxb.* . 146
Arduina
bispinosa, L. . 188
Argostemma . . 12
connatum, Dalz. . 13
courtallense, *Arn.* 12
cuneatum, D. & G. 13
glaberrimum, Dalz. . . 13
verticillatum, *Wall.* 13
Argyreia . . . 324
aggregata, Chois. 329
argentea, Chois. . 326
cuneata, *Ker.* . 327
cymosa, *Sweet* . 327

Page

Argyreia
elliptica, Chois. . 329
Hookeri, *Clke.* . 325
involucrata, *Clke.* 325
Lawii, *Clke.* . . 327
malabarica, Chois. 328
malabarica, Woodr. . . 325
pilosa, *W. & A.* . 326
sericea, *Dalz.* . 326
setosa, Chois. . 330
speciosa, *Sweet* . 324
Arnebia . . . 288
Griffithii, *Boiss.* . 289
hispidissima, *DC.* 289
Artanema . . . 365
sessamoides, *Bth.* 365
Artemisia . .. 103
glabrata, DC. . 104
indica, Willd. . 105
pallens, *Wall.* . 105
paniculata, Roxb. 105
parviflora, *B.-Ham.* . . 104
scoparia, *Waldst.* 104
vulgaris, *L.* . . 105
Arthrocnemum . 589
glaucum, Woodr. 589
indicum, *Moq.* . 589
ASCLEPIADACEÆ . 207
Asclepias
curasavica, L. . 245
volubilis, L. . . 231
Aster
Amellus, L. . . 123
Asteracantha . . 427
longifolia, *Nees* . 428
Asystasia . . . 466
coromandeliana, *Nees* . . 466
gangetica, Anders. 467
Lawiana, *Dalz.* . 467
violacea, *Dalz.* . 467
Atriplex . . . 587
hortensis, L. . 588
repens, Aitch. . 588
Stocksii, *Boiss.* . 587
Avicennia . . 516
alba, *Bl.* . . 517
officinalis, *L.* . 516
officinalis, Watt. . 517
tomentosa, Jacq. . 516
Azima . . . 183
tetracantha, *Lam.* 184

Barleria . . . 456
acanthoides, *Vahl.* 458
Beddomei, Anders. 461
buxifolia, *L.* . 458
cærulea, Grah. . 462
Courtallica, *Nees* 462

Page

Barleria
cristata, *L.* . 460
cuspidata, *Heyne* 458
dichotoma, Roxb. 460
elata, Dalz. . . 461
Gibsoni, *Dalz.* . 464
grandiflora, *Dalz.* 463
Hochstetteri, *Nees* . . 459
involucrata, *Nees* 461
involucrata, Woodr. . . 461
Lawii, *Anders.* . 460
longifolia, L. . 428
lupulina, Lindl. . 464
montana, *Nees* . 461
polystachya, Nees. 462
Prionitis, *L.* . 457
sepalosa, *Clke.* . 463
strigosa, *Willd.* . 462
terminalis, Nees . 462
tomentosa, *Roth* . 459
Basella . . . 594
alba, L. . . . 595
rubra, *L.* . . 594
Bassia . . . 151
elliptica, Dalz. . 154
latifolia, *Roxb.* . 152
longifolia, *L.* . 152
malabarica, *Bedd.* 153
Batatas
edulis, Chois. . 320
paniculata, Chois. 319
pentaphylla, Chois. . . 308
Beaumontia . . 201
grandiflora, Wall. 201
Jerdoniana, *Wt.* . 201
Beloperone
aurantiaca, Bth. . 496
Berthelotia
lanceolata, DC. . 82
Beta
maritima, Watt. . 595
vulgaris, L. . . 595
Bidaria
elegans, Dalz. . 225
Bidens . . . 101
pilosa, *L.* . . 101
Wallichii, DC. . 101
Bignonia
adenophylla, Wall. 411
chelonoides, L. f. 406
Colei, Boj. . . 411
crispa, B.-Ham. . 403
gracilis, Lodd. . 409
incarnata, Aubl. . 409
indica, L. . . 402
longifolia, Willd. 409
magnifica, Bull. . 409
quadrilocularis, Roxb. . . 405

Page

Bignonia
radicans, L. . . 410
spathacea, Roxb. . 404
stans, L. . . 410
stipulata, Roxb. . 410
suaveolens, Roxb. 406
suberosa, Roxb. . 409
undulata, Sm. . 403
unguis-cati, L. . 409
venusta, Ker. . 410
xylocarpa, Roxb. . 408
BIGNONIACEÆ . . 400
Blainvillea . . 96
latifolia, DC. . 97
rhomboidea, *Cass.* 97
Blepharis . . . 423
asperrima, *Nees* . 424
boerhaviæfolia, *Pers.* . . 424
edulis, Pers. . . 426
linariæfolia, Pers. . . 426
molluginifolia, *Pers.* . . 425
sindica, *Anders.* . 426
Blepharispermum . 85
subsessile, *DC.* . 85
Blumea . . . 74
alata, DC. . . 80
amplectens, *DC.* . 75
aurita, DC. . . 81
Belangeriana, *DC.* 78
bifoliata, *DC.* . 75
eriantha, *DC.* . 78
fasciculata, DC. . 76
glandulosa, DC. . 77
glomerata, *DC.* . 76
holosericea, Dalz. 76
lacera, *DC.* . . 76
laciniata, DC. . 80
lanuginosa, Law. . 79
leptocladea, Dalz. 76
longifolia, DC. . 79
malabarica, *Hk. f.* 79
Malcolmii, *Hk. f.* 78
membranacea, *DC.* . . . 77
muralis, DC. . 77
myriocephala, Woodr. . . 79
oxyodonta, *DC.* . 77
spectabilis, *DC.* . 79
virens, *DC.* . . 77
Wallichii, Clke. . 79
Wightiana, *DC.* . 75
Boerhaavia . . 563
diffusa, *L.* . . 563
elegans, *Chois.* . 565
fruticosa, *Dalz.* . 565
procumbens, Roxb. . . 564
repanda, *Willd.* . 564

Page

Boerhaavia
repens, L. . . 564
scandens, Grah. . 565
stellata, Wt. . 565
verticillata, *Poir.* 564
Bonamia
semidigyna, Hall. 298
Bonnaya . . . 368
brachiata, *Link.* . 369
grandiflora, Spr. 370
hyssopioides, Bth. 368
oppositifolia, *Spr.* 370
parviflora, Bth. . 368
reptans, *Spr.* . 369
verbenæfolia, Spr. 370
veronicæfolia, *Spr.* 369
BORAGINACEÆ . . 263
Borago
zeylanica, Jacq. . 282
Boucerosia
edulis, Edg. . . 244
Bouchea . . . 500
marrubifolia, *Schauer* . . 500
Bougainvillæa
glabra, Chois. . 567
spectabilis, Willd. 567
Boussingaultia
basselloides, H. B. & K. . . 595
Brachycome
iberidifolia, Bth. . 123
Brachyramphus
Heyneanus, Wt. . 118
sonchifolius, DC. . 119
Breweria . . . 297
cordata, *Bl.* . . 298
latifolia, *Bth.* . 298
Roxburghii, Chois. 298
Browallia
demissa, L. . . 346
clata, L. . . 346
Brugmansia
candida, Pers. . 344
Brunsfelsia
americana, L. . 346
Buchnera . . 373
cuphrasioides, Vahl . . 376
hispida, *B.-Ham.* 373
Buddleia . . . 247
asiatica, *Lour.* . 248
discolor, Roth . 248
Bursino-petalum
arboreum, D. & G. 3

Cacalia
sempervirens, Vahl . . 112
sonchifolia, L. . 107
Cæsulia . . . 92
axillaris, *Roxb.* . 92

Page

Calacanthus . . 450
Dalzelliana, *Anders.* . . 450
Calendula
officinalis, L. . 126
Callicarpa . . 502
cana, Dalz. . . 503
lanata, *L.* . . 502
Wallichiana, Wall. 503
Calliopsis
tinctoria, DC. . 125
Callistemma
hortense, Cass. . 124
Callistephus
concolor, Dalz. . 91
cuneatus, Dalz. . 88
hortensis, Cass. . 124
Wightianus, L. . 90
Calonyction . . 321
Bona-nox, Boj. . 322
muricatum, *Don.* . 322
Roxburghii, Don. 322
speciosum, *Chois.* 322
Calophanes . . 437
Dalzellii, Anders. 439
Nagchana, Nees . 438
vagans, Wt. . . 438
Calosanthes
indica, Bl. . . 402
Calotropis . . 214
gigantea, *Br.* . 214
procera, *Br.* . 215
Campanula . . 134
Alphonsii, *Wall.* . 134
dehiscens, Roxb. . 133
CAMPANULACEÆ . . 129
Campsis
radicans, Seem. . 410
Campylanthus . . 372
ramosissimus, *Wt.* 372
Canscora . . . 256
alata, Wall. . 258
concanensis, *Clke.* 258
decurrens, *Dalz.* . 257
diffusa, *Br.* . 257
grandiflora, Wt. . 258
Lawii, Clke. . . 258
Lawii, Wt. . . 257
pauciflora, *Dalz.* . 258
perfoliata, *Lam.* . 258
Canthium
angustifolium, Roxb. . . 35
didymum, Gærtn. 34
didymum, Grah. . 34
Leschenaultii, W. & A. . . 35
parviflorum, Lam. 35
Rheedei, DC. . 35
umbellatum, Wt. 34
Capsicum . . 347
annuum, L. . . 347

	Page
Capsicum	
annuum, Prain	348
annuum, Roxb.	347
baccatum, Linn.	349
ceratocarpum, Fing.	348
cerasiforme, Mill.	348
frutescens, L.	348
frutescens, Roxb.	347
grossum, Clke.	348
grossum, Linn.	348
minimum, Clke.	349
minimum, Mill.	349
nigrum, Willd.	348
purpureum. Vahl	348
Caralluma	243
ascendens, Grah.	245
edulis, *Bth.*	244
fimbriata, *Wall.*	244
Cardanthera	422
pinnatifida, *Bth.*	423
Carissa	186
arduina, Lam.	188
Carandas, *L.*	186
Dalzellii, Bedd.	187
diffusa, Roxb.	187
hirsuta, Roth	187
inermis, *Vahl*	187
lanceolata, Dalz.	187
macrophylla, Wall.	187
spinarum, *L.*	187
suavissima, *Bedd.*	188
villosa, Roxb.	187
Caroxylon	
indicum, Wt.	592
Carthamus	
tinctorius, L.	126
Catharanthus	
pusillus, Don.	191
roseus, Don.	192
Celosia	569
argentea, *L.*	570
cristata, L.	571
Monsonia, Retz.	578
polygonoides, *Retz.*	570
pulchella, *Moq.*	570
Celsia	352
Arcturus, Grah.	353
coromandeliana, *Vahl*	352
Centaurea	
Cyanus, L.	126
Centipeda	103
orbicularis, *Lour.*	103
Centranthera	380
hispida, *Br.*	381
Centratherum	62
courtallense, Clke.	62
Hookeri, *Clke.*	63
phyllolænum, *Bth.*	62
Centratherum	
Ritchiei, *Hk. f.*	62
tenue, *Clke.*	63
Centrosolenia	
bullata, Lem.	400
Centunculus	139
tenellus, *Duby*	140
Cephalostigma	131
flexuosum, *Hk. f.*	132
hirsutum, Hk. f.	132
Schimperi, *Hochst.*	132
Ceratotheca	
triloba, Mey.	414
Cerbera	190
Odollam, *Gærtn.*	190
Thevetia, L.	207
Ceropegia	238
acuminata, Grah.	241
angustifolia, Dalz.	239
attenuata, *Hk.*	239
bulbosa, *Roxb.*	240
Candelabrum, Roxb.	241
hirsuta, *W. & A.*	242
Jacquemontiana, Dalz.	242
Juncea, *Roxb.*	240
Lawii, *Hk. f.*	240
Lushii, Grah.	241
oculata, *Hk.*	242
ophiocephala, Dalz.	242
Stocksii, *Hk. f.*	243
tuberosa, *Roxb.*	241
vincæfolia, Hk.	242
Cestrum	
aurantiacum, Lindl.	346
elegans, Schl.	346
Chamissoa	
aspera, Wt.	571
Charieis	
heterophylla, Cass.	123
Chasalia	47
curviflora, *Thw.*	47
Chenolea	
sedoides, Hk. f.	595
CHENOPODIACEÆ	585
Chenopodina	
indica, Wt.	592
Chenopodium	586
album, *L.*	586
ambrosioides, *L.*	587
murale, *L.*	586
viride, L.	586
Chirita	396
hamosa, *Br.*	396
Chonemorpha	202
macrophylla, *Don.*	202
Christisonia	384
calcarata, *Wt.*	385
Christisonia	
Lawii, *Wt.*	385
Stocksii, Hk.	385
Chrysanthemum	
indicum, Linn.	126
Chrysophyllum	148
acuminatum, Roxb.	149
Cainito, L.	149
Roxburghii, *Don.*	149
Roxburghii, Woodr.	149
Cichorium	
Endivia, L.	127
Intybus, L.	127
Cistanche	386
lutea, Wt.	386
tubulosa, *Wt.*	386
Citharexylum	
subserratum, Sw.	518
Clerodendron	510
aculeatum, Griesb.	514
calamitosum, L.	513
emirnense, Boj.	514
fragrans, Br.	514
inerme, *Gærtn.*	511
infortunatum, *L.*	513
nutans, Wall.	513
Phlomidis, *L. f.*	511
phlomoides, Willd.	512
serratum, *Spr.*	512
Siphonanthus, Br.	514
squamatum, Vahl.	513
Thomsonæ, Balf.	514
Coffea	
arabica, L.	55
Coldenia	271
procumbens, *L.*	271
Colea	
mauritiana, Boj.	411
Colebrookea	541
oppositifolia, *Sm.*	541
fernifolia, Roxb.	541
Coleus	530
amboinicus, Lour.	531
aromaticus, Bth.	531
barbatus, *Bth.*	530
Blumei, Bth.	531
spicatus, *Bth.*	530
Verschaffeltii	531
Zatarhendi, Dalz.	531
Cometes	568
surattensis, *Burm.*	568
COMPOSITÆ	56
Congea	
azurea, Wall.	518
tomentosa, Roxb.	518
CONVOLVULACEÆ	290
Convolvulus	300
arvensis, *L.*	303
bicolor, Bot. Mag.	299

Page

Convolvulus
brachyphyllus, Boiss. . . 301
copticus, L. . . 318
denticulatus, Spr. 306
glomeratus, *Chois.* 302
hastatus, Desr. . 306
hederaceus, L. . 321
hispidus, Vahl . 312
microphyllus, *Sieb.* 301
Nil, L. . . . 321
paniculatus, Linn. 319
parviflorus, Vahl . 304
Pes-capræ, L. . 318
reptans, L. . . 315
Rottlerianus, *Chois.* . . 301
rhyniospermus, *Hochst.* . . 302
semidigynus, Roxb. . . 298
scindicus, *Stks.* . 300
tenellus, Stks. . 301
umbellatus, Wall. 305
Conyza . . 73
absinthifolia, DC. 74
adenocarpa, Dalz. 74
stricta, *Willd.* . 73
Cordia . . . 264
angustifolia, Roxb. 268
fulvosa, *Wt.* . 267
latifolia, Roxb. . 265
Macleodii, *Hk. f.* . 266
monoica, *Roxb.* . 267
Myxa, *L.* . . 265
obliqua, Willd. . 265
Rothii, *R. & S.* . 268
Sebestena, L. . 268
Wallichii, *Don.* . 266
Coreopsis
aristosa, Mich. . 125
tinctoria, Nutt. . 125
CORNACEÆ . . 1
Cosmos
bipinnatus, Cav. . 125
Cosmostigma . . 231
racemosum, *Wt.* . 232
Crescentia
Cujete, L. . . 411
Cressa . . . 296
cretica, *L.* . . 296
indica, Retz. . 296
Crossandra . . 455
axillāris, Nees . 456
coccinea, Dalz. . 456
undulæfolia, *Salisb.* . . 455
Crossostephium
artemisoides, Less. 126
Cryptolepis . . 210
Buchanani, *R. & S.* . . . 210

Page

Cryptophragmium
glabrum, Dalz. . 454
latifolium, Dalz. . 454
Cryptostegia
grandiflora, Br. . 245
Cuscuta . . . 291
arabica, Wt. . 293
chinensis, *Lam.* . 293
hyalina, *Roth* . 292
oxypetala, Boiss. . 293
reflexa, *Roxb.* . 292
sulcata, Roxb. . 293
Cyathocline . . 71
flava, Clke. . . 72
Lawii, Dalz. . . 72
Lawii, Wt. . . 71
lutea, *Law.* . . 71
lyrata, *Cass.* . . 71
stricta, DC. . . 71
Cyathula . . . 581
prostrata, *Bl.* . 581
Cynanchum . . 221
Callialata, *Ham.* . 221
pauciflorum, *Br.* . 221
Cynara
Cardunculus, L. . 126
Scolymus, L. . 126
Cynoglossum . . 283
canescens, Grah. . 284
cœlestinum, Lindl. . . 286
denticulatum var. zeylanica, *Clke.* 284
glochidiatum, Dalz. . . 284
lanceolatum, Forsk. . . 285
lanceolatum, Woodr. . . 284
micranthemum, Dalz. . . 285
Ritchiei, *Clke.* . 284
Cyphomandra
betacea, Sendt. . 346
Cyrilla
aquatica, Roxb. . 362
Cyrtanthera
aurantiaca, Hk. . 496
Cyrtodeira
fulgida, Lind. . 400

Dædalacanthus . 439
concanensis, Anders. . . 441
montanus, *Anders.* 441
montanus, Woodr. 441
nervosus, Anders. 441
purpurascens, *Anders.* . . 440
roseus, *Anders.* . 439

Page

Dæmia . . . 219
extensa, *Br.* . . 219
Dahlia
variabilis, Desf. . 125
Datura . . . 343
alba, Nees . . 344
arborea, L. . . 344
fastuosa, *L.* . . 343
Hummatu, Bern. 343
Matel, L. . . 344
Decaneurum
dendigulense, DC. 67
lilacinum, Dalz. . 63
microcephalum, Dalz. . . 64
molle, Dalz. . . 63
Dentella . . . 11
repens, *Forst.* . 12
Desmochæta
atropurpurea, DC. 583
muricata, DC. . 572
prostrata, DC. . 582
Dianthera
secunda, Griseb. . 496
Dichopsis
elliptica, Bth. . 154
Dichrocephala . . 70
latifolia, *DC.* . 70
Schmidii, Wt. . 103
Dicliptera . . 481
bivalvis, Nees . 482
Burmanni, Dalz. . 483
cuneata, *Nees* . 483
Leonotis, *Dalz.* . 482
micranthes, *Nees.* 481
Roxburghiana, Dalz. . . 483
zeylanica, *Nees* . 482
Dicoma . . . 116
lanuginosa, DC. . 117
tomentosa, *Cass.* . 116
Didymocarpus
cristata, Dalz. . 396
Digera . . . 572
arvensis, *Forsk.* . 572
Dilivaria
ilicifolia, Juss. . 427
Diospyros . . 158
assimilis, Bedd. . 164
buxifolia, Hiern 165
canarica, Bedd. . 161
Candolleana, *Wt.* 161
capitulata, Wt. . 166
Chloroxylon, *Roxb* . . 166
cordifolia, *Roxb.* 165
crumenata, *Thw.* 161
Ebenum, *Kœn.* . 163
embryopteris, *Pers.* . . 167
exsculpta, B.-Ham. . . 160

Page

Diospyros
glutinosa, Kœn. . 167
Goindu, Dalz. . 165
hirsuta, Hiern . 161
Kaki, L. . . 168
Melanoxylon, *Roxb.* . . 159
microphylla, *Bedd.* 164
montana, *Roxb.* . 165
montana, Clke. . 166
nigricans, Dalz. . 164
oocarpa, *Thw.* . 162
paniculata, *Dalz.* . 163
pruriens, *Dalz.* . 162
sylvatica, *Roxb.* . 160
Tupru, B.-Ham. . 160
Wightiana, Wall. 160
Diplospora . . 32
apiocarpa, *Hk. f.* 32
sphærocarpa, *Hk. f.* . . . 32
Dipteracanthus
dejectus, Nees . 431
longifolius, Stks. 433
patulus, Nees . 432
Discospermum
apiocarpum, Dalz. 32
sphærocarpum, Dalz. . . 33
Dobera
Roxburghii, Planch. . . 184
Dolichandrone . 403
crispa, *Seem.* . 403
falcata, *Seem.* . 404
Lawii, Seem. . 404
stipulata, Bth. . 410
Dopatrium . . 363
junceum, *B.-Ham.* 363
Doratanthera
linearis, Bth. . 352
Doronicum
argenteum, Dalz. 109
calcaratum, Roxb. 89
hewrense, Dalz. . 109
reticulatum, Wt. 110
tenuifolium, Wt. . 109
tomentosum, Wt. 109
Dregea
volubilis, Bth. . 231
volubilis var. *angustifolia*, Hk. f. 231
Drejera
boliviensis, Nees 496
Duranta
Plumieri, Jacq. . 518
Dyschoriste . . 437
Dalzellii, *Kuntz.* . 438
depressa, *Nees* . 437
erecta, Kuntz. . 438
vagans, *Kuntz.* . 438

Page

Dysophylla . . 538
auricularia, *Bl.* . 538
erecta, Dalz. . 540
gracilis, Dalz. . 540
myosuroides, *Bth.* 538
myosuroides, Dalz. 538
quadrifolia, *Bth.* 539
rupestris, Dalz. . 540
salicifolia, *Dalz.* . 539
stellata, *Bth.* . 540
Stocksii, *Hk. f.* . 541
tomentosa, Dalz. 540

EBENACEÆ . . 156
Ebermaiera
glauca, Nees . 422
zeylanica, Nees . 422
Ecbolium . . 483
Linneanum, *Kurz.* 484
Linneanum, Trim. 484
Echinops . . 112
echinatus, *Roxb.* . 112
Echinospermum
cœlestinum, Wt. 286
Echites
paniculata, Roxb. 204
Eclipta . . . 95
alba, Haask. . 96
erecta, *L.* . . 95
prostrata, L. . 95
Ehretia . . . 269
aspera, *Roxb.* . 270
buxifolia, *Roxb.* . 270
cuneata, Wt. . 272
floribunda, Bth. . 270
lævis, *Roxb.* . 269
obovata, Br. . 270
obtusifolia, Hochst. . . 270
Elephantopus . . 68
scaber, *L.* . . 68
Ellertonia . . 193
Rheedei, *Wt.* . 193
Elytraria . . . 419
crenata, Vahl . 420
Embelia . . . 143
basaal, DC. . . 144
basaal, Mez. . . 145
glandulifera, Wt. . 144
Ribes, *Burm.* . 143
robusta, *Roxb.* . 144
tetrandra, Grah. . 145
Tsjeriam-cottam, DC. . . 144
viridiflora, *Scheff.* 145
Emilia . . . 106
flammea, Cass. . 107
sagittata, DC. . 107
sonchifolia, *DC.* . 107
Endopogon
integrifolius, Dalz. . . 448

Page

Enicostemma . . 254
littorale, *Bl.* . . 255
Epaltes . . . 83
divaricata, *Cass.* . 83
Episcia
fulgida, Hk. f. . 400
tesselata, Lind. . 400
Epithema . . 398
carnosum, *Bth.* . 399
ceylanicum, Wt. . 399
Eranthemum . . 468
aspersum, Hk. f. . 469
bicolor, Schrk. . 468
crenulatum, Wall. 468
malabaricum, *Clke.* . . 468
montanum, Dalz. . 441
nervosum, Dalz. . 440
pulchellum, Roxb. 440
roseum, Br. . . 440
Erigeron . . . 72
asteroides, *Roxb.* 73
hispidum, DC. . 73
Ervatamia . . 196
coronaria, Stapf . 197
Hevneana, *Cooke* 196
Erycibe . . . 293
paniculata, *Roxb.* 293
Wightiana, Grah. 294
Erythracanthus
elongatus, Dalz. . 422
Erythræa . . 255
Roxburghii, *Don.* 255
Ethulia — ? Grah. . 65
Eupatorium
Ayapana, DC. . 123
divergens, Dalz. . 67
triplinerve, Vahl . 123
Euxolus
oleraceus, Moq. . 575
Evolvulus . . 296
alsinoides, *L.* . 297
emarginatus, Burm. . . 305
hirsutus, Lam. . 297
Exacum . . 252
bicolor, *Roxb.* . 252
Lawii, *Clke.* . 254
pedunculare, Arn. 253
pedunculatum, *L.* 253
pumilum, *Griesb.* 254
tetragonum, Bot. Mag. . . 253

Fagræa . . . 248
coromandelliana, Wt. . . . 249
obovata, *Wall.* . 248
Fittonia
argyroneura, Coëm. . . 496
Pearcei . . 496

Page

Flaveria
contrayerba, Pers. 125
Frerea . . . 243
indica, *Dalz.* . 243

Gaillardia
aristata, Purs. . 126
picta, Sweet . 126
pulchella, Foug. . 126
Gaillonia . . 53
hymenostephana, *Jb. & S.* . . 54
Gardenia . . 29
florida, L. . . 31
gummifera, *L. f.* . 31
jasminoides, Ellis. 31
latifolia, *Ait.* . 30
lucida, *Roxb.* . 30
montana, Roxb. . 29
turgida, *Roxb.* . 29
Genianthus . . 213
laurifolius, *Hk. f.* 213
Geniosporum . . 525
prostratum, *Bth.* . 525
GENTIANACEÆ . . 251
Geophila . . . 48
reniformis, *Don.* . 49
Gesneria
Douglasii, Lindl. 399
zebrina, Paxt. . 400
GESNERIACEÆ . . 394
Glossocardia . . 100
Bosvallea, DC. . 100
Bosvallia, DC. . 100
Boswellia, Grah. . 100
linearifolia, *Cass.* 100
Glossogyne . . 101
pinnatifida, *DC.* . 102
Glossonema . . 213
varians, *Bth.* . 214
Glossostigma . . 371
spathulatum, *W. & A.* . . 371
Gloxinia
maculata, L'Her. 400
speciosa, Lodd. . 400
tubiflora, Hk. . 400
Gmelina . . . 504
arborea, *Roxb.* . 504
asiatica, *L.* . . 505
Hystrix, Schult. . 505
Gnaphalium . . 86
crispatulum, Clke. 87
indicum, *L.* . . 87
luteo-album, *L.* . 86
pulvinatum, *Del.* . 87
Gomphrena
globosa, L. . . 584
Goniocaulon . . 113
glabrum, *Cass.* . 113
indicum, Clke. . 113

Page

GOODENIACEÆ . . 127
Grangea . . . 72
maderaspatana, *Poir.* . . 72
Graptophyllum
hortense, Nees . 496
Gratiola
grandiflora, Roxb. 370
juncea, Roxb. . 363
Monnieria, L. . 357
oppositifolia, Roxb. . . 370
Griffithia
fragrans, W. & A. 28
speciosa, Bedd. . 28
Grumilea
congesta, Grah. . 45
vaginnans, Dalz. . 45
Guizotia
abyssinica, Cass. 125
oleifera, DC. . 125
Gymnema . . 224
montanum, *Hk. f.* 225
nepalense, Grah. 204
pergularioides, *Wt.* . . . 225
sylvestre, *Br.* . 224
tingens, Wt. . 225
Gymnostachyum . 453
canescens, Anders. . . 455
glabrum, *Anders.* 454
latifolium, *Anders.* 454
longifolium, Anders. . .455
Gynura . . . 106
angulosa, *DC.* . 106
nitida, Woodr. . 106
simplex, Dalz. . 106

Halocharis . . 593
sulphurea, *Moq.* . 594
Haloxylon . . 592
recurvum, *Bunge* 592
salicornicum, *Bunge* . . 592
Stocksii, Hk. f. . 592
Hamelia
patens, Jacq. . 55
Hamiltonia . . 50
mysorensis, W. & A. . . . 51
suaveolens, *Roxb.* 51
Haplanthus . . 452
tentaculatus, *Nees.* 453
verticillaris, *Nees* 452
Hedyotis . . 13
aspera, Bedd. . 19
aspera, Heyne . 18
Auricularia, *L.* . 13
Burmanniana, Br. 16
cærulea, *W. & A.* 14

Page

Hedyotis
carnosa, Dalz. . 21
fœtida, Dalz. . 23
glabella, Br. . 14
herbacea, L. . 16
Heynei, Bedd. . 18
Heynii, Br. . . 16
lancifolia, Dalz. 21
latifolia, Dalz. 21
Leschenaultiana, W. & A. . 20
nitida, *W. & A.* 14
quadrilocularis, Thw. . 22
Rheedei, W. & A. 21
trinervia, Roem & Schult. . . 17
vestita, Woodr. . 14
Helianthus
annuus, L. . . 124
rigidus, Desf. 124
tuberosus, L. . 124
Heligme
Rheedei, Wt. . 198
Heliotropium . 272
bracteatum var. *laxiflora*, Clke. 280
calcareum, *Stks.* . 277
calcareum, Woodr. 277
cinerascens, Aitch. 278
coromandelianum, Retz. . . 278
Eichwaldi, *Steud.* 277
europæum, Aitch 277
indicum, *L.* . 273
linifolium, Lehm. 279
marifolium, *Retz.* 280
ophioglossum, *Stks.* . . 275
ovalifolium, *Forsk.* . . 278
paniculatum, *Br.* 279
peruvianum, L. 280
rariflorum, *Stks.* . 276
Rottleri, Dalz. . 280
scabrum, Retz. . 280
subulatum, Hocht. 275
supinum, *L.* . 275
tuberculosum, *Boiss.* . . 278
undulatum, Woodr. . . 279
zeylanicum, *Lam.* 274
Helipterum
Manglesii, Muell. 124
roseum, Bth. . 124
Hemiadelphis
polysperma, Nees. 429
Hemichoriste
montana, Nees . 486
Hemidesmus . . 209
indicus, *Br.* . 210

Page

Hemigraphis . . 433
dura, *Anders.* . 433
ebracteolata, Clke. 434
elegans, *Nees* .435
latebrosa, *Nees* . 434
Herpestes
Monnieria, Dalz. 357
Herpestis
floribunda, Br. . 358
Hamiltoniana, Bth. . . . 357
Monniera, Bth. . 357
Monnieria, H. B. & K. . . 357
Heterophragma . 404
adenophyllum, Seem. . . 410
chelonoides, Dalz. 406
Roxburghii, *DC.* 404
suaveolens, Dalz. 407
Heterostemma . 232
Dalzellii, *Hk. f.* . 232
urceolatum, Dalz. 236
Wallichii, Dalz. . 233
Hewittia . . . 299
bicolor, *W. & A.* 299
Hexacentris
mysorensis, Wt. . 418
Hippion
orientale, Dalz. . 255
Hochstetteria . . 117
Schimperi, *DC.* . 117
Holarrhena . . 195
antidysenterica, *Wall.* . . 195
Holmskioldia
sanguinea, Retz. . 518
Holochilus
micranthus, Dalz. 158
Holostemma . . 220
Rheedei, Wall. . 220
Rheedianum, *Spr.* 220
Hopea
racemosa, Dalz. . 170
spicata, Dalz. . 169
Hoppea . . . 256
dichotoma, *Willd.* 256
fastigiata, Woodr. 256
Hoya . . . 233
carnosa, Br. . . 235
Griffithii, Hk. f. . 235
Lacuna, Ham. . 231
ovalifolia, *W. & A.* 234
pallida, Dalz. . 234
parasitica, Grah. . 234
pendula, *Wt.* . 235
pendula, W. & A. 234
retusa, *Dalz.* . 233
viridiflora, Br. . 231
Wightii, *Hk. f.* . 234
Hydrolea . . . 263
zeylanica, *Vahl* . 263

Page

Hydrophylax . . 51
maritima, *L. f.* . 51
HYDROPHYLLACEÆ . 262
Hygrophila . . 428
angustifolia, *Br.* . 430
polysperma, *Anders.* . . 429
salicifolia, Nees .430
Serphyllum, *Anders.* . . 429
spinosa, Anders. . 428
Stocksii, Anders. 430
Hymenodictyon . 9
excelsum, *Wall.* . 9
obovatum, *Wall.* . 10
Hyoscyamus . . 344
insanus, Stks. . 345
muticus, *L.* . 344
niger, L. . . 345
Hypœstes . . 477
lanata, *Dalz.* . . 477
Hyptis
suaveolens, Poit. 560

Ichnocarpus . . 205
frutescens, *Ait.* . 205
ILLECEBRACEÆ . . 567
Ilysanthes . . 367
hyssopioides, *Bth.* 368
parviflora, *Bth.* . 368
Inula . . . 87
cutchica, Clke. . 88
grantioides, *Boiss.* 88
Ipomœa . . . 310
ægyptia, L. . . 308
angustifolia, Clke. 306
aquatica, *Forsk.* . 315
barlerioides, *Bth.* 312
Batatas, Poir . 320
biloba, *Forsk.* . 317
Bona-nox, L. . 322
bracteata, Grah. . 326
calycina, *Clke.* . 311
campanulata, *L.* . 316
carnea, Jacq. . 321
chryseides, Ker. . 307
Clarkei, *Hk. f.* . 314
coccinea, L. . 330
coptica, Roth . 318
cymosa, R. & S. . 305
dasysperma, Jacq. 321
denticulata, Br. . 306
digitata, *L.* . 318
dissecta, Pers. . 309
dissecta, *Willd.* . 318
dissecta, Woodr. . 319
eriocarpa, *Br.* . 312
filicaulis, Bl. . 306
grandiflora, Clke. 315
grandiflora, Roxb. 322
hederacea, Jacq. . 321
hispida, R. & S. . 312

Page

Ipomœa
Horsfalliæ, Hk. . 321
involucrata, *Beauv.* 314
laciniata, *Clke.* . 319
Leari, Paxt. . 321
longiflora, *Br.* . 315
muricata, Jacq. . 322
obscura, *Ker.* . 317
palmata, *Forsk.* . 319
paniculata, Br. . 319
paniculata, Burm. 304
pentaphylla, Jacq. 308
Pes-capræ, Sweet 318
pes-tigridis, *L.* . 320
pilcata, Roxb. . 314
pilosa, *Swcet* . 313
pulchella, Roth . 320
purpurea, Roth . 321
Quamoclit, L. . 331
racemosa, Roth . 316
reniformis, Chois. 305
reptans, Poir. . 315
rhyncorhiza, Dalz. 307
rubro-cærulea, Hk. . . 321
rumicifolia, *Chois.* 313
sepiaria, *Kœn.* . 315
sessiliflora, Roth 312
sindica, *Stapf* . 313
sinuata, Ort. . 309
staphylina, *R. & S.* . . . 316
stipulacea, Sweet 316
Stocksii, *Clke.* . 312
tridentata, Roth . 306
tuberosa, L. . 320
Turpethum, Br. . 309
uniflora, R. & S. . 300
vitifolia, Sweet . 308
Isonandra . . 150
Candolleana, *Wt.* 150
Stocksii, Clke. . 151
Ixora . . . 36
Bandhuca, Roxb. 40
brachiata, *Roxb.* . 39
coccinea, *L.* . . 40
elongata, *Heyne* . 38
lanceolaria, *Coleb.* 37
nigricans, *Br.* . 38
parviflora, *Vahl* . 39
pedunculata, Dalz. 38
polyantha, *Wt.* . 37

Jacobinia
boliviensis, Woodr. 496
Jacquemontia . . 303
cœrulea, Chois. . 304
paniculata, *Hall.* 303
Jasminum . . 171
affine, Wt. . . 175
arborescens, *Roxb.* . 173, 174

Page

Jasminum
arborescens, Woodr. . . 172
aureum, Don. . 176
auriculatum, *Vahl.* 174
bracteatum, Roxb. . . 173
calophyllum, Wall. 176
flexile, *Vahl* . 175
grandiflorum, L. . 176
hirsutum, Willd. . 173
humile, L. . . 175
latifolium, Grah. . 172
malabaricum, *Wt.* 172
odoratissimum, L. 175
officinale, L. . 175
ovalifolium, Wt. . 175
pubescens, *Willd.* 173
Ritchiei, *Clke.* . 174
Rottlerianum, *Wall.* . . 173
Roxburghianum, *Wall.* . . 174
Sambac, *Ait.* . . 172
Justicia . . . 484
Adhatoda, L. . 494
Betonica, *L.* . 486
bicalyculata, Vahl. 495
bivalvis, Grah. . 482
brunnelloides, Lam. . 421
dentata, Klein . 484
diffusa, *Willd.* . 489
Ecbolium, L. . 484
echioides, L. . 452
gangetica, L. . 467
Gendarussa, Burm. 492
glauca, *Rottl.* . 487
heterocarpa, *Anders.* . . 486
lætevirens, Vahl . 484
micrantha, *Heyne.* 489
montana, *Wall.* . 485
nasuta, L. . . 494
paniculata, Burm. 451
pectinata, L. . 479
picta, L. . . 496
procumbens, *L.* . 491
quinqueangularis, *Kœn.* . . 490
ramosissima, Roxb. . . 486
repens, L. . . 480
secunda, Vahl . 496
simplex, *Don.* . 490
trinervia, *Vahl* . 487
verticillata, Roxb. 453
wynaadensis, *Heyne* . . 488

Kigelia
pinnata, DC. . 411

Page

Klugia . . . 397
Notoniana, *DC.* . 397
scabra, Dalz. . 397
Knoxia . . . 33
corymbosa, *Willd.* 33
Kochia . . . 588
indica, *Wt.* . . 588
scoparia . . 589

LABIATÆ . . 518
Lactuca . . . 117
Heyneana, DC. . 118
obtusa, Clke. . 122
remotiflora, *DC.* . 118
runcinata, *DC.* . 118
Scariola, L. . . 119
Lagasca . . 93
mollis, *Cav.* . . 93
Laggera . . . 80
alata, *Schult.* . 80
arida, Clke. . 82
aurita, *Schult.* . 80
Lamprachenium . 64
microcephalum, *Bth.* . . 64
Lantana . . . 498
aculeata, L. . 499
alba, Schauer. . 498
Camara, L. . . 498
indica, *Roxb.* . 498
Lasianthus . . 49
sessilis, *Talb.* . 49
venulosus, *Wt.* . 50
Lasiopogon . . 86
lanatum, *Cass.* . 86
Launæa . . 121
chondrilloides, *Hk. f.* . . 121
glomerata, *Hk. f.* 123
nudicaulis, *Hk. f.* 122
pinnatifida, *Cass.* 122
Lavandula . . 533
Burmanni, *Bth.* . 534
Gibsoni, *Grah.* . 533
Lawii, Wt. . 534
Perrottetii, Bth. . 534
Stœchas, L. . 534
vera, DC. . . 535
Legendrea
mollissima, W. & B. . . 330
LENTIBULARIACEÆ . 388
Leonotis . . . 555
nepetifolia, *Br.* . 555
Leontodon
Taraxacum, L. . 127
Leonurus . . . 545
sibiricus, *L.* . 546
tataricus, Roxb. . 546
Lepidagathis . . 469
asperifolia, Anders. . . 471

Page

Lepidagathis
calycina, *Hochst.* 475
clavata, *Dalz.* . 472
cristata, *Willd.* . 470
cuspidata, *Nees* . 474
fasciculata, *Nees* 476
goensis, Dalz. . 476
grandiflora, Dalz. 450
hyalina, Woodr. . 476
incurva, *Don.* . 475
lutea, *Dalz.* . 471
mitis, *Dalz.* . 470
mucronata, Nees 476
prostrata, *Dalz.* . 473
rigida, *Dalz.* . 473
strobilifera, Stks. 475
trinervis, *Nees* . 471
Leptacanthus
alatus, Wt. . 448
Leptadenia . . 236
Jacquemontiana, Dcne. . . 238
reticulata, *W. & A.* . . . 237
Spartium, *Wt.* . 237
Lettsomia . . 328
aggregata, *Roxb.* 328
elliptica, *Wt.* . 329
setosa, *Roxb.* . 330
Leucas . . . 546
aspera, *Spr.* . . 548
biflora, *Br.* . 553
Cephalotes. *Spr.* . 549
ciliata, *Bth.* . 554
collina, Dalz. . 552
diffusa, Woodr. . 549
lanata, *Bth.* . 552
linifolia, *Spr.* . 548
longifolia, *Bth.* . 551
martinicensis, *Br.* 550
mollissima, *Wall.* 552
montana, *Spr.* . 552
nutans, *Spr.* . 550
procumbens, *Desf.* 553
stelligera, *Wall.* . 553
stricta, *Bth.* . 551
urticifolia, *Br.* . 547
vestita, Woodr. . 550
zeylanica, *Br.* . 549
Leucoblepharis
subsessile, Arn. . 85
Ligustrum . . 180
neilgherrense var. obovata, *Clke.* . 181
neilgherrense, Dalz. . . 181
obovatum, Dcne. . 181
Limnanthemum . 260
aurantiacum, *Dalz.* . . 262
cristatum, *Griesb.* 261
indicum, *Thw.* . 261

Page

Limnanthemum parvifolium, *Griesb.* . . 261
Wightianum, Griesb. . . 261
Limnophila . . 360
conferta, *Bth.* . 361
gratioloides, *Br.* . 362
gratissima, *Bl.* . 361
heterophylla, Woodr. . . 362
Menthastrum, Bth. . . 361
polystachya, *Bth.* 361
racemosa, *Bth.* . 362
Roxburghii, *Don.* 360
sessiliflora, *Bl.* . 362
Linaria . . . 353
cabulica, Bth. . 354
ramosissima, *Wall.* . . 353
sphærocarpa, Bth. 355
Lindenbergia . . 379
abyssinica, *Hochst.* . . 379
polyantha, *Royle* . 380
urticæfolia, *Link.* 379
Linociera . . 178
intermedia Var. Roxburghii, *Clke.* . . 178
malabarica, *Wall.* 178
Lippia . . . 499
citriodora, H. B. & K. . . . 517
nodiflora, *Mich.* . 499
Lobelia . . . 130
nicotianæfolia, *Heyne* . . 131
trialata, *B.-Ham.* 130
trigona, *Roxb.* . 130
Lochnera . . . 191
pusilla, *K. Schum.* 191
rosea, Reichb. . 192
LOGANIACEÆ . . 246
Lophospermum scandens, Don. . 382
Lycium . . . 342
barbarum, *L.* . 342
depressum, Stks. 343
europœum, L. . 343
foliosum, Stks. . 343
Lycopersicum esculentum, Mill. 345

Maba . . . 157
micrantha, *Hiern* 158
nigrescens, *Dalz.* 157
Madacarpus belgaumensis, Wt. 111
Madaractis lanuginosa, Edgw. 109

Page

Mæsa . . . 140
dubia, Wall. . 142
indica, *Wall.* . 141
velutina, Mez . 142
Marsdenia . . 229
lanceolata, *Cooke.* 231
tenacissima, *W. & A.* . . . 230
volubilis, *Cooke.* 230
Martynia diandra, Glox. . 414
Mastixia . . . 2
pentandra, *Bl.* . 2
Mastostigma varians, Stks. . 214
Maurandia antirrhiniflora, H. & B. . . . 382
Barclaiana, Lindl. 382
Barclayana, Woodr. . . 382
scandens, Gray. . 382
semperflorens, Jacq. . . 382
Maurandya antirrhinifolia, Dalz. . . 382
antirrhiniflora, Grah. . . 382
Barclayana, Dalz. 382
semperflorens, Grah. . . 382
Mazus rugosus, Lour. . 383
Melampodium divaricatum, DC. 124
paludosum, H. B. & K. . . . 124
Mengea tenuifolia, Moq. . 576
Mentha arvensis, L. .559
piperita, L. . 560
viridis, L. . 559
Menyanthes cristata, Roxb. . 261
Meriandra bengalensis, Bth. 559
Merremia . . 304
chryseides, *Hall.* 307
dissecta, Hall. . 309
emarginata, *Hall.* 305
hastata, *Hall.* . 306
pentaphylla, *Hall.* 308
rhyncorhiza, *Hall.* 307
tridentata, *Hall.* . 306
umbellata, *Hall.* . 305
vitifolia, *Hall.* . 307
Meyenia . . . 418
erecta, Benth. . 418
Hawtayneana, *Nees* . . 419

Page

Micranthus . . 436
oppositifolius, *Wend.* . . 436
Microcarpœa cochlearifolia, Sm. 371
spathulata, Hk. . 372
Micromeria . . 542
capitata, *Bth.* . 542
Malcomiana, Dalz. . . 542
piperita, Grah. . 542
Microrhynchus chondrilloides, Clke. . . 122
fallax, Jaub. . 122
glomeratus, Jaub. 123
nudicaulis, Less. . 122
sarmentosus, DC. 122
Millingtonia hortensis, L. f. . 409
Mimulus . . . 358
gracilis, *Br.* . 358
Mimusops . . 154
Elengi, *L.* . . 155
hexandra, *Roxb.* . 155
indica, DC. . 156
Kauki, L. . . 156
Mirabilis Jalapa, L. . . 567
Mitragyna . . 8
parvifolia, *Korth.* 8
Mitrasacme . . 247
alsinoides, *Br.* . 247
crystallina, Griff. . 247
indica, Wt. . . 247
pusilla, Dalz. . 247
Mitreola . . . 246
oldenlandioides, *Wall.* . . 246
paniculata, Wall. 246
Monechma . . 492
bracteatum, *Hochst.* . . 492
Monetia tetracantha, Salisb. . . 184
Moniera . . . 356
cuneifolia, *Michx.* 356
floribunda, *Cooke.* 357
Hamiltoniana, *Cooke.* . . 357
Morinda . . . 42
bracteata, Roxb. 43
citrifolia, *L.* . 42
citrifolia, Trim. . 43
tinctoria, *Roxb.* . 43
tomentosa, Heyne. 43
Moschosma . . 527
polystachyum, *Bth.* . . 527
Mussænda . . 24
frondosa, *L.* . . 24

	Page
Myrogyne minuta, Less.	103
MYRSINACEÆ	140
Myrsine	142
capitellata, *Wall.*	142
Nægelia zebrina, Reg.	400
Nanothamnus	83
sericeus, *Thoms.*	83
Nauclea	6
Cadamba, Roxb.	6
cordifolia, Roxb.	8
elliptica, Bedd.	7
elliptica, D. & G.	5
missionis, Wall.	5
parviflora, D. & G.	8
parvifolia, Roxb.	8
purpurea, *Roxb.*	7
Nelsonia	420
brunelloides, Kuntz.	421
campestris, *Br.*	420
tomentosa, Dietr.	421
Nepeta	555
bombaiensis, *Dalz.*	556
ruderalis, *B.-Ham.*	556
Nerium caudatum, Roxb.	206
obesum, Forsk.	207
odorum, Sol.	206
Neuracanthus	464
Lawii, Wt.	466
sphærostachys, *Dalz.*	465
trinervius, *Wt.*	465
Neuropeltis	295
ovata, Wall.	296
racemosa, *Wall.*	295
Nicandra physaloides, Gærtn.	346
Nicotiana Tabacum, L.	346
Nomaphila pinnatifida, Dalz.	423
Nothosærua	579
brachiata, *Wt.*	580
Notonia	107
balsamica, Dalz.	108
corymbosa, DC.	108
grandiflora, *DC.*	107
NYCTAGINACEÆ	563
Nyctanthes	176
Arbor-tristis, *L.*	176
Obione Stocksii, Wt.	588
Ocimum	520
adscendens, *Willd.*	522
Ocimum	
basilicum, L.	523
canum, *Sims*	521
gratissimum, *L.*	522
sanctum, *L.*	521
Oianthus	235
disciflorus, *Hk. f.*	236
urceolatus, *Bth.*	236
Oldenlandia	14
aspera, *DC.*	18
corymbosa, *L.*	15
crystallina, *Roxb.*	16
dichotoma, *Hk. f.*	17
diffusa, *Roxb.*	16
gracilis, *Hk. f.*	19
herbacea, *Roxb.*	16
herbacea, DC.	16
Heynii, Don.	16
pumila, DC.	17
retrorsa, *Boiss.*	18
senegalensis, *Hiern*	19
trinervia, *Retz.*	17
umbellata, *L.*	17
Olea	179
cuspidata, Wall.	180
dioica, *Roxb.*	179
europæa, L.	180
fragrans, Thunb.	181
paniculata, Roxb.	179
Roxburghiana, R. & S.	179
Roxburghii, Spr.	179
sativa, Hoff.	180
OLEACEÆ	170
Operculina	309
Turpethum, *Manso.*	309
Ophelia alba, Wt.	260
Lawii, Wt.	260
minor, Griesb.	259
multiflora, Dalz.	260
pauciflora, Dalz.	260
Ophiorrhiza	23
Harrisiana, *Heyne*	23
Harrisonii, Wt.	24
Ophioxylon serpentinum, Wt.	189
serpentinum, L.	189
Origanum Majorana, L.	559
OROBANCHACEÆ	383
Orobanche	386
ægyptiaca, *Pers.*	387
cernua, *Lœfl.*	387
indica, B.-Ham.	388
nicotianæ, Wt.	387
Oroxylum	401
indicum, *Vent.*	401
Orthosiphon	523
glabratus, Bth.	524
pallidus, *Royle*	523
tomentosus, *Bth.*	524
Osmanthus fragrans, Lour.	181
Oxystelma	216
esculentum, *Br.*	216
Wallichii, Wt.	217
Pajanelia	408
longifolia, Schum.	409
multijuga, *DC.*	408
Rheedei, Clke.	408
Palaquium	153
ellipticum, *Engl.*	154
Palmia bicolor, Endl.	299
Pandorea jasminoidea, Schum.	410
Panjanelia Rheedei, Wt.	408
Paracaryum	285
asperum, Stks.	287
cœlestinum, *Bth.*	285
Lambertianum, *Clke.*	287
malabaricum, *Clke.*	286
Parmentiera cereifera, Seem.	411
Parsonsia	197
spiralis, *Wall.*	198
Pavetta	40
Brunonis, Wt.	41
indica, *L.*	41
hispidula, *W. & A.*	41
siphonantha, Dalz.	41
tomentosa, Roxb.	41
PEDALIACEÆ	411
Pedalium	412
Murex, *L.*	412
Pedicularis	381
zeylanica, *Bth.*	381
Pentas carnea, *Benth.*	56
Pentatropis	217
cynanchoides, *Br.*	218
microphylla, *W. & A.*	218
spiralis, Dcne.	218
Peplidium	370
humifusum, *Del.*	371
Pergularia	228
minor, Andr.	229
odoratissima, Wt.	229
pallida, *W. & A.*	229
Periploca	211
aphylla, *Dcne.*	211
esculenta, L.	217

	Page
Peristrophe	495
bicalyculata, *Nees*	495
Petalidium	435
barlerioides, *Nees*	435
patulum, Dalz.	432
Petrea volubilis, L.	518
Petræa volubilis, Woodr.	518
Petunia nyctaginiflora, Juss.	346
violacea, Lindl.	346
Pharbitis laciniata, Dalz.	319
Learii, Dalz.	321
Phaylopsis	436
parviflora, Willd.	437
Phelipæa indica, Don.	388
Phillyrea microphylla, Grah.	181
Phlogocanthus curviflorus, Nees	496
Physalis	339
minima, *L.*	340
peruviana, L.	340
somnifera, L.	341
Physichilus Serphyllum, Nees.	430
Piptoclaina malabarica, Don.	276
Pisonia	566
aculeata, *L.*	566
alba, Spanog.	567
morindifolia, Br.	566
Pladera pusilla, Roxb.	256
PLANTAGINACEÆ	560
Plantago	560
amplexicaulis, *Cav.*	561
ciliata, *Desf.*	562
Ispaghula, Roxb.	562
major, *L.*	560
ovata, *Forsk.*	562
remotiflora, Stks.	561
Stocksii, *Boiss.*	561
Platychæte villosa, Boiss.	91
Platystoma	526
africanum, *Beauv.*	526
flaccidum, Bth.	526
Plectranthus	527
Coetsa, *B.-Ham.*	528
cordifollus, Don.	529
incanus, *Link.*	529
Macraei, Bth.	528
menthoides, Bth.	528
Plectranthus	Page
rotundifolius, Grah.	529
subincisus, Bth.	529
Stocksii, *Hk. f.*	528
Wightii, Grah.	528
Plectronia	33
parviflora, *Bedd.*	35
Rheedei, *Bedd.*	34
Wightii, *Cooke.*	34
Pleurogyne minor, Bth.	259
Pluchea	81
arguta, *Boiss.*	82
frutescens, Bth.	82
lanceolata, *Clke.*	82
Malcolmii, Clke.	79
tomentosa, *DC.*	81
Wallichiana, *DC.*	82
Wallichii, Woodr.	82
PLUMBAGINACEÆ	135
Plumbago	136
capensis, Thunb.	137
coccinea, Boiss.	137
rosea, L.	137
zeylanica, *L.*	136
Plumeria acuminata, Ait.	206
acutifolia, Poir.	205
alba, L.	206
Pogostemon	535
frutescens, Grah.	536
Heyneanus, Bth.	537
mollis, Bth.	537
paniculatus, *Bth.*	535
parviflorus, *Bth.*	536
Patchouly, Pell.	537
plectranthoides, *Desf.*	536
purpurascens, *Dalz.*	537
purpuricaulis, Dalz.	536
rotundatus, Wt.	538
Porana	294
malabarica, *Clke.*	294
paniculata, Roxb.	295
racemosa, Grah.	295
Premna	506
cordifolia, Grah.	507
coriacea, *Clke.*	506
integrifolia, *L.*	506
latifolia, Dalz.	507
Nimmoniana, Grah.	507
scandens, Grah.	506
serratifolia, L.	507
Prenanthes sarmentosa, Willd.	122
PRIMULACEÆ	138
Priva	501
leptostachya, *Juss.*	502
Pseudanthus brachiatus, Wt.	580
Psilostachys	579
sericea, *Hk. f.*	579
Psilotrichum sericeum, Dalz.	579
Psychotria	43
ambigua, W. & A.	47
bracteata, W. & A.	45
canarensis, *Talb.*	46
Dalzellii, *Hk. f.*	45
flavida, *Talb.*	45
herbacea, Jacq.	49
longifolia, Dalz.	47
octosulcata, *Talb.*	46
sarmentosa, Woodr.	47
Thwaitesii, *Hk. f.*	44
truncata, *Wall.*	44
Pulicaria	89
angustifolia, *DC.*	90
Boissieri, *Hk. f.*	91
foliolosa, *DC.*	91
glaucescens, *Jaub.*	91
Stocksii, *Hk. f.*	92
Wightiana, *Clke.*	90
Punecria coagulans, Stks.	342
Pupalia	582
atropurpurea, *Moq.*	582
lappacea, *Moq.*	583
orbiculata, *Wt.*	583
Pyrostegia ignea, Presl.	410
Quamoclit coccinea, Mœnch	330
phœnicea, Chois.	330
pinnata, Boj.	331
vulgaris, Chois.	331
Radermachera	407
xylocarpa, *Schum.*	407
Randia	26
dumetorum, *Lam.*	27
longispina, DC.	28
malabarica, *Lam.*	28
rugulosa, *Hk. f.*	28
uliginosa, *DC.*	27
Rapanea capitellata, Mez.	143
Rauwolfia	188
canescens, L.	190
decurva, Hk. f.	189

Page

Rauwolfia
densiflora, *Bth.* . 189
serpentina, *Bth.* . 188
Rhabdia . . 272
lycioides, *Mart.* . 272
viminea, Dalz. . 272
Rhamphicarpa . 377
longiflora, *Bth.* . 377
Rhazya . . 192
stricta, *Dcne.* . 192
Rhinacanthus . 494
communis, *Nees* 494
Rhodanthe Manglesii,
Lindl. . . 124
Rhynchoglossum . 398
obliquum, *Bl.* . 398
obliquum, DC. . 398
zeylanicum, Hk. . 398
Rivea . . 322
Bona-nox, Chois. . 323
fragrans, Nim. . 323
hypocrateriformis,
Chois. . . 323
ornata, *Chois.* . 323
Rondeletia
odorata, *Jacq.* . 56
Rostellaria
crinita, Nees . 489
diffusa, Nees . 490
peplοides, Nees . 490
procumbens,
Nees . . 491
Vahlii, Nees . 490
Rostellularia
gracilis, Wt. . 479
Roupellia
grata, Wall. . 206
Rubia . . 54
cordifolia, *L.* . 54
tinctorum, L. . 55
RUBIACEÆ . . 3
Ruellia . . 431
Baikiei, Woodr. . 433
bracteata, Roxb. . 436
crenata, Benth. . 435
deccanensis,
Grah. . . 431
dura, Nees . 434
ebracteata, Dalz. . 434
elegans, Bot. Mag. 434
erecta, Burm. . 438
imbricata, Vahl . 437
infundibuliformis,
Roxb. . . 456
latebrosa, Dalz. . 434
longifolia, *Anders.* 432
patula, *Jacq.* . 432
prostrata, *Poir.* . 431
ringens, Roxb. . 431
zeylanica, Kœn. . 467

Page

Rungia . . 477
crenata, *Anders.* . 478
elegans, *Dalz.* . 480
linifolia, *Nees* . 479
muralis, Nees . 479
parviflora, Dalz. . 479
parviflora, *Nees* . 478
pectinata, Nees . 479
polygonoides,
Nees . . 479
repens, *Nees* . 480
Russelia
floribunda,
H B. & K. . 383
floribunda,
Woodr. . 383
juncea, Zucc. . 382
rotundifolia, Cav. 383

Salicornia . . 589
brachiata, *Roxb.* . 590
indica, Willd. . 589
Salsola . . 593
fœtida, *Del.* . 593
fruticosa, L. . 590
indica, Willd. . 592
Láná, Edgw. . 591
nudiflora, Willd. . 591
spinescens, Wt. . 593
Salvadora . . 182
oleoides, *Dcne.* . 183
persica, *L.* . . 182
Stocksii, Wt. . 183
Wightiana,
Planch. . . 183
SALVADORACEÆ . 182
Salvia . . 557
ægyptiaca, *L.* . 558
coccinea, Juss. . 558
farinacea, Bth. . 559
involucrata, Cav. 558
officinalis, L. . 559
plebeia, *Br.* . 557
pseudococcinea,
Grah. . . 558
Samara
Rheedei, Wt. . 145
Sanchezia
nobilis, Hk. f. . 496
Santia
venulosa, W. & A. 50
Sapota
elengoides, DC. . 150
tomentosa, DC. . 150
SAPOTACEÆ . . 148
Saprosma . . 48
indicum, *Dalz.* . 48
Sarcocephalus . 4
missionis, *Hav.* . 5
Sarcostemma . 222
brevistigma, *Wt.* 222

Page

Sarcostemma
intermedium,
Dcne. . . 223
Stocksii, *Hk. f.* . 223
viminale, Wt. . 223
Scævola . . 128
Kœnigii, *Vahl* . 128
Lobelia, *Murr.* . 128
Plumierii, Vahl . 129
Taccada, Roxb. . 128
uvifera, Stks. . 129
Schrebera . . 177
swietenioides,
Roxb. . . 177
Schweinfurthia . 354
pedicellata, *Bth.* . 355
sphærocarpa,
Braun . . 354
Sclerocarpus . . 96
africanus, *Jacq.* . 96
Scoparia
dulcis, L. . . 383
Scorzonera
hispanica, L. . 127
SCROPHULARIACEÆ . 349
Scutellaria . . 545
discolor, *Coleb.* . 545
indica, Bl. . . 545
Sebæa
carinata, Grah. . 253
Seddera
latifolia, Hochst. . 298
Senecio . . 108
belgaumensis,
Clke. . . 111
Dalzellii, *Clke.* . 110
Edgeworthii,
Hk. f. . . 109
Gibsoni, *Hk. f.* . 111
Grahami, *Hk. f.* . 110
hewrensis, *Hk. f.* 109
Lawii, Clke. . 110
multifidus, Willd. 109
reticulatus, Clke. . 110
sempervivus, Sch. 112
tenuifolius, *Burm.* 108
tomentosus, Clke. 109
Sericostoma . . 288
paucifiorum, *Stks.* 288
Serissa
fœtida, *Lam.* 55
Serratula
indica, Willd. 114
Sesamum . 412
indicum, L. 413
laciniatum, *Klein* 413
orientale, L. . 413
Shutereia
bicolor, Chois. . 299
Sideroxylon . . 149
tomentosum,
Roxb. . . 150

Page

Siegesbeckia . . 94
orientalis, *L.* . 94
Sinningia
speciosa, Hiern 400
tubiflora, Frit. . 399
Siphonacanthus
repens, Nees . 433
Sievogtia
maritima, Dalz. . 255
SOLANACEÆ . . 331
Solanum . . . 331
albicaule, *Kotsc.* . 338
bigeminatum, *Nees* . 334
coagulans, Forsk. 337
denticulatum, *Bl.* 334
ferox, *L.* . . 335
giganteum, *Jacq.* 336
gracilipes, *Dcne.* . 338
incanum, *L.* . 337
incertum, Dun. . 333
indicum, *L.* . 336
macrophyllum, Dun . . 339
Melongena, L. . 339
Neesianum, Dalz. 334
nigrum, *L.* . 332
pubescens, *Willd.* 333
rubrum, Mill. . 333
sanctum, L. . 337
sindicum, Prain. . 338
torvum, Sw. . 339
trilobatum, *L.* 337
tuberosum, L. . 339
verbascifolium, *L.* 333
xanthocarpum, *Schd.* . . 335
Sonchus, . . 119
arvensis, *L.* . . 120
asper, *Hill.* . . 120
Candolleanus, Jaub. . . . 122
ciliatus, Lam. . 120
oleraceus, *L.* . 119
Wightianus, DC. . 121
Sopubia . . 377
delphinifolia, *Don.* . . 378
trifida, *B.-Ham.* . 378
Spathodea
campanulata, Beauv. . . 410
crispa, Wall. . 403
falcata, Wall. . 404
Spermacoce . . 52
hispida, *L.* . . 53
stricta, *L. f.* . 52
Sphæranthus . 84
africanus, *L.* . 84
hirtus, Willd. . 84
indicus, *L.* . . 84

Page

Sphæranthus
microcephalus, Willd. . . 85
mollis, Roxb. . 84
Sphenoclea . . 133
Pongatium, DC. . 134
zeylanica, *Gærtn.* 134
Spilanthes . . 99
Acmella, *Murr.* . 99
calva DC. . . 100
Spinacia
oleracea, L. . . 595
Stachytarpheta . 500
indica, *Vahl* . 501
jamaicensis, Vahl . . 501
mutabilis, Vahl . 501
urticifolia, Dalz. . 501
Stapelia
grandiflora, Mass. 245
Statice . . 135
Stocksii, *Boiss.* . 136
Staurogyne . . 421
glauca, *Kuntz.* . 421
zeylanica, *Kuntz.* 422
Stemodia . . 358
serrata, *Bth.* . 359
viscosa, *Roxb.* . 359
Stenolobium
stans, Seem. . 410
Stephanophysum
Baikiei, Hk. . 433
repens, Anders. . 433
Stephanotis
floribunda, Brong. 245
Stephegyne
parvifolia, Korth. 8
Stereospermum . 405
chelonoides, *DC.* . 405
suaveolens, *DC.* . 406
xylocarpum, Bth. 408
Streptium
asperum, Roxb. . 502
Striga . . 374
coccinea, Grah. . 375
densiflora, *Bth.* . 375
euphrasioides, *Bth.* . . 376
hirsuta, Bth. . 376
lutea, *Lour.* . 375
orobanchioides, *Bth.* . . 374
sulphurea, *Dalz.* . 376
Strobilanthes . 441
asper, *Wt.* . . 447
barbatus, *Nees* . 445
callosus, *Nees* . 444
ciliata, Grah. . 445
ciliatus, *Nees* . 446
glatinosa, Grah. . 449
Grahamianus, Wt. 445

Page

Strobilanthes
Heyneanus, *Nees* 444
ixiocephalus, *Bth.* 448
lupulinus, *Nees* . 443
membranaceus, Talb. . . 449
minor, Talb. . 449
Neesiana, Wt. . 449
parviflorus, Bedd. 447
perfoliatus, *Anders.* . . 448
reticulatus, *Stapf* 442
rugosus, Wt. . 444
scrobiculatus, *Dalz.* . . 446
sessilis, *Nees* . 443
sessiloides, Dalz. 443
tetrapterus, Dalz. 445
warreensis, *Dalz.* 447
Strophanthus
dichotoma, Wall. 206
Wallichii, DC. . 206
Strychnos . . 249
axillaris, Dalz. . 250
bicirrhosa, Lesch. 250
colubrina, Grah. . 250
colubrina, *L.* . 249
Dalzellii, *Clke.* . 250
Nux-vomica, *L.* . 250
potatorum, *L.f.* . 251
Stylocoryna
Webera, Rich. . 26
Stylocoryne
Webera, W. & A. 26
STYRACACEÆ . . 168
Suæda . . . 590
fruticosa, *Forsk* . 590
indica, Moq. . 591
maritima, *Dum.* . 591
monoica, *Forsk.* . 591
nudiflora, *Moq.* . 591
Sutera . . . 355
glandulosa, *Roth* 356
Swertia . . . 258
corymbosa var. Lawii, *Clke.* . 260
decussata, *Nim.* . 259
minor, *Cooke.* . 259
Symphorema . 514
involucratum, *Roxb.* . . 515
polyandrum, *Wt.* 515
Symplocos . . 168
Beddomei, *Clke.* 169
kanarana, *Talb.* . 170
laurina, Wall. . 169
racemosa, Grah. . 170
reticulata, Clke. . 170
spicata, *Roxb.* . 169
Stocksii, *Brand.* . 170

Page

Tabernæmontana
coronaria, Willd. 197
crispa, Dalz. . 197
dichotoma, Grah. 197
Heyneana, Wall. 197
Tagetes
erecta, L. . . 125
patula, L. . . 125
Taraxacum
officinale, Wigg. . 127
Tarenna . . 25
zeylanica, *Gærtn.* . . 25
Tecoma
capensis, Lindl. . 410
jasminoides, Lindl. . . 410
radicans, Juss. . 410
stans, Juss. . . 410
undulata, Don. . 402
Tecomaria
capensis, Spach. . 409
Tecomella . . 402
undulata, *Seem.* . 402
Tectona . . 503
grandis, *L.* . . 503
Telanthera
ficoidea, Moq. . 584
Thevetia
neriifolia, Juss. . 207
Thunbergia . . 416
alata, Boj. . . 418
erecta, Anders. . 418
fragrans, *Roxb.* . 417
grandiflora, Roxb. . . 418
Hawtayneana, Wall. . . 419
mysorensis, *T. Anders.* . 417
Thymus
Serpyllum, L. . 559
Tiaridium
indicum, Lehm. . 274
Tithonia
tagetiflora, Dest. . 124
Torenia . . . 364
asiatica, L. . . 365
bicolor, *Dalz.* . 364
cordifolia, *Roxb.* 364
Fournieri, Lind. . 365
Tournefortia
subulata, Hochst. 275
zeylanica, Wt. . 275
Toxocarpus . . 212
concanensis Hk. f. . . 212
crassifolius, Dalz. 213
Kleinii, *W. & A.* 212
laurifolius, Wt. . 213

Page

Tragopogon
porrifolium, L. . 127
Trichodesma . 281
africanum, *Br.* . 283
amplexicaule, Roth . . 282
indicum, *Br.* . 281
zeylanicum, *Br.* . 282
Tricholepis . . 113
amplexicaulis, *Clke.* . . 115
Candolleana, Wt. 116
glaberrima, *DC.* . 114
procumbens, Wt. 116
radicans, *DC.* . 114
Tridax . . 102
procumbens, *Linn.* . . 102
Tubiflora . . 419
acaulis, *Kuntz.* . 420
Tylophora . . 226
asthmatica, *W. & A.* . . 228
carnosa, Dalz. . 228
carnosa, Wall. . 227
Dalzellii, *Hk.f.* . 227
fasciculata, *Ham.* 226
rotundifolia, *Ham.* . . 227
tenuis, *Bl.* . . 227
tenuissima, Wt. . 227

Utricularia . . 388
affinis, *Wt.* . . 392
albo-cærulea, *Dalz.* . . 391
arcuata, *Wt.* . 391
cærulea, *L.* . 392
decipiens, Dalz. . 392
diantha, R. & S. . 391
exoleta, *Br.* . 390
fasciculata, Roxb. 390
filicaulis, Wall. . 393
flexuosa, *Vahl* . 390
glochidiata, Wt. . 394
graminifolia, Grah. . . 393
nivea, *Vahl* . 393
orbiculata, Wall. 394
purpurascens, Grah. . . . 392
racemosa, Wall. . 393
reticulata, *Sm.* . 393
stellaris, *L.* . . 389
striatula, *Sm.* . 393
uliginoides, Wt. . 392

Vallaris . . 198
Heynei, *Spr.* . 199
dichotoma, Wall. 199

Page

Vandellia . . 366
crustacea, *Bth.* . 366
hirsuta, *B.-Ham.* . 367
laxa, Bth. . . 367
pedunculata, *Bth.* 367
Roxburghii, Don. 367
scabra, var. *laxa*, Hk. f. .367
Vangueria . . 36
spinosa, *Roxb.* . 36
Verbena
chamædryfolia, Juss. . . 517
incisa, Hk. . . 517
mutabilis, Jacq. . 501
officinalis, L. . 517
venosa, Gill. . .517
VERBENACEÆ . . 497
Verbesina
biflora, Wall. . 98
calendulacea, L. . 98
Vernonia . . 65
anthelmintica, *Willd.* . . 66
arborea, Ham. . 68
cinerascens, *Schult.* . . 66
cinerea, *Less.* . 65
divergens, *Edgw.* 67
indica, *Clke.* . 67
Veronica . . 372
Anagallis, *L.* . 373
Vicoa . . . 88
appendiculata, DC. . . 89
auriculata, *Cass.* . 88
cernua, *Dalz.* . 89
indica, DC. . . 89
Villarsia
cristata, Spr. . 261
indica, Vent. . 261
Vinca
pusilla, Murr. . 191
rosea, L. . . 192
Vitex . . . 507
alata, Willd. . 510
altissima, *L.f.* . 509
bicolor, Willd. . 508
leucoxylon, *L.f.* . 510
Negundo, *L.* . 508
trifolia, *L.* . . 508
trifolia, Grah. . 508
Vittadinia
australis, Rich. . 123
Vogelia . . 137
arabica, Boiss. . 138
indica, *Gibs.* . 138
Volkameria
fragrans, Vent. . 514
Voluntarella . . 115
divaricata, *Bth.* . 115

	Page
Wahlenbergia	133
agrestis, DC.	133
gracilis, *Schr.*	133
Wallrothia	
leucoxylon, Roth	510
Webera	
corymbosa, Willd.	26
Wedelia	97
biflora, *DC.*	99
calendulacea, *Less.*	98
scandens, Clke.	99
urticæfolia, *DC.*	98
Wendlandia	10
exserta, *DC.*	10
Notoniana, *Wall.*	11
Withania	340
coagulans, *Dun.*	341
somnifera, *Dun.*	341
Wollastonia	
biflora, DC.	98, 99
scabriuscula, DC.	99
Wrightia	199
antidysenterica, Grah.	196
Rothii, Don.	200
Wrightia	
tinctoria, *Br.*	200
tomentosa, *R. & S.*	199
Wallichii, DC.	200
Xanthium	93
indicum, DC.	94
strumarium, *L.*	94
Zapania	
nodiflora, Lam.	499
Zinnia	
elegans, Jacq.	124

INDEX TO VERNACULAR NAMES

	Page
Abnus	164
Aboli	456
Adenachakanher	207
Adulsa	494
A'ghâda	581
Aisar	503
A'k	215, 216
Akada	424
A'kâshvel	292
Akasnim	409
Akkalkára	100
A'kra	444
A'l	42
A'lu	36
Amarvel	292
Ambar	293
A'mbarvel	218
A'mbat	145
A'mbati	144
A'mbri	231, 234
Aminge	409
A'mphutaváni	482
Amti-vel	316
Anantvel	210
A'nkul	2
Ansaroli	2
Antamul	228
Arsul	34
Askand	341
Atki	141
Bakorá	40
Bakuli	155
Balage	509
Bám	357
Bártang	561
Bártondi	42
Batátá	339
Bát-mogará	172
Bhadrak	128
Bhadraksh	128
Bháman	542
Bhámbhurda	76
Bhandirá	513
Bhangra	96
Bhauri	295
Bharang	513
Bhindodi	226
Bhokar	265
Bhorsal	9
Bhuigend	470
Bhuiringani	335
Bhul	356
Bhurundi	274
Bhutkes	25
Boknal	131
Bondvel	329
Bopala-mirchi	348
Borsali	155
Brahmadandi	64
Bugdi	146
Bukra	443
Bundar	67
Burambi	75
Burando	76
Burumbi	554(2)
Buwádo	577
Chákvat	586
Chámbári	506
Chameli	176
Chandanbatva	588
Chándhára	543
Chándvel	303
Charonvá	532
Chavlái	576(2)
Chikali	156
Chimine	417
Chinai-salit	567
Chinchurdi	337
Chirboti	340
Chirval	17
Chitrak	137
Chota-kalpa	282
Chota-Karáit	255
Chunna	336
Dáhán	114(2), 115
Dahiván	267
Dármori	449
Dasamuli	440
Dasmori	420
Dátrang	269
Davaná	106
Dev-Phanas	7
Dhákta-adulsa	484
Dhákti-A'mbri	234
Dhatura	344
Dhaval	131
Dhol	380
Dhor-davaná	105
Diár	183
Dikemáli	30, 31
Dikna	146, 424
Dipmál	555
Dolakuda	196
Dorli	337
Doundi	409
Dudháli	378
Dudháni	217, 551
Dudh-kalmi	309
Dudh-vel	330
Dudh-yel	234
Dula	165
Ellakura	593
Gájará	105
Gajkarni	494
Gajpipali	562
Gandarájá	31
Ganesh-pushpa	331
Gantelbu	434
Gariya	322
Garmar	530
Gável	326
Gehelá	28
Gel	28
Ghátipitpápra	480
Ghetuli	564
Ghodá	341
Ghodeghui	534
Ghol	576
Gidas	51
Gidasáwa	51
Gidesa	51
Goindu	165
Gojibhá	544
Goki	178
Gokran	460
Goma	548, 554
Gondáni	265, 268
Gopáli	544
Gorakh-mundi	84
Gorbále	39
Gorea	534
Gudmurki	403
Gul-abbas	567
Gulchándni	322
Gul-dándi	126
Guljáphiri	125
Gulsham	440
Gundi	268
Gura	464

	Page
Hadki	189
Hámana	242
Hannachalli	249
Har	177
Hastipata	68
Hed	8
Heddi	178
Hedi	8
Hedu	8
Hemapupika	175
Hirandodi	231, 237
Hiranpag	303
Ippi	153
Iran	512
Ishvarg	193
Ispaghul	562
Itari	444
Itta	55
Jáfri-gundi	585
Jagat-madan	492
Jai	175, 176
Jakára	453
Jaljamba	584
Jamaki	234
Jasad	426
Jati	232
Jati-Jai	176
Jharvad	93
Kadam	6, 8
Kadashing	408
Kadkusumbá	113
Kadu	260
Kadu-jire	66
Kadu-kárlá	66
Kadvá-sirid	10
Kafri-mirchi	348
Káfurkapát	559
Kajat-cha-ghás	391
Kájlá	148
Kájrá	251
Kájrá-vel	250
Kajuri	18
Káki	168
Kaknaj	342
Kakro	91
Kálá-chitrak	137
Kálá-dhatura	343
Kála-inderjav	200
Kála-Kaddu	9
Kálá-kudá	200
Kalam	8
Kála-meti	451
Kalanisurdhi	287
Kála-til	125, 413
Kála-tulshi	521
Káli-shivan	505
Kalmashi	492
Kalpa	451
Kámakasturi	523
Kámalatá	331
Kamarri	31
Kánal	250
Kanangi	320
Kanchri	584
Kángani	333
Kanher	206
Kántemaka	425
Kánte-Máth	573
Kanvel	240
Kapuri-maduri	578
Kápurli	532
Káralá	125
Karamba	180
Karambal	492
Karanda	186
Karanta	211
Kardi	296
Kare	26, 164
Kare-kunchal	165
Karigida	161
Kárkanni	144
Káro	592
Kárva	449
Karvand	186
Karvat	542
Kárvi	445
Kásarkanamara	251
Katampu	95
Kateri	453
Káteringani	335
Kát-kuda	38
Katmora	432
Kavadi	260
Kávali	224
Kavla-nim	409
Kemettivalli	204
Kerdi	133
Keriti	263
Khabbar	183
Khákan	183
Khárá-narvel	507
Khári-Láni	592
Kharkhodá	237
Kharsing	408
Khera-cháphá	206
Kholeta	457
Kip	238
Kirni	35, 156
Kolista	462
Kolshindá	428
Kreát	451
Krishnasarvá	205
Kudá	196
Kumbal	150
Kumud	261
Kumudini	261
Kunja-luta	229
Kunvalá	150
Kurdu	570
Kuri-kumar	163
Kusar	172
Kusumba	127
Kutaki	353
Kutri	333, 336
Lál-ágáda	529
Lál-Chitrak	137
Lál-mirchi	347
Lámtáni	204
Láná	592
Lanan	593
Láni	592
Lenda	170
Liári	268
Lichardi	284
Lih-katmanda	116
Lingur	509
Lohero	403
Lona	296
Lovungi-mirchi	349
Luntak	256
Machamul	125
Machim	272
Machul	590
Machur	589
Madanghanti	53
Mádár	215
Mahaka	362
Mahálungi	328
Mahátiti	451
Main-mul	530
Máká	92, 96
Mákadsing	245
Málati	204
Máli-tulshi	523
Málvi-gokhra	412
Malyá	164
Manjishth	55
Márándi	427
Maredi	73
Maryádvel	318
Matisul	555
Mayál-ki-báji	595
Medasinghi	404
Menakalli	249
Mharbir	77
Mhatara	120 (2)
Mhová	152, 153
Mirchi	347
Mirjoli	169
Mohá	152
Mokhá	178
Mokiri	178
Moras	591 (2)
Morga	306
Motha-sunki	65
Mothe-gokhru	412
Mothi-ringani	337
Mundi	84

	Page
Munga	214
Murgha-ka-phul	571
Murva	559
Nagal-kudá	198
Nágamalli	494
Nágkudá	197
Nalichi-bhági	315
Navanangi	117
Navli	308
Nensi	167
Nimurdi	78
Ninai	167
Nira-bráhmi	357
Nirgud	508
Nirgundi	508, 509
Nirmali	251
Nisottar	309
Nisurdhi	286
Niv	6
Nivale	534
Odu-játi	484
Osádi	70
Pách	537
Padal	406
Pálak	595 (2)
Pánácha-onva	531
Pánchoti-pálla	154
Pándhara	27
Pándhrá-cháphá	206
Pándhrá-kudá	196
Pándri	27
Pángli	536
Panirband	342
Pánjiri	532
Pápat	41
Párijátak	177
Paripáth	16
Párjámb	180
Parparam	218
Parul	407
Patharchur	531
Páthari 118, 119,	122(2)
Phánji	323
Phattarsuva	100
Phuga	5
Pilu	183
Pilvá	183
Pippa	244
Pippu	244
Pitáni	224
Pitmári	228
Pitpápda	16, 100
Pivala-bhángrá	98
Pivala-kanher	207
Pivala-Koránta	457
Popati	340
Popti	263
Pudina	559, 560
Punarnavá	564
Pungali	317, 564
Ráhu	180
Rai-Kudá	39
Rájgira	574
Rakta-rohida	403
Rakta-rora	158
Rám-til	125
Rám-tulshi	523
Rán	180
Ránaboli	484
Rán-mogará	173
Rán-popati	340, 346
Ransher	212
Rán-tewan	430
Rán-tulshi	522
Ratálu	320
Ratoliya	499
Rawan	506
Rávan	156
Rui	215, 216
Sabjá	523
Sadamandi	107
Sadáphuli	192
Safed-til	413
Ság	504
Ságwán	504
Sahadevi	66, 70
Sakapat	184
Sámbhar-yel	330
Samudraphen	318
Samudrashok	325
Sangkhi	192
Sankaphi	192
Sannipát	355
Sarvad	25
Sátura	565
Sátvin	194
Setakávali	211
Sevar	193
Shankaveli	297
Shankeshvar	94
Sheras	510
Shewál	370
Shidodi	220
Shindal-makudi	243
Shinguti	237
Shiuli	177
Shivan	505
Shivan-Yallaki	46
Shwán	180
Sihar	193
Sita-chi-ásre	391
Soma	223
Sonasali	73
Sonkadi	89
Sonki	99, 110, 111
Sukanu	191
Suraka	588
Suryaphul	124
Sut	487
Tagar	197
Tálimkhána	428
Támbada-kudá	200
Tambarvel	317
Támbdi-kari-chagavat	375
Támrag	160
Támraj	160
Tandulja	575, 576
Tántáni	499
Tarsi	149
Tel-Davaná	104
Temburi	167
Temru	160
Tetu	402
Tev	492
Til	413
Tivar	516, 517
Tripakshi	271
Tripanki	271
Tugelmi	317
Tukam	558
Tulas	521
Tulshi	521
Tultuli	220
Tupá	34
Turti	363
Udichiráyet	253
Undirkáni	305
Uparsul	210
Ushuk-láni	591
Utarni	219
Utkatár	112
Vaivarang	144
Vandar-roti	108
Vángi	339
Vanjai	511
Varas	405
Vasu	564
Vávli	155
Velbondi	595
Vel-vángi	345
Vichuacha-jhar	414
Vilayti-vakundi	245
Vishnukranta	297
Waiti	437, 448

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