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Materials for a Flora of the Malayian Peninsula.—By SIR GEORGE KING, K.C.I.E., LL.D., F.R.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. S. GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

No. 16.

The present contribution commences with an account of the genus *Psychotria*, which concludes the Natural Order *Rubiaceæ*. In addition, it contains accounts of the Natural Orders *Valerianæ* and *Compositæ* (prepared by Sir G. King); *Stylidiæ*, *Goodenoviæ*, and *Campanulacæ* (prepared by Mr. Gamble); *Vacciniacæ* and *Ericacæ* (Sir G. King); *Epacridæ* and *Plumbaginæ* (Mr. Gamble). For the new genera and species proposed in these Orders the authors are jointly responsible. The account of the Order *Monotropæ* has been supplied by Lieut.-Col. Prain, F.R.S., Superintendent of the Royal Botanic Garden, Calcutta; and that of the Order *Gentianæ* has been added, having been drawn up by Mr. C. B. Clarke, F.R.S., late President of the Linnean Society of London. It is somewhat out of its proper sequence, but has been included, as the descriptions were ready for publication.

In addition, therefore, to the account of the Rubiaceous genus *Psychotria*, with 29 Malayan Peninsular species, of which 11 are new to science, this fasciculus contains accounts of the Malayan members of 11 Natural Orders, including 48 genera and 81 species, of which 2 genera and 17 species are new to science.

Nat. Ord. LIX. RUBIACEÆ.

53. PSYCHOTRIA, Linn.

Shrubs or small trees, erect or occasionally climbing or twining; rarely herbs. *Leaves* opposite, rarely in whorls of 3 or 4. *Stipules* free in pairs, or connate, often with glands or hairs, deciduous or persistent. *Flowers* rather small, in terminal, rarely axillary, cymes

corymbs or fascicles, bracteolate or not, never involucrate (in the Malayan species). *Calyx-tube* short; the limb persistent in part or deciduous. *Corolla-tube* straight, short; the throat naked or hairy; the lobes of the mouth 5, rarely 4 to 6, valvate in bud. *Stamens* as many as the corolla-lobes, inserted on the throat or mouth; anthers linear or obtuse, attached dorsally near the base to short or long filaments. *Ovary* 2-celled; style long or short, bifid; ovules often cuneiform, solitary, erect from the base of each cell. *Fruit* small, baccate or drupe-like, ovoid globose or oblong, smooth or ridged, composed of two plano-convex, 1-celled, 1-seeded pyrenes; or didymous and separating into two cocci. *Seeds* plano-convex, the ventral surface grooved or plane, the dorsal smooth, ridged or sulcate; testa thin, albumen hard; embryo small, basal; cotyledons broad, thin; radicle inferior.—DISTRIB. Species about 550; tropical or sub-tropical.

Scandent :—

Flowers 4-merous :—

Panicles lax; leaves elliptic- or oblong-lanceolate .. 1. *P. laxiflora*.

Flowers 5-merous :—

Seeds with 4 ridges on the dorsal surface, the ventral surface plane :—

Flowers sessile in small capitula at the ends of the branches of the cymes :—

Leaves ovate to oblong-elliptic, 1·75 to 2·5 in. broad;

inflorescence puberulous 2. *P. morindaeflora*.

Leaves narrowly elliptic, less than 1·25 in. broad;

inflorescence coarsely pubescent 3. *P. Maingayi*.

Flowers pedicellate in cymosely branched cymes :—

Leaves elliptic-oblancoelate to elliptic, the midrib sometimes pubescent on the lower surface, otherwise glabrous; main-nerves 7 to 10 pairs; petioles ·4 to ·75 in. long; fruit ·25 in. long 4. *P. sarmentosa*.

Leaves narrowly elliptic-oblong, main-nerves 4 to 6 pairs; petioles ·4 to ·8 in. long; fruit ·35 in. long .. 5. *P. Kunstleri*.

Leaves broadly obovate or sub-ovate; main-nerves 5 to 10 pairs; petioles ·5 to 1·5 in.; fruit ·4 in. long .. 6. *P. penangensis*.

Seeds with 3 ridges on the dorsal surface, the ventral surface plane :—

Flowers pedicellate, in cymosely branched paniculate cymes; fruit narrowly ellipsoid 7. *P. Scortechinii*.

Flowers on short pedicels in globular cymes at the ends of the branches of the panicles :—

Leaves and stems glabrous; fruit subglobose, ·2 in. long 8. *P. pilulifera*.

Leaves and stems and inflorescence rusty-pubescent .. 9. *P. ovoidea*.

Seeds with more than 4 ridges on both dorsal and ventral surfaces 10. *P. Ridleyi*.

- Seeds faintly ridged on the dorsal surface, the ventral surface with a shallow groove 11. *P. polycarpa*.
- Erect shrubs, usually small:—
- Flowers 4-merous:—
- Leaves with a strong pale intra-marginal nerve .. 12. *P. calocarpa*.
- Flowers 5-merous:—
- Flowers shortly pedicellate, in dense globular cymules at the ends of the long-peduncled branches of a terminal umbellate cyme; leaves deciduously puberulous, with 9 to 13 pairs of main-nerves; fruit .3 in. long; seeds 4-ridged on the dorsal surface, slightly concave on the ventral 13. *P. multicapitulata*.
- Flowers sub-sessile, in short condensed dichotomous sessile axillary cymes; leaves with scurfy pubescence and 8 to 11 pairs of main-nerves; seeds 5-ridged on the dorsal and broadly grooved on the ventral surface 14. *P. tortilis*.
- Flowers in a terminal umbellately branching cyme:—
- Seeds with a single dorsal ridge, the ventral surface plane:—
- Leaves quite glabrous:—
- Leaves 6 to 10 in. long; main-nerves 12 to 15 pairs 15. *P. Griffithii*.
- Leaves usually under 6 in. long, main-nerves 8 to 10 pairs 16. *P. angulata*.
- Leaves adpressed-pubescent, 6 to 12 in. long .. 17. *P. Helferiana*.
- Seeds with a single dorsal ridge, the ventral surface with a groove; leaves 5 to 8 in. long, quite glabrous, main-nerves 7 to 8, rarely 10 pairs 18. *P. montana*.
- Seeds with 5 ridges on the dorsal surface, the ventral surface plane:—
- Leaves glabrous:—
- Leaves oblong-elliptic to oblanceolate-elliptic, 3.5 to 8 in. long; fruit .25 in. long 19. *P. viridiflora*.
- Leaves softly pubescent:—
- Leaves elliptic to elliptic-oblong, the bases cuneate rounded or cordate, 3.5 to 5 in. long; fruit .25 to .3 in. long 20. *P. Birchiana*.
- Leaves elliptic, the upper surface glabrous except the midrib, 5 to 7 in. long; fruit .45 in. long .. 21. *P. fulva*.
- Seeds 5-ridged on the dorsal surface and 2-grooved on the ventral; leaves glabrous on the upper surface, their margins crenulate 22. *P. fulvoidea*.
- Seeds with 5 ridges on the dorsal surface and 1 ridge on the ventral; leaves glabrous, usually oblanceolate 23. *P. stipulacea*.
- Seeds 4-ridged on the dorsal surface, plane on the ventral:—
- Leaves elliptic, tapering equally to each end, 9- to 10-nerved; calyx-lobes very long caudate-acuminate 24. *P. Curtisii*.
- Leaves obovate-oblong or obovate-oblanceolate, 10- to 14-nerved; calyx-lobes short, broad, blunt .. 25. *P. rhinocerotis*.

Seeds with 4 ridges on the dorsal surface and a faint groove on the ventral; leaves elliptic or elliptic-lanceolate, 12- to 18-nerved 26. *P. malayana*.

SPECIES IMPERFECTLY KNOWN.

Psychotria Wrayi, No. 27.
 ,, *inaequalis*, No. 28.
 ,, *condensa*, No. 29.

1. *PSYCHOTRIA LAXIFLORA*, Blume Bijdr. 964. Scandent or epiphytic, glabrous except the inflorescence; young branches slightly thicker than a crow-quill, terete, dark-coloured, brown, shining. *Leaves* membranous, narrowly elliptic- or oblong-lanceolate, much acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the lower the paler, midrib distinct; main-nerves 4 to 6 pairs, faint, curved, ascending; length 2 to 4 in.; breadth .5 to 1 in.; petiole .15 to .2 in. long. *Stipules* forming a tube from .15 to .3 in. long, sharply toothed. *Panicles* solitary, terminal, lax, more than half as long as the leaves, on naked peduncles about 1 in. long; branches cymose, with small acute bracteoles at their bases, puberulous. *Flowers* .15 to .2 in. long, puberulous, in cymules of three at the ends of the branchlets; their pedicels short, with broad acute caducous bracteoles at their bases. *Calyx* shortly funnel-shaped, the mouth sub-truncate or obscurely 4 toothed. *Corolla* longer than the calyx, broadly clavate in bud, funnel-shaped; the mouth with 4 broad obtuse lobes, throat sericeous. *Anthers* 4, elliptic, blunt, sub-sessile. *Fruit* clavate-ellipsoid, with 8 vertical ridges (2 of them double), glabrous; seeds with 4 bold ridges on the dorsal surface; the ventral surface quite flat. Miq. Fl. Ind. Bat. II. 187.

SINGAPORE: *Ridley* 13, 4828. JOHORE: *Ridley*. PERAK: *King's Collector* 4117, 8428; *Wray* 110.—DISTRIB. Sumatra, *Forbes* 1297, 1309, 1710, 2466; Java, *Koorders* 23550B.

2. *PSYCHOTRIA MORINDÆFLORA*, Wall. Cat. 8438 A.B.C. in part. A woody climber, 15 to 20 feet long, glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, dark brown when dry, terete, somewhat thickened at the nodes, the internodes minutely lenticellate and faintly striate. *Leaves* coriaceous, ovate to elliptic, sometimes oblong-lanceolate, shortly and rather bluntly acuminate, the base slightly cuneate or rarely rounded; upper surface olivaceous-greenish when dry, the lower purplish-brown; the midrib channelled on the upper surface, prominent on the lower; main-nerves 6 to 8 pairs, rather straight, spreading, thin but rather distinct on both surfaces when dry; length 3 to 4.5 in.; breadth 1.75 to 2.5 in.; petiole

·2 to ·5 in. *Stipules* caducous, leaving a pale narrow scar between the petioles. *Cymes* terminal, about 2 in., rarely 3 in. long; the branches compressed and angled, scurfy-puberulous, two of them springing from the base, the other three umbellate at the apex of the main axis, each bearing at its apex a dense, many-flowered, minutely bracteolate capitulum less than ·5 in. in diam. *Flowers* ·2 in. long, sessile. *Calyx* cupular, the mouth with 5 small blunt teeth. *Corolla* twice as long as the calyx; the mouth with 5 deep oblong blunt lobes; throat densely sericeous. *Anthers* 5, short, elliptic, basifixed on stout filaments. *Style* cylindrical, thickened upwards; stigma of 2 broad lobes. *Fruit* short, compressed ovoid-elliptic, with 8 vertical ridges (2 of them double) crowned by the small calyx, ·25 in. long and ·15 in. in diam. from front to back; seeds with 4 dorsal ridges; ventral surface plane. Hook. fil. Fl. Br. Ind. III. 166. *Psychotria?* Wall. Cat. 8355.

PERAK: *King's Collector* 2585, 2665; *Scortechini* 1826; *Wray* 4001.
PENANG: *Wallich*; *Curtis* 478.

3. *PSYCHOTRIA MAINGAYI*, Hook. fil. Fl. Br. Ind. III. 166. A slender woody climber; young branches half as thick as a goose-quill, pubescent, ultimately pale and glabrous. *Leaves* thickly membranous, narrowly elliptic, caudate-acuminate, the base much narrowed; both surfaces glabrous, when dry pale olivaceous, the upper rather the darker; main-nerve about 6 pairs, indistinct on both surfaces like the midrib; length 2 to 3·25 in.; breadth ·65 to 1·2 in.; petiole ·1 to ·2 in., slender. *Stipules* cartilaginous, persistent, connate into a tube ·15 in. long with a few hairs at the truncate and toothed or acute apex. *Cymes* axillary, on slender, compressed, coarsely pubescent peduncles shorter than the leaves, few-branched. *Flowers* sessile, bracteoles linear. *Calyx* much longer than the pubescent ovary, widely campanulate; the lobes ovate-triangular, caudate-acuminate, spreading. *Corolla* unknown. *Fruit* broadly ellipsoid, with 8 deep vertical grooves, pale, nearly glabrous when ripe, ·2 in. long.

SINGAPORE: *Maingay* (K.D.) 926; *Ridley* 6924.

4. *PSYCHOTRIA SARMENTOSA*, Blume Bijdr. 964. Scandent; woody; young stems thinner than a goose-quill, pale, glabrous. *Leaves* thinly coriaceous, elliptic-oblong to elliptic, acute or shortly and abruptly acuminate, much narrowed at the base, edges slightly recurved; both surfaces pale brown tinged with olivaceous when dry, minutely reticulate; the upper glabrous, the lower sometimes pubescent only on the stout midrib; main-nerve 7 to 10 pairs, curving slightly upwards, faint; length 2·5 to 4 in.; breadth 1 to 1·75 in.; petioles ·4 to ·75 in., winged above. *Stipules* broad at the base, the apex caudate-acuminate.

Cymes terminal, puberulous, shorter than the leaves, on short peduncles, cymosely branched; the branches angled, spreading, many-flowered; bracteoles minute, linear. *Flowers* about .15 in. long, puberulous outside, on short pedicels. *Calyx* campanulate, with 5 short triangular teeth. *Corolla* villous at the base in the interior. *Fruit* ellipsoid, .25 in. long, with 10 vertical ridges (2 of them double). *Seeds* with 4 dorsal ridges, the ventral surface plane. DC. Prod. IV. 522; Wight Ic. 1038; Thwaites Enum. Pl. Ceyl. 148; Kurz For. Fl. Burm. II. 14; Hook. fil. Fl. Br. Ind. III. 165. *P. obovata*, Wall. Cat. 8380. *Gramilea Jungkuhiana*, Miq. Fl. Ind. Bat. II. 296. *Psychotria* sp., Wall. Cat. 8382, 8352?, 8384.

SINGAPORE: *Ridley* 2874, 2875, 9112. MALACCA: *Griffith* (K.D.) 3043. PERAK: *King's Collector* 4967, 7572. PENANG: *King* 1346; *Curtis* 951, 2781.—DISTRIB. Burma, *Wallich*; *Helper* (K.D.) 3041, &c.; Indian Peninsula; Ceylon; Malay Archipelago; Andaman Islands.

VAR. *pachyphylla*, King & Gamble. *Leaves* thickly coriaceous, shining, greenish when dry, 3 to 4 in. long; fruit .25 in. long, subglobular.

PENANG: *Ridley* 9363; *Curtis* 2215.

5. PSYCHOTRIA KUNSTLERI, n. sp., King & Gamble. A glabrous epiphyte with slightly angled stems thinner than a goose-quill, pale yellowish when dry. *Leaves* succulent, glossy and bluish-green when fresh, but yellow on both surfaces and dull when dry, narrowly elliptic-oblong, rarely oblong-oblancoolate, gradually and equally tapering to each end; the midrib bold, channelled on the upper surface; main-nerves 4 to 6 pairs, spreading, very indistinct; length 3 to 5.5 in.; breadth .8 to 1.4 in.; petioles .4 to .8 in. long. *Stipules* forming a cartilaginous persistent cup with an entire mouth, about .1 in. long. *Cyme* solitary, umbellate, terminal, longer than the leaves (the naked peduncle of 2 to 3 in. being included), lax, from 2 to 4 in. broad; branches spreading, dividing near their apices into umbellate cymes; bracteoles few, linear, acute. *Flowers* not seen: on basally bracteolate pedicels as long as themselves. *Fruit* .35 in. long, ellipsoid, deeply 10-grooved, crowned by the rather large remains of the 5-toothed calyx, 10-ridged. *Seeds* dorsally 4-ridged, the ventral surface flat.

PERAK: *Scortechini*; *King's Collector* 1886, 4953, 6588; *Wray* 2230.—DISTRIB. Sumatra, *Forbes* 2823.

6. PSYCHOTRIA PENANGENSIS, Hook. fil. Fl. Br. Ind. III. 175. A shrubby epiphyte or climber, 8 to 12 feet long, all parts except the inflorescence glabrous; young branches slightly compressed, thinner than a goose-quill, dark-coloured. *Leaves* thinly coriaceous, broadly elliptic-obovate or sub-ovate, shortly and abruptly triangular, acumi-

nate, much narrowed at the base into the broad petiole; both surfaces brown when dry, the upper slightly olivaceous; the midrib broad, channelled on the upper surface, main-nerves 5 to 10 pairs, spreading, thin, distinct on the lower surface; length 3 to 4·5 in.; breadth 1·5 to 2·5 in.; petiole ·5 to 1·5 in. long, slightly winged above. *Stipules* broadly ovate, sub-acute or blunt, sub-tubular, sometimes bifid, ·2 to ·4 in. long. *Cymes* umbellate, solitary or terminal, pedunculate, as long as or longer than the leaves (including the compressed naked 1 to 2 in. long peduncle); primary branches long, spreading; the ultimate umbels with broad-based subulate unequal bracteoles. *Flowers* ·2 to ·25 in. long, sessile or on short pedicels; bracts ·25 in. long. *Calyx-tube* obconic, its teeth triangular. *Corolla* longer than the calyx, shortly and widely tubular, deeply divided into 5 broad lobes thickened near the apex, the apex itself sharp and inflexed, glabrous inside except for the ring of hair in the throat at the insertion of the short filaments. *Anthers* elliptic, blunt, entire. *Fruit* ellipsoid, compressed, with 10 obtuse vertical ridges (2 of them double), glabrescent, crowned by the rather large calyx; length ·4 in.; breadth ·25 in. *Seeds* 2, plano-convex, the dorsal surface with 4 blunt ridges, the ventral surface plane.

MALACCA: *Maingay* (K.D.) 920. SINGAPORE: *Ridley* 2870. PERAK: *Scortechini* 2034; *King's Collector* 3049, 4591, 10723. SELANGOR: *Ridley* 7425. PANGKORE: *Curtis* 1621.

7. PSYCHOTRIA SCORTECHINII, n. sp., King & Gamble. A climber, all parts glabrous; young branches pale brown, thicker than a crow-quill, terete, smooth. *Leaves* membranous, ovate-lanceolate or narrowly elliptic, acuminate, the base narrowed or rarely rounded; both surfaces brown when dry (the lower slightly paler), the midrib prominent; main-nerves 5 or 6 pairs, curved, spreading, not prominent; length 2·5 to 4 in.; breadth 1 to 1·5 in.; petiole ·15 to ·2 in. *Stipules* oblong, acute, connate at their bases, ·15 to ·2 in. long, caducous. *Cymes* paniculate, solitary, terminal, rarely axillary, spreading, lax, cymosely branched, in flower as long as or nearly as long as the leaves, in fruit longer, the branches bracteolate, angled, divaricating. *Flowers* on the ultimate branchlets in threes, ·15 in. long, on short pedicels, each with a bracteole at the base. *Calyx* cupular, with 5 short acute teeth. *Corolla* longer than the calyx, cylindric, with short triangular lobes, the throat with tufts of yellowish hairs between the 5 stamens. *Anthers* on short filaments. *Style* cylindric, stigma 2-lobed. *Fruit* narrowly ellipsoid, tapering to each end, sometimes clavate, slightly compressed, 8-ridged (2 being double), crowned by the calyx, ·35 in. long and ·2 in. in diam. *Seeds* with 3 broad dorsal ridges, ventral surface plane.

PERAK : *Scortechini* 311, 404, 426; *King's Collector* 897, 2566, 5373.

This closely resembles *P. laxiflora*, Bl., but has 5-merous flowers and longer, less clavate fruit.

8. *PSYCHOTRIA PILULIFERA*, n. sp., King & Gamble. A small tree or climber; all parts except the inflorescence glabrous; young branches about as thick as a crow-quill, terete, pale brown when dry. *Leaves* coriaceous, narrowly elliptic, much tapered to both ends; both surfaces olivaceous when dry, the lower slightly the paler; main-nerves 6 or 7 pairs, inconspicuous, the midrib bold beneath when dry; length 2·5 to 3·5 in.; breadth ·75 to 1 in.; petiole ·35 to ·4 in. long, slender. *Inflorescence* a terminal, few-branched, puberulous panicle of condensed 8-10-flowered globular cymes. *Flowers* and their short pedicels minutely tomentose. *Calyx* shortly campanulate, the mouth with 5 spreading triangular acute lobes. *Corolla* tubular; the lobes oblong, broad, with small inflexed apices. *Anthers* 5, attached to the throat by short filaments surrounded by coarse hair. *Fruit* sub-globose, with 10 bold vertical ridges (2 of them double), crowned by the small calyx, ·2 long and ·15 in. in diam. *Seeds* with 3 bold ridges on the dorsal surface; ventral surface plane.

PERAK, at elevations of 3,000 to 5,000 feet: *Wray* 287, 398, 434, 946, 3870.

9. *PSYCHOTRIA OVOIDEA*, Wall. Cat. 8383. A slender woody climber, 20 to 40 feet long; stems thinner than a goose-quill, densely rusty-pubescent. *Leaves* with recurved margins, coriaceous, ovate- or elliptic-lanceolate, shortly acuminate, the base cuneate or rounded, sometimes minutely cordate; upper surface olivaceous when dry, glabrous, the main-nerves depressed; the lower brown, pubescent on the stout midrib and 5 to 7 pairs of prominent curved ascending main-nerves, puberulous on the interspaces; length 1·5 to 2·5 in.; breadth ·85 to 1·25 in.; petioles ·15 to ·25 in. long. *Stipules* connate, ovate-lanceolate, ·25 in. long, caducous. *Cymes* ·75 to 2 in. in diam., trichotomous, solitary, terminal, rusty-pubescent, on angled peduncles ·5 to 1 in. long. *Flowers* about ·15 in. long, on short pedicels, crowded in dense cymes at the ends of the branches and mixed with linear bracteoles. *Calyx* campanulate, with 5 spreading acute teeth. *Corolla* twice as long as the calyx, salver-shaped, with 5 lobes, the tube villous inside. *Fruit* ovoid-globose, ·15 in. long, the apex crowned by the calyx, the sides with 6 faint vertical ridges. *Seeds* faintly 3-ridged on the dorsal surface; the ventral surface broad, flat. Hook. fil. Fl. Br. Ind. III. 166.

SINGAPORE: *Wallich*, *Seeman* 2348. MALACCA: *Maingay* (K.D.) 923; *Ridley* 97, 8407.

10. *PSYCHOTRIA RIDLEYI*, n. sp., King & Gamble. A small shrub; all parts glabrous except the inflorescence; stems half as thick as a goose-quill, terete, greenish when dry. *Leaves* membranous, oblong- to elliptic-oblancoate, the apex abruptly and very shortly acuminate, the base much narrowed, both surfaces pale olivaceous when dry, the midrib rather prominent, the upper sometimes with scattered minute, adpressed white hairs; main-nerves 7 to 9 pairs, slightly curved, spreading, faint on both surfaces; length 3 to 5.5 in.; breadth 1.25 to 2.25 in.; petioles .4 to .8 in. long, winged near the apex. *Stipules* broadly ovate, subacute, .1 in. long. *Cyme* on a peduncle about 1 in. long (longer in fruit), corymbosely branched, the bracts at the forks linear-lanceolate. *Flowers* in cymules of three, everywhere canescent, on short pedicels bibractcolate at the base. *Calyx* campanulate with elongated tube; the mouth with 5 erect ovate-triangular lobes. *Corolla* longer than the calyx; the tube short, slightly villous at the base near the insertion of the broad sub-sessile anthers; the 5 lobes broadly ovate, acute. *Fruit* ovoid-ellipsoid, 12-ridged, crowned by the small calyx, .3 to .4 in. long. *Seeds* many-ridged on both dorsal and ventral surfaces.

SINGAPORE: *Ridley* 48, 10818. JOHORE: *Ridley* 6472. MALACCA: on Mt. Ophir, *Hullett* 811; *Goodenough* 1363.

11. *PSYCHOTRIA POLYCARPA*, Hook. fil. Fl. Br. Ind. III. 165. A climber, glabrous except the inflorescence; young branches thinner than a goose-quill, terete, when dry dark-coloured. *Leaves* coriaceous, ovate- or obovate-lanceolate to obovate- or ovate-rotund, the apex in the narrower forms shortly and bluntly acuminate, in the broader abruptly and bluntly apiculate; both surfaces olivaceous when dry, the upper somewhat shining, the lower dull and darker, the midrib prominent on both; main-nerves 5 or 6 pairs, spreading, faint on both surfaces; length 2 to 3 in.; breadth .75 to 1.75 in.; petioles .3 to .6 in. *Stipules* very short, connate to form a collar, caducous. *Panicles* large, umbellately cymose, longer than the leaves (sometimes very much so); their branches numerous, spreading, puberulous, with minute bracteoles at the divisions. *Flowers* .15 in. long, numerous, in ultimate cymules of 2 or 3, shortly pedicellate. *Calyx* thick, minutely pubescent, shortly campanulate or sub-cupular, the mouth with 5 acute teeth or subentire. *Corolla* longer than the calyx, salver-shaped, its 5 lobes spreading, lanceolate, acute, the throat sericeous; anthers 5, elliptic. *Fruit* ellipsoid, tapered to the base, and the apex crowned by the rather large remains of the calyx; obscurely ridged; .15 in. long and .1 in. in diam.; sometimes sub-globular, the epicarp somewhat pulpy. *Seeds* slightly convex and faintly ridged on the dorsal surface, the ventral with a broad

shallow groove. *P. obovata*, Wall. Cat. 8380A. *Grunilea polycarpa*, Miq. Fl. Ind. Bat. II. 295.

SINGAPORE: *Ridley* 2029. MALACCA: *Griffith* (K.D.) 3042; *Main-gay* (K.D.) 924; *Hullett* 402. JOHORE: *Ridley* 4090, 11160. PENANG: *Curtis* 1095. PERAK: *Wray* and *King's Collector* many numbers. DISTRIB.—Java, *King*; *Forbes* 1061; *Koorders* 28043B.

12. PSYCHOTRIA CALOCARPA, Kurz in Journ. As. Soc. Beng., 1872, II. 315. A glabrous shrub 2 to 4 feet high; young branches thinner than a goose-quill, dark-coloured when dry. *Leaves* thickly membranous, oblong-ob lanceolate or oblanceolate, shortly caudate-acuminate at the apex, much attenuate at the base, the edges sometimes broadly crenate; both surfaces olivaceous when dry, the midrib and nerves broad, distinct and pale; main-nerves 10 to 12 pairs, slightly curved, spreading and interarching to form a bold pale intramarginal nerve .1 to .15 in. from the edge; length 5 to 8 in.; breadth 1.65 to 2.5 in.; petiole .75 to 1.25 in., slightly winged near the apex. *Stipules* broadly triangular, acuminate, membranous, sometimes bifid, .2 in. long. *Cymes* terminal or axillary, sessile or shortly pedunculate, shorter than the petioles, about 1.25 in. across and .5 in. long, branched from near the base, the branches compressed, trichotomous; the bracteoles lanceolate, acuminate. *Flowers* .2 in. long, on short pedicels. *Calyx* with a short cylindric tube and 4 longer oblong blunt sub-erect concave lobes. *Corolla* exceeding the calyx, narrowly campanulate, bluntly 4-lobed, the throat densely sericeous, otherwise glabrous. *Fruit* sub-globose or ovoid, sub-compressed; the epicarp fleshy, glabrous, rugulose when dry; .3 in. in breadth and rather less in length, the persistent calyx-lobes small. *Seeds* large, the dorsal surface faintly 1-ridged, the ventral deeply grooved. Kurz For. Fl. Burm. II. 9; Hook. fil. Fl. Br. Ind. III. 173. *P. asiatica*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 160; Wall. Cat. 8331: not of Linn. nor of Roxb. *P. viridiflora*, Reinw. var. *undulata*, Kurz For. Fl. Burm. II. 13. *P. pieta*, Wall. Cat. 8353; and *Psychotria*, l.c. 8359.

PERAK: *Ridley* 7199; *Wray* 2200; *King's Collector* 1930, 2348, 6798, 10772; *Scortechini*. MALACCA: *Hervey*.—DISTRIB. Himalaya, Assam, Burma.

This plant is very common in the lower Himalaya, Assam, and Burma. In the Flora of British India it is described as herbaceous, but the Malayan specimens are all woody. The leaves are always readily distinguished, when dry, by the pale broad main-nerves and by the very conspicuous intra-marginal nerve. In Malaya the plant is glabrous, but in the Indian specimens the under surfaces of the leaves are decidedly puberulous.

13. PSYCHOTRIA MULTICAPITATA, n. sp. King & Gamble. An erect.

much-branched shrub 3 to 7 feet high; young branches thinner than a goose-quill, slightly compressed, swollen at the nodes, pale, deciduously puberulous. *Leaves* thinly membranous, greenish when dry, broadly obovate-lanceolate, oblong or elliptic, abruptly and shortly caudate-acuminate, the base narrowed to the rather short petiole; upper surface quite glabrous; the lower scurfy-puberulous on the broad midrib and 9 to 13 pairs of curved spreading main-nerves; length 5 to 10 in.; breadth 2.5 to 4 in.; petiole .75 to 1.15 in. *Stipules* free, broadly triangular, .15 in. long. *Cymes* terminal, solitary, peduncled, about 2 in. long (including the peduncle) and the same in breadth, umbellately branched from near the base; the ultimate branches numerous, bearing terminal many-flowered globular minutely bracteolate cymules, about .5 in. in diam., the common peduncle about an inch or more long, the branches shorter, all puberulous. *Flowers* on short puberulous pedicels, ovoid in bud, about .15 in. long when expanded. *Calyx* cupular, with 5 or 6 triangular acute sub-erect teeth. *Corolla* longer than the calyx, the tube cylindric and, like the throat, densely white-sericeous inside; lobes of the limb short, triangular, deflexed. *Anthers* bifid at the base. *Style* thick, bifid, longer than the corolla. *Fruit* ellipsoid-obovoid, 10-ridged, crowned by the small calyx, glabrous, .3 in. long. *Seed* dorsally with 4 faint ridges, ventrally somewhat concave.

PERAK: *Scortechini* 214, 291; *King's Collector* 436, 867, 2862, 5402, 7380, 7513, 10559.

14. *PSCHYOTRIA TORTILIS*, Blume Bijdr. 958. Stem woody below, erect, 6 to 18 in. high, not branched, cinereous, 4-angled, sparsely covered with short coarse scurfy hairs. *Leaves* membranous, broadly elliptic or ovate-elliptic, the apex acute or sub-acute, narrowed from below the middle to the petiole; upper surface when dry dark green, the lower pale, glaucous, minutely lepidote; the 8 to 11 pairs of slightly curved spreading main-nerves covered with minute short coarse deciduous dark-coloured hairs; length 4 to 6 in.; breadth 1.75 to 3 in.; petioles .5 to 2 in., compressed, scurfy-pubescent. *Stipules* broadly triangular, much acuminate, bifid, .15 to .3 in. long. *Cymes* solitary, sessile, axillary, dichotomous, many-flowered, condensed, .5 in. to 1 in. long and as much broad. *Flowers* .15 in. long, on short ebracteolate pedicels. *Calyx* campanulate, with 5 triangular spreading teeth, covered with coarse hair. *Corolla* longer than the calyx, narrowly campanulate, with 5 ovate acute lobes, hairy like the calyx. *Anthers* 5, sessile, oblong, blunt, included. *Style* shorter than the calyx; stigmas short, linear, divergent. *Fruit* crowned by the small calyx-lobes, reniform, pale with numerous short vertical brown streaks, and stiff short white hairs, .1 in. broad and less in length; the dorsal surface of each of the two

cartilaginous cocci with 3 bold ridges. *Seeds* bluntly 5-ridged on the dorsal, broadly grooved on the ventral surface. DC. Prod. IV. 520; Hook. fil. Fl. Br. Ind. III. 169. *P. microcarpa*, Wall. Cat. 8344. *Stroblosa tortilis*, Korth. Kruidk. Arch. II. 246.

PENANG: *Wallieh* 8344; *Curtis* 405, 1269. SINGAPORE: *Lobb*. PERAK: *King's Collector* 710, 2627; *Seortehini*.—DISTRIB. Sumatra, *Forbes* 1495.

15. PSYCHOTRIA GRIFFITHII, Hook. fil. Fl. Br. Ind. III. 171. A shrub; glabrous except the puberulous inflorescence; young branches thinner than a goose-quill, terete, of a dark colour when dry. *Leaves* coriaceous, oblong or elliptic, shortly and somewhat abruptly acuminate, the base cuneate, the edges slightly recurved and pale, both surfaces drying olivaceous-green, shining, the midrib and the 12 to 15 pairs of curved spreading main-nerves distinct; length 6 to 10 in.; breadth 1.75 to 3.5 in.; petiole .4 to .8 in., slightly winged above, stout. *Stipules* broadly triangular, sub-acute, .2 to .3 in. long. *Cymes* terminal, solitary, pyramidal, about 1.5 in. long and the same in breadth, on naked compressed peduncles 1.5 in. or more long (lengthening to 2 in. or more in fruit); branches short, stout, puberulous, ebracteolate; the ultimate ones bearing the shortly pedicelled flowers in cymes of three. *Flowers* .2 in. long. *Calyx* campanulate, with 5 broadly triangular acute sub-erect teeth. *Corolla* as long as the calyx, fleshy, tubular, with 5 broad oblong hooded lobes; the tube finely sericeous inside, otherwise glabrous. *Anthers* 5, broadly oblong, entire, dorsifixed; the filaments thin, compressed, broad. *Style* short, with 2 broad flat lobes. *Fruit* elliptic, slightly obovoid, the apex sub-truncate, crowned by the remains of the disk and calyx, glabrous, black when dry, .4 in. long and .35 in. broad; with 4 broad vertical ridges, two of them grooved externally and consisting of two ridges united, the other two single; 2-celled, and 2-seeded. *Seeds* large, the dorsal surface with a single ridge, the ventral flat, not grooved, everywhere smooth.

MALACCA: *Griffith* (K.D.) 3044; *Maingay* (K.D.) 918; *Hervey*; *Derry* 367. PERAK: *Ridley* 2873. SINGAPORE: *Ridley* 2872, 2873, 6314, 6468, 6556; *Hullett* 848.

16. PSYCHOTRIA ANGULATA, Korth. in Ned. Kruidk. Arch. II. 243. A shrub 4 to 6 ft. high, glabrous except the inflorescence; young branches pale brown when dry, thinner than a goose-quill, terete. *Leaves* coriaceous, oblanceolate to oblanceolate-elliptic, the apex shortly and rather abruptly acuminate, the base much narrowed; both surfaces brown when dry, tinged with olivaceous; the upper very shining, the broad midrib and nerves depressed; the lower less shining, the midrib

very prominent, and the 8 to 10 pairs of spreading nerves thin but distinct; length 4 to 6 in.; breadth 1 to 1.75 in.; petiole .2 to .5 in., slightly winged near the apex. *Stipules* broadly triangular, acute, sub-acute or bifid, .25 in. long. *Cyme* solitary, terminal, pyramidal, about 1.5 in. long, on a naked peduncle 1.25 to 3 in. long; branches whorled, shortly bracteolate at their bases, spreading; the ultimate branchlets crowded at their ends with numerous sessile flowers .25 in. long. *Calyx* pale, widely cupular, .05 in. long, with irregular small teeth. *Corolla* thick, tubular, its 5 broad lobes with acute inflexed apices; the throat densely sericeous. *Anthers* elliptic, blunt, on short filaments. *Fruit* ovoid or narrowly obovoid, pulpy, obscurely ridged, glabrous, crowned by the small calyx, .5 in. long and half as much broad (unripe), 2-celled. *Seeds* 2, plano-convex. Miq. in Ann. Mus. Lugd. Bat. IV. 210; Hook. fil. Fl. Br. Ind. III. 172. *Psychotria*, Wall. Cat. 8348. *Chasalia perforata*, Miq. Fl. Ind. Bat. Suppl. 546.

MALACCA: *Griffith* (K.D.) 3037. PROVINCE WELLESLEY: *Ridley* 7026. JOHORE: *Ridley* 11161. SINGAPORE: *Ridley* 2867. PAHANG: *Ridley* 1353. PENANG: *Curtis* 14, 726; *King's Collector* 1683. PERAK: *King's Collector* 4170.—DISTRIB. Burma.

17. PSYCHOTRIA HELFERIANA, Kurz in Journ. As. Soc. Beng., 1872, II. 314. A shrub; the whole plant more or less rusty-pubescent; young branches as thick as a goose-quill or thicker, the pubescence dense and deciduous. *Leaves* thickly membranous, elliptic or oblong-elliptic, rarely obovate-elliptic, the apex acuminate, the base usually cuneate but sometimes rounded; both surfaces dark brown when dry, the lower somewhat tinged with red and less hairy than the upper; the hairs on both adpressed and very numerous on the stout midrib, less so on the 9 to 16 pairs of spreading curved main-nerves; length 6 to 12 in.; breadth 2.5 to 4.5 in.; petioles 1 to 1.75 in. *Stipules* broadly ovate to oblong-lanceolate, often as much as 1 in. long, the apex acuminately bifid. *Flowers* .2 in. long, numerous, mixed with many unequal bracteoles mostly longer than themselves, all acuminate and some of them bifid and crowded in dense pedunculate capitula in a few-branched axillary cyme usually shorter than the leaf-petioles. *Calyx*-tube narrowly campanulate, with 5 lanceolate erect lobes nearly as long as itself, everywhere pilose. *Corolla* similar to the calyx, but smaller and less hairy. *Stamens* almost sessile; anthers broad, blunt. *Fruit* ovoid or ellipsoid, somewhat compressed and boldly 8-ridged, crowned by the lobes of the calyx, .3 in. long and .2 in. in diam. Kurz For. Fl. Burm. II. 11; Hook. fil. Fl. Br. Ind. III. 172.

SINGAPORE: *Wallieh* 8368; *Goodenough* 184; *Maingay* (K.D.) 921. MALACCA: *Maingay* (K.D.) 921; *Ridley* 184; *Lobb*. JOHORE: *Ridley*

11159; *King*; *Hullett* 507. PERAK: *King's Collector* 4345, 4661.
—DISTRIB. Burma.

VAR. *diffusa*, *King* & *Gamble*. *Capitula* in spreading pedunculate panicles several inches in diam.

PERAK: *Scortechini* 400. JOHORE: *Ridley* 3732. SINGAPORE: *Hullett*.

VAR. *angustifolia*, *King* & *Gamble*. *Leaves* elliptic-oblong or oblong, not more than 2 in. in width; capitulum solitary, sessile.

SINGAPORE: *King*.—DISTRIB. Andamans.

VAR. *glabra*, *King* & *Gamble*. *Leaves* glabrous.

PERAK: *Wray* 1963.

18. PSYCHOTRIA MONTANA, *Blume* *Bijdr.* 960. A stout glabrous shrub; young branches half as thick as a goose-quill, angled, brown when dry. *Leaves* thinly membranous, on rather long petioles, elliptic or elliptic-oblong, acuminate, the base cuneate; both surfaces greenish or olivaceous-brown when dry, the lower the paler; main-nerves 7 to 8 pairs (rarely 10 pairs) curving upwards, pale and bold like the midrib on the lower surface, faint on the upper; length 5 to 8 in.; breadth 1.75 to 3.5 in.; petioles .4 to 1.25 in., winged near the apex. *Stipules* connate by their short broad bases, the apices caudate-acuminate, curved. *Cymes* terminal, paniculate, on angled peduncles .5 to 1.25 in. in length; branches spreading, angled, bearing numerous shortly pedicelled flowers in cymules of three. *Flowers* .25 in. long. *Calyx* cupular with 5 broad spreading triangular teeth. *Corolla* with sub-campanulate tube having a broad band of hairs inside in the upper half; the lobes of the mouth 5, broad, acute, reflexed. *Fruit* ellipsoid-ovoid to ellipsoid, boldly 4-ridged, glabrous, .25 to .3 in. long. *Seeds*: the dorsal surface with a single ridge, the ventral deeply concave, grooved. DC. *Prod.* IV. 521; *Hook. fil. Fl. Br. Ind.* III. 174. *P. viridissima*, *Kurz* in *Journ. As. Soc. Beng.* 1872, II. 315; *For. Fl. Burm.* II. 13. *Chasalia montana*, *Miq. Fl. Ind. Bat.* II. 281. *C. expansa*, var. *montana*, *Miq. MS.* *Psychotria*, *Wall. Cat.* 8371, 8378, and *Rubiaceæ*, 8339. *Coffea tabaccifolia*, *Wall. Cat.* 8334.

PERAK: *Scortechini*; *Ridley*, 2922; *King's Collector*, 452, 2190; *Wray* 276.—DISTRIB. Sumatra, *Forbes* 1566, 1862, 2201, 2241, 2330. JAVA: *Blume*; *Forbes* 271, 759, &c. Burma; Assam; Sylhet (*Griffith*, K.D.) 3047.

VAR. *brevipetiolata*, *King* & *Gamble*. *Leaves* with petioles .2 to .4 in. long.

PERAK: *Scortechini* 277, 1513; *Wray* 1628, 2289; *King's Collector* 389, 922, 1954, 2190, 4707, 6111, 8596. SELANGOR: *Ridley* 10583. PAHANG: *Ridley* 5831. MALACCA: on Mt. Ophir, *Hullett* 762

19. *PSYCHOTRIA VIRIDIFLORA*, Reinw. ex Blume Bijdr. 965. A small tree or a bush, all parts, except the inflorescence, glabrous; young branches thinner than a goose-quill, dark brown. *Leaves* membranous, oblong-elliptic to oblanceolate-elliptic, shortly and stoutly acuminate, the base much narrowed; both surfaces brown when dry; main-nerves 8 to 14 pairs, curved, spreading, rather faint on both surfaces; length 3.5 to 8 in.; breadth 1.25 to 2.5 in.; petiole .4 to .75 in. occasionally as much as 1.25 in. long. *Stipules* broadly oblong, narrowed to the apex, but not acute, .3 to .5 in. long, deciduous. *Cymes* on naked peduncles (.3 to 1.5 in. long) in broad panicles 1 to 2 in. long and as much wide (more when in fruit); branches divaricating, puberulous, with small broad bracteoles. *Flowers* in small cymes, on the ultimate branches, .1 in. long, on short pedicels, glabrous outside. *Calyx* cupular with irregular, short, sharp teeth. *Corolla* longer than the calyx, widely tubular, with 5 broad sub-acute lobes; the throat sericeous. *Anthers* 5, oblong, blunt, attached by short filaments in the throat. *Fruit* elliptic, with a wide shallow areola on the apex, the sides with 10 bold vertical ridges (2 of them double), glabrous, about .25 in. long and .2 in. in diam. *Seeds* plano-convex, the convexity deeply 5-grooved, the ventral surface flat. *P. sulcata*, Wall. Cat. 8370; Hook. fil. Fl. Br. Ind. III. 168. *P. Jackii*, Hook. fil. Fl. Br. Ind. III. 167.

MALACCA: *Griffith* (K.D.) 3021; *Goodenough* 1878; *Derry* 457, 1224; *Ridley* 1600. PANGKORE: *Curtis* 1369. TRANG: *Wray* 2778. NEGRI SEMBILAN: *Ridley* 1930. SELANGOR: *Ridley* 7434. PERAK: *Scortechini*; *Ridley* 2919, 3067; *Wray* 290, 2027, 2778, 2956; *King's Collector* 2655, 4275, 4374, 5964, 6327, 7224. PENANG: *Wallich* 8343, 8370.—DISTRIB. Burma, *Helper & Griffith* (K.D.) 3040; Sumatra, *Forbes*; Java, *Blume*; Borneo, *Beccari*; *Motley*; *Haviland*.

20. *PSYCHOTRIA BIRCHIANA*, n. sp., King & Gamble. Herbaceous; woody at the base; all parts softly rusty-pubescent; stems 6 to 18 in. high, thinner than a goose-quill, their pubescence crisped, dense, coarse, and entirely or partly deciduous. *Leaves* thickly membranous, elliptic to elliptic-oblong, sometimes sub-obovate, acute, the base rounded or minutely cordate or sometimes cuneate; both surfaces brown when dry, the lower sometimes paler and with fewer hairs; the midrib prominent and very hairy on both sides, the 10 to 12 pairs of rather faint little-curved spreading main-nerves less hairy than the midrib; length 3.5 to 5 in.; breadth 1.5 to 2.25 in.; petiole .5 to 1 in., covered with coarse tomentum mixed with ovate-acuminate scales. *Stipules* oblong-ovate, acuminate, .5 to .75 in. long. *Cymes* pedunculate; solitary, terminal, spreading, 1.5 to 2 in. across, and about as long, the branches spreading, bracteate at the divisions, the bracts lanceolate,

acute, reflexed, .2 or .3 in. long; the peduncle 1.5 to 2.5 in. long, scaly, tomentose; ultimate branches short, bearing at their apices dense capitules of small sub-sessile flowers, mixed with short broad bracteoles. *Flowers* about .1 in. long. *Calyx* cupular-campanulate, pubescent; the mouth wide and with 5 blunt, triangular, spreading lobes. *Corolla* exceeding the calyx, widely tubular, with 5 or 6 short inflexed teeth, glabrous inside, hairy outside. *Anthers* oblong, blunt at each end, the filaments short. *Fruit* ellipsoid, tapering equally to each end, boldly 10-ridged, somewhat compressed, crowned by the hairy calyx-lobes, otherwise sub-glabrous, .25 to .3 in. long and .2 in. across. *Seeds* with 5 dorsal ridges, the ventral surface plane.

PERAK, on Birch's Hill, elev. 4,000 feet: *Scortechini* 258; *Wray* 1; *King's Collector* 2134, 2950, 7348. SELANGOR: *Ridley* 7432.

The flowers are described as white, and the ripe fruit as cherry red. Named in honour of Mr. Birch, a British civil officer, who was murdered by the aborigines in Perak.

21. PSYCHOTRIA FULVA, Buch.-Ham. ex. Wall. Cat. 8366, excl. B. A shrub; young branches thinner than a goose-quill, dark brown when dry, bearing a few scattered coarse hairs. *Leaves* thickly membranous, elliptic, shortly acuminate and tapering almost equally to the base; upper surface without hairs except a few on the midrib near the base, under surface with dark cinereous pubescence on the midrib and 15 to 18 pairs of sub-horizontal slightly curved main-nerve; length 5 to 7 in., breadth 1.75 to 3.5 in.; petioles 1.25 to 2.4 in., coarsely and deciduously pubescent. *Stipules* membranous, broadly oblong, the apex deeply and acuminately bifid, the edges coarsely ciliate; length about 1 in. *Cymes* pedunculate, axillary, trichotomous, the flowers in condensed capitular cymes at the ends of the short branches, enveloped when in bud in 2 or 3 large deciduous bracts; in fruit about 2 in. across and less in length; peduncles about 2 in. long; branches about .5 in. long, horizontal; all, like the short flower pedicels, coarsely rusty-pubescent. *Calyx* cupular, with 5 deep, spreading, narrow, acuminate lobes. *Corolla* not seen. *Fruit* narrowly elliptic, somewhat compressed, tapering slightly to each end, the apex crowned by the erect connivent calyx-lobes, boldly but somewhat unequally 12-ridged, glabrous, .45 in. long and .25 in. in diam. *Seeds* 5-ridged on the dorsal, the ventral surface flat. Hook. fil. Fl. Br. Ind. III. 169, excl. syn. *P. monticola*, Kurz. *Psychotria*, Wall. Cat. 8337; Griff. Notulæ, IV. 268; Ic. Pl. Asiat. t. 479, f. 2.

PERAK, On Ulu Batang Padang: *Wray* 1615.—DISTRIB. E. Bengal, *Griffith* (K.D.) 3022, 3034, 3035, 3036; Khasia, *Hook f. & Thoms.* 14.

P. monticola, Kurz, a Burmese plant, has been reduced to *P. fulva*, Buch.-Ham., but in my opinion it is quite distinct.

22. *PSYCHOTRIA FULVOIDEA*, n. sp., King & Gamble. A small shrub; young branches thinner than a goose-quill, dark-coloured, glabrous. *Leaves* membranous, narrowly elliptic, acuminate, crenulate, the base cuneate; upper surface glabrous, dark brown when dry, the lower reddish-brown; the midrib, nerves and reticulations rusty-pubescent, otherwise glabrous; midrib prominent on both surfaces, the 10 to 14 pairs of spreading, curving main-nerves slightly prominent on the lower; length 6 to 7 in.; breadth 2 to 2.5 in.; petiole 1 to 1.3 in. *Stipules* membranous, ovate, caudate-acuminate, the edges irregularly serrate, ciliate, length about 1 in. *Cymes* axillary, trichotomous, condensed, about 2 in. broad when in fruit and 1.25 in. long, on deflexed, coarsely but shortly pubescent peduncles 3 in. long; their branches short, spreading, bracteate at the divisions and coarsely pubescent. *Flowers* condensed into globose capitulate cymes at the apices of the branches, sessile. *Calyx* narrowly campanulate, pubescent, with 5 erect acute teeth. *Corolla* unknown. *Fruit* narrowly elliptic, tapering to each end, the apex crowned by the short pubescent lobes, with 12 deep ridges and grooves, glabrous, .4 in. long and .2 in. in diam. *Seed* dorsally 5-ridged, ventrally 2-grooved.

PERAK: *Scortechini* 538.

This approaches *P. fulva*, but is a smaller plant, with crenulate leaves quite glabrous on the upper surface and nearly so on the lower.

23. *PSYCHOTRIA STIPULACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 164. A shrub, 1 to 2 feet high, all parts except the inflorescence glabrous; stems as thick as a goose-quill, brown when dry. *Leaves* membranous, broadly oblanceolate to elliptic, or oblong, abruptly and shortly acuminate, much narrowed to the base; both surfaces glabrous, when dry brown with a reddish tinge; midrib very stout, main-nerves 11 to 13 pairs, spreading, slightly curved, distinct on both surfaces; length 5 to 9 in.; breadth 2 to 4 in.; petioles .5 to 1.25 in. long, winged near the apex. *Stipules* large, sub-persistent, ovate, sometimes bifid, .75 to 1 in. long, and about .4 in. broad. *Cyme* usually solitary, corymbose, trichotomous, terminal, on a short peduncle, bracteate at the base, about 2 to 3 in. in diam.; its branches puberulous, bracts and bracteoles triangular. *Flowers* .15 in. long, on short pedicels, clustered in dense, cymose, capituliform cymes at the ends of the ultimate branches. *Calyx* campanulate, with 5 broad pubescent lobes, the tube glabrous. *Corolla* longer than the calyx, widely campanulate, 4- or 5-toothed. *Fruit* ellipsoid, sub-compressed, 10-ridged, crowned by the small calyx, .3 in. long, and .15 in. in diam. *Seed* dorsally 5-ridged, ventrally concave, with one central ridge. Wall. Cat. 8329; DC. Prod. IV. 519; Hook. fil. Fl. Br. Ind. III. 167.

PENANG: *Wallich* 8329; *Curtis* 732. TRANG: *Kunstler* 1382.
 PAHANG: *Ridley* 2216. PERAK: *Ridley* 2918; *King's Collector*,
 1357, 1382; *Wray* 3440; *Seorteehini* 278, 307, 558, 692.—DISTRIB.
 Sumatra.

24. *PSYCHOTRIA CURTISII*, n. sp., King & Gamble. A shrub, 6 feet high; young branches thinner than a goose-quill, rusty-pubescent. *Leaves* elliptic, sometimes somewhat obovate, tapering equally to each end, shortly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper glabrous or with a few hairs on the midrib near the base, the lower rusty-puberulous between the 9 or 10 pairs of bold, shortly and densely rusty-pubescent curved ascending main-nerves; length 5 to 8 in.; breadth 1.5 to 3 in.; petioles .5 in., densely rusty-pubescent. *Stipules* caducous. *Cyme* solitary, terminal, 3-branched, on a pubescent peduncle from .3 to .5 in. long (much longer in fruit), branches bearing 3 to 5 sessile flowers in capitula at their apices; bracteoles linear. *Flowers* .25 in. long, rusty-pubescent. *Calyx* half-superior, campanulate, the mouth with 5 long, spreading, ovate-acuminate lobes. *Corolla* longer than the calyx, salver-shaped, with 5 oblong lobes. *Fruit* ovoid, tapering to the apex, crowned by the long lobes of the calyx, the sides puberulous, 10-ridged. *Seeds* with 4 ridges on the dorsal surface, the ventral plane.

PENANG: *Curtis* 2695.

25. *PSYCHOTRIA RHINOCEROTIS*, Reinw. ex Blume Bijdr. 961. A shrub; young branches thinner than a goose-quill, at first rusty-tomentose, afterwards glabrescent and pale brown. *Leaves* coriaceous, obovate-oblong or obovate-oblongate, the apex broad, but usually with a small abrupt apiculus, the base cuneate; upper surface olivaceous, glabrous, the lower brown and softly and finely rusty-pubescent; the midrib broad, more prominent on the upper than on the lower surface; main-nerves 10 to 14 pairs, slightly curved, oblique, distinct on both surfaces; length 3 to 5 in.; breadth 1.35 to 2.5 in.; petiole .2 to .6 in., stout. *Panicle* solitary, terminal, 1.5 in. long and slightly wider; branches few, lax, divaricate, cymosely few-flowered. *Fruit* elliptic-ovoid, slightly compressed, with 10 vertical grooves (2 of them double), crowned by the rather broad, bluntly 5-toothed calyx, acutely 10-ridged (2 ridges double), pubescent between the ridges; length .25 in.; breadth .2 in. *Seeds* dorsally 4-ridged, ventral surface plane. *Miq.* Fl. Ind. Bat. III. 292; *DC.* Prod. IV. 521; *Korth. Kruidk.* p. 242.

PERAK: *King's Collector* 8272; *Seorteehini*.

26. *PSYCHOTRIA MALAYANA*, Jack in Mal. Misc. I. 3; reprinted in *Calc. Journ. Nat. Hist.* IV. (1843), p. 26. A shrub; young branches

rather thinner than a goose-quill, sub-terete, glabrous, rather pale brown when dry. *Leaves* coriaceous, elliptic or broadly elliptic-lanceolate, shortly and abruptly acuminate, much narrowed to the base; upper surfaces glabrous, brown, shining when dry, the lower dull and sparsely pubescent, often tinged reddish, the edges slightly recurved; main-nerves 12 to 18 pairs, ascending, little curved, bold on the lower surface and faint on the upper; length 5 to 10 in.; breadth 2.5 to 4.5 in.; petioles .4 to 1.5 in. *Stipules* broadly ovate, blunt, about .35 in. long. *Cyme* terminal, on an angled, sub-compressed peduncle .5 to 1 in. long (lengthening in fruit), the branches corymbose, whorled, many-flowered; ultimate cymules 3-flowered. *Flowers* .5 in. long, 2 on each cymule, on short pedicels (the middle one sessile), minutely bracteolate at the base. *Calyx* under .1 in. long, tubular, the truncate mouth minutely 5-toothed. *Corolla* tubular, .4 in. long, with 5 oblong sub-acute lobes; the throat villous inside. *Fruit* .4 in. long and .3 in. in diam., elliptic-ovoid, vertically 10-ridged, the apex with very slight remains of the calyx. *Seeds* faintly 4-ridged on the dorsal, the ventral surface plane with a faint central groove. DC. Prod. IV. 520. *P. aurantiaca*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall., II. 165; Blume Bijdr. 962; Wall. Cat. 8335. *Grumelia aurantiaca* and *Chasalia expansa*, Miq. Fl. Ind. Bat. II. 296 and 281.

SINGAPORE: *Ridley* 6468, 8422; *Hullett* 904. PAHANG: *Ridley* 2197. PERAK: *King's Collector* 6327, 7168; *Wray* 2956; *Scortechini* 307.—DISTRIB. Borneo, Java.

The corolla of this is larger than that of any other Malayan species of *Psychotria*, being about .4 in. long when dry.

SPECIES IMPERFECTLY KNOWN.

27. *PSYCHOTRIA WRAYI*, n. sp., King & Gamble. A small shrub, glabrous except the inflorescence; young branches as thick as a swan's-quill, terete, dark-coloured when dry. *Leaves* coriaceous, oblanceolate-elliptic, shortly acuminate, gradually narrowed from about the middle to the short, partially winged petiole; both surfaces dark olivaceous-brown when dry, the midrib rather prominent; main-nerves 13 to 15 pairs, oblique, almost straight, thin but pale and rather distinct on the lower surface, indistinct on the upper; length 6 or 7 in.; breadth 2 to 2.5 in.; petiole about .5 in., winged above. *Stipules* broadly ovate, sub-acute, the edges coarsely ciliate, .5 in. long. *Cymes* terminal, on short peduncles, bracteate at the base, umbelliform, widely spreading, about 4 in. broad and only half as long; the branches 4-angled, sub-compressed, pubescent, divergent. *Flowers* crowded at the extremities of the branchlets, .25 in. long, on short thick pedicels. *Calyx* deeply

cupular, with 5 broad, shallow blunt teeth. *Corolla* much longer than the calyx, widely tubular; lobes 5, blunt, broadly ovate, reflexed, the throat with a little short hair. *Anthers* 5, narrowly elliptic, blunt, on short filaments, almost basifixed, exerted by the reflexion of the lobes of the corolla. *Fruit* unknown.

PERAK: *Wray* 3959; *King's Collector* 2755.

28. *PSYCHOTRIA INÆQUALIS*, n. sp., King & Gamble. A small unbranched shrub; the stem thinner than a goose-quill, deciduously puberulous, only a foot high, brown when dry. *Leaves* thickly membranous, those of a pair somewhat unequal in size, elongate-obovate, the smaller one oblong-elliptic, all abruptly and shortly acuminate, the base cuneate; upper surface glabrous, minutely pitted when dry; the lower with many coarse pale-brown, crisped, flattened hairs on the midrib and nerves, and a few pale appressed hairs on the interspaces; midrib broad and channelled on both surfaces, as are also the 10 to 13 pairs of pale ascending, slightly curved main-nerves; length 6 to 10 in.; breadth 2·5 to 5 in.; petiole ·5 to ·75 in., stout. *Stipules* narrowly ovate, acuminate, pubescent, ·65 in. long. *Cyme* solitary, terminal, 2 to 3·5 in. long (including the 1 to 2 in. peduncle), pyramidal, everywhere rusty-puberulous, the branches opposite, many-flowered, and with broad abruptly acuminate bracts; the lowest pair exceeding 1 in. in length, reflexed; branchlets divaricate. *Flowers* ·1 in. long, on short stout pedicels. *Calyx* small, tubular; its lobes broadly triangular. *Corolla* not much longer than the calyx, its lobes linear with moniliform bluish hairs at their bases and on the throat. *Fruit* unknown.

PERAK: *Scortechini* 279.

29. *PSYCHOTRIA CONDENSEA*, n. sp., King & Gamble. A small woody shrub; young branches half as thick as a goose-quill, the nodes close together and slightly thickened, the internodes striate, at first scurfy-puberulous but afterwards glabrous. *Leaves* coriaceous, narrowly elliptic or elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface when dry very dark brown, the lower paler and tinged with olivaceous, the midrib prominent and pale; the 5 or 6 pairs of oblique main-nerves visible beneath but not above; length 1 to 1·25 in.; breadth ·3 to ·5 in.; petiole ·05 in. *Stipules* broadly triangular, acuminate, nearly ·1 in. long. *Umbel* cymose, 3-branched, terminal, shorter than the leaves; each branch with 3 unequally pedicellate flowers. *Flowers* not seen. *Fruit* globular-ovoid, with 2 prominent furrowed vertical ridges and several obscure ones between them, crowned by the 5-toothed calyx; length ·2 in.; breadth ·15 in. *Seeds* with one prominent dorsal ridge, ventral surface flat.

PERAK: *Scortechini*.

Order LX. VALERIANEÆ.

Herbaceous (as regards the Indo-Malayan species). *Leaves* opposite, exstipulate, their bases often connected by an interpetiolar line or ridge; entire, pinnatifid or pinnate. *Flowers* sessile, in cymes, usually hermaphrodite but sometimes polygamous or diœcious, bracteate. *Calyx-tube* adnate to the ovary, the limb in the flower small, in the fruit often enlarged or pappose. *Corolla* superior, gamopetalous, its tube cylindric or gibbous or spurred at the base; the limb with 3 to 5 imbricate lobes, often irregular. *Stamens* 1 to 4, on the tube, usually exserted. *Ovary* inferior with a single perfect, 1-ovuled cell, and 2 barren empty cells; style filiform; stigma 2- or 3-lobed or entire; ovule in the fertile cell pendulous from the apex of the loculus. *Fruit* indehiscent, dry, 1-seeded, the 2 barren cells enlarged or represented by narrow ridges. *Seed* pendulous, with very little or no albumen; embryo straight, radicle superior.—*DISTRIB.* About 350 species, in temperate climates; generally diffused, but absent from Australia and South Africa.

VALERIANA, Linn.

Perennial herbs. *Leaves* entire, pinnatifid or pinnate, the radical often undivided and with long petioles. *Flowers* in cymes, corymbosely paniculate; bracts small, oblong or linear, free or nearly so, persistent. *Calyx-limb* in flower obsolete, in fruit developing into a ring of from 5 to 15 feathery bristles, united at their bases into a short funnel-shaped tube. *Corolla-tube* funnel-shaped, its base often sub-gibbous; limb with 5 spreading lobes, both tube and limb pink or white. *Stamens* 3. *Ovary* 3-celled, only 1 cell containing 1 ovule; stigma sub-entire or shortly 3-fid. *Fruit* oblong, plano-convex, with 6 ribs, 1-celled; the 2 barren cells obsolete, crowned by the persistent pappose calyx.—*DISTRIB.* About 180 species in moist temperate regions.

VALERIANA HARDWICKII, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. I. 166. *Root* fibrous. *Stem* erect, 1 to 3 feet high, pubescent below, mostly glabrous upwards but pilose or barbate at the nodes. Radical *leaves* ovate, acute, on long petioles; stem *leaves* unequally pinnatifid, the segments 3 to 5, the upper the longest, all lanceolate or ovate-lanceolate and irregularly toothed. *Panicles* lax, often as much as a foot long, the branches dichotomous, with small subulate bracteoles at the forks; fruit hairy. Wall. Cat. 432, Pl. As. Rar. 39, t. 263; Don Prod. Fl. Nep. 159; DC. Prod. IV. 640; Clarke in Hook. fil. Fl. Br. Ind. III. 213. *V. Hardwickiana*, Roem. & Schult., Syst. I., Mant. 259. *V. tenera*, Wall. Cat. 435; DC. Mem. Valer. 16; Prod. IV. 640.

V. elata, Don Prodr. 159. *V. javanica*, Blume Bijdr. 919. *V. acuminata*, Royle Ill. Him. Bot. 241.

At high elevations on the central ridge in Perak, this is said to occur, but I have seen no specimens.

Order LXI. COMPOSITÆ.

Herbs or shrubs, sometimes scandent, rarely trees. *Leaves* alternate, rarely opposite or whorled; simple or sometimes compound exstipulate. *Florets* numerous, small, aggregated in centripetal heads, sessile on the dilated top of the peduncle (receptacle); the heads surrounded by an involucre of 1- or more-seriate, free or connate bracts; bracteoles none or reduced to paleate scales or bristles on the receptacle; individual florets all tubular (head discoid), or the outer or all ligulate (head rayed); all bi-sexual or the inner bi-sexual or male, the outer female or neuter; sometimes diœcious. *Sepals* connate in a calyx-tube, adnate to the ovary; limb none, or composed of hairs (pappus) or scales. *Petals* connate in a corolla of two forms: (a) tubular or campanulate, with 4-5-lobed limb; lobes valvate with marginal nerves; (b) ligulate with lobes elongated and connate in a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4-5, inserted within the corolla-tube; filaments usually free; anthers basifixed, usually connate (syngenesious); connective produced upwards; cells simple or tailed at the base; pollen sub-globose, rough. *Pistil* an inferior 1-celled ovary; ovule solitary, basal, erect, anatropous, nucleus with one coat; style slender, normally 2-fid; the arms (sometimes) connate, linear or sub-terete, naked or pubescent externally or tipped by pubescent cones; the margins stigmatic. *Fruit* a dry indehiscent achene (cypsela). *Seed* erect; testa membranous; albumen none; embryo straight; cotyledons plano-convex; radicle short.—**DISTRIB.** Universal; genera about 1,000; species about 8,000.

Corollas of all the florets either tubular to near the mouth or the marginal row ligulate; style-arms long, distinct, or very short, or the style sub-entire in the sterile florets of heads with heterogamous florets; stems sometimes woody; leaves alternate or opposite; sap never milky:—

Florets red, purple, or white, never yellow; all similar (homogamous) and tubular, or rarely (*Elephantopus*) cleft laterally; involucre of bracts always more than 1-seriate; pappus present, usually setaceous, receptacle naked or rarely (*Ageratum*) paleaceous:—

Anthers cleft at the base and appendiculate at the apex; style-arms subulate, hairy; leaves alternate (*Vernoniæ*):—

Heads distinct, many-flowered; pappus long, copious, cypselas ribbed 1. VERNONIA.

- Heads 1- or few-flowered, crowded into dense clusters resembling single heads; pappus chaffy 2. ELEPHANTOPUS.
- Anthers sub-entire at the base, either truncate or appendiculate at the apex; leaves opposite at any rate below (*Eupatorieæ*):—
- Anthers truncate at the apex 3. ADENOSTEMMA.
- Anthers appendiculate at the apex:—
- Pappus paleaceous, receptacle sometimes paleaceous .. 4. AGERATUM.
- Pappus of slender hairs; receptacle always naked; bracts of involucre 4 with sometimes a small outer one; scandent 5. MIKANIA.
- Florets, if homogamous and tubular, yellow; if heterogamous, at least those of the disk yellow; or if none of the florets yellow (*Emilia*) then with the bracts of the involucre 1-seriate
- Anthers appendiculate at the apex (*Asteroideæ*):—
- Receptacle naked, smooth, or pitted; sometimes, when pitted, the edge of the pit fimbriate:—
- Bracts of involucre in two rows:—
- Anthers sub-entire at the base; florets all tubular, those of the disk purple, of the ray filiform, yellowish or white; pappus none or of 2 bristles; heads small in lax paniced cymes, bracts of involucre in two series; erect herbs 6. DICHROCEPHALA.
- Bracts of the involucre many-seriate, leaves alternate:—
- Anthers obtuse and entire at the base; florets of disk tubular with wide limb; those of the ray filiform-tubular or tubular only at the base, expanding into small yellowish ligules; pappus copious and silky; heads in dense corymbose panicles; climbers .. 7. MICROGLOSSA.
- Anthers cleft at the base; style-arms of hermaphrodite flower filiform, linear, or obtuse, or those of the sterile flowers undivided (*Inuloideæ*):—
- Flower-heads medium-sized; separate, solitary, or in corymbose or paniculate cymes, not in globose clusters, if clustered the cypselas with copious soft pappus:—
- Herbs; bracts of involucre narrow; flowers not corymbose:—
- Anther-cells tailed at the base, the tails of adjacent anthers confluent 8. BLUMEA.
- Anther-cells sagittate at the base, not tailed or connate 9. LAGGERA.
- Shrubs; bracts of involucre broad; flowers corymbose 10. PLUCHEA.
- Flower-heads small, clustered in dense ovoid or globose masses; herbs with winged stems; pappus none 11. SPHERANTHUS.
- Bracts of the involucre 1-seriate, sub-equal, free or united, with sometimes a few short outer bractlets

(*calyculus*) at their bases; heads homogamous; anther-cells sub-entire at the base; receptacle naked (*Senecionidæ*):—

Leaves alternate; pappus of fine hairs, style-arms of hermaphrodite flowers truncate or obtuse, penicillate or with a hairy tip:—

Heads ebracteate; florets purple 12. EMILIA.

Heads bracteolate; florets yellow 13. GYNURA.

Receptacles paleaceous; anthers sub-entire at the base; bracts of involucre 1- to many-seriate; heads usually radiate, heterogamous; style-arms truncate or appendiculate, or those of the sterile florets entire; pappus of 2 to 4 arms or paleaceous or absent; leaves at the base of the stem usually opposite, those higher up opposite or alternate (*Helianthoidæ*):—

Pappus of only 4 bristly awns, or cup-like or absent:—

Cypselas all thick, or those of the ray-florets 3-angled and those of the disc laterally compressed; pappus cup-like or composed of 2 to 3 stiff chaffy or bristly arms, with or without intermediate smaller scales or altogether absent; leaves usually opposite:—

Inner bracts of the involucre embracing and enclosing the cypselas of the fertile ray-florets; pappus absent, outer bracts of involucre 5, glandular 14. SIEGESBECKIA.

Inner bracts of the involucre all flat, scales of receptacle flat, very narrow, usually few; disk-florets 4-5-fid, ligules small; pappus absent, or if present shortly 2-awned; outer bracts of involucre numerous 15. ECLIPTA.

Scales of the receptacle concave or complicated more or less enclosing and embracing the disk florets:—

Cypselas not winged, compressed or 3-5-angled, ray-florets yellow with large ligules; disk-cypselas with 1 or 2 short deciduous awns; leaves all opposite 16. WEDELIA.

Cypselas of the disk-florets ciliate, winged on the margins, laterally compressed; heads small; leaves always opposite 17. SPILANTHES.

Cypselas more or less depressed from the top; pappus of 2 (rarely 3 or 4) bristles or absent:—

Outer bracts of the involucre almost equal; herbaceous; inner bracts separate, almost resembling the scales of the receptacle; ray-florets fertile; leaves opposite:—

Cypselas flat, their margins lacerate and winged; pappus composed of bristles 18. SYNEDRELLA.

Outer bracts of the involucre few, small; inner bracts connate below, membranous:—

- Cypselas not beaked; leaves opposite, simple to pinnatisect 19. BIDENS.
- Pappus of membranous scales; heads radiate; leaves opposite:—
- Scales of pappus feathery, fringed; heads medium-sized 20. TRIDAX.
- Anthers inappendiculate at the apex; receptacle (in our species) not paleaceous; pappus absent or reduced to a raised rim, rarely scaly and short; leaves usually alternate (*Anthemideæ*):—
- Flower-heads discoid, heterogamous; pappus absent:—
- Florets of the circumference very numerous; cypselas flat or concave at the top; flower-heads globose or hemispheric, sub-sessile; bracts of involucre in 2 series, spreading in fruit 21. CENTIPEDA.
- Florets of the circumference few; heads very small, in racemes or panicles; cypselas ellipsoid or obovoid, rounded at the apex 22. ARTEMISIA.
- Corollas of all the florets flatly expanded from a tubular base, ligulate, their apices 5-toothed; leaves radical or cauline and alternate, never opposite; stem always herbaceous, fistulose; sap milky (*Cichorieæ*):—
- Pappus of simple hair-like bristles, at least in the central florets; florets yellow, cypselas fusiform or oblong, with glabrous or puberulous ribs 23. CREPIS.
- NOTE.—The above key is taken mainly from “Bengal Plants,” by Lieut.-Col. D. Prain, F.R.S., Superintendent, Royal Botanic Garden, Calcutta.

1. VERNONIA, Schreb.

Herbs, shrubs, climbers or small trees. *Leaves* alternate, penninerved, entire or dentate. *Heads* axillary or terminal, solitary or in cymes or panicles, homogamous; flowers often few, but very rarely solitary. *Involucre* ovoid, globose or hemispheric, as long as or shorter than the flowers; bracts in many series, the inner longest. *Receptacle* naked or pitted, sometimes with short hairs. *Corollas* all equal, tubular, slender; lobes 5, narrow. *Anther-bases* obtuse, sagittate. *Style-arms* subulate, acute, hairy. *Cypselas* striate, ribbed or angled, rarely terete, truncate at the apex; pappus of many hairs, usually in two rows, the inner hairs thin and slender, the outer sometimes stout and compressed, persistent or deciduous.—DISTRIB. About 500 species, mostly American.

- A large shrub or small tree; leaves sub-coriaceous; involucrel bracts obtuse 1. *V. arborea*.
- Herbaceous annuals; leaves membranous; involucrel bracts acuminate:—
- Heads few, 35 in. in diam., in long-peduncled cymes.. .. . 2. *V. chinensis*.

Heads numerous, .2 to .25 in. in diam., in loose terminal corymbose cymes 3. *V. cinerea*.

1. *VERNONIA ARBOREA*, Buch.-Ham. in Trans. Linn. Soc. XIV. 218. A tree, 30 to 60 feet high; young branches as thick as a goose-quill or thinner, at first covered, like the under surfaces of the leaves and branches of the inflorescence, with short rusty tomentum, sometimes glabrous or glabrescent. *Leaves* sub-coriaceous, entire, elliptic ovate or ovate-oblong, acute or shortly acuminate, the base rounded or cuneate; upper surface glabrous, or nearly so, except the midrib, the reticulations minute and distinct; main-nerves 8 to 14 pairs, spreading, interarching, bold and distinct on the lower surface, more faint on the upper; length 3.5 to 6 in.; breadth 1.75 to 2.75 in.; petioles .75 to 1.25 in., pubescent. *Heads* 2- to 5-flowered, collected in large open terminal panicles much longer than the leaves. *Involucral bracts* few, small, oblong, obtuse, less than half as long as the flowers, pubescent, concave, persistent. *Corolla* glabrous, bluish. *Cypselas* not conspicuously ribbed, short, truncate; pappus in a single row, tuberculate, white tinged with ochraceous, persistent. DC. Prod. V. 22; Kurz For. Fl. Burm. II. 80; Clarke Comp. Ind. 23; Hook. fil. Fl. Br. Ind. III. 239. *Vernonia javanica*, *Blumeana* and *celebica*, DC. l.c. 21, 22; Miq. Fl. Ind. Bat. II. 9, 10. *Eupatorium celebicum* and *javanicum*, Blume Bijdr. 903. *Conyza acuminata* and *arboorea*, Wall. Cat. 3034A and 3074.

MALACCA: Griffith. SINGAPORE: Lobb; Ridley 2735, 2739, 9478; Maingay (K.D.) 948, 949, 950. PENANG: Curtis 2, 926. NEGRI SEMBILAN: Ridley 10087. SELANGOR: Ridley. PERAK: Wray 2240, 2442; King's Collector, many Numbers; Seortechni.—DISTRIB. Ceylon, Malay Archipelago, Philippines, China.

2. *VERNONIA CHINENSIS*, Less. in Linnæa, VI. 674. An erect annual with divaricate, softly puberulous to tomentose, angled branches. *Leaves* alternate, sessile or petiolate, membranous, ovate elliptic elliptic-lanceolate or oblanceolate, narrowed at the base, sub-serrate or entire. *Heads* few, .35 in. in diam., in lax, few-branched, axillary and terminal, open puberulous cymes, on slender peduncles longer than the leaves. 15- to 30-flowered. *Involucral bracts* not numerous, lanceolate, awned or acute, usually at first pubescent outside, inside glabrous, shining, 1-nerved; longer than the glabrous or glabrescent corollas. *Cypselas* less than 1 in. long, 4- or 5-ribbed, glabrous. *Pappus* scanty, white. Clarke Comp. Ind. 78; Hook. fil. Fl. Br. Ind. III. 235. *V. albicans*, DC. in Wight Contrib. 6; Prod. V. 26 (*in part*). *Cyanopsis pubescens* and *C. villosa*, DC. Prod. V. 69. *Conyza chinensis*, Lamk. Diet. II. 83 (not of Linn.). *C. punctulata*, Wall. Cat. 2995. *Eupatorium menthaefolium*, Wall. Cat. *Cyananthillium villosum* and *C. pubescens*, Blume

Bijdr. 889 and 890. *Centratherum chinense*, Less. in Linnæa (1829) 320. *Synanthera*, Wall. Cat. 7136.

PENANG: *J. Scott*; *Curtis* 931; *King*; *Desehamps*; MALACCA: *Cuming*; *Griffith*; *Hullett* 634. SINGAPORE: *King*.—DISTRIB. Malay Archipelago, Philippines.

3. *VERNONIA CINEREA*, Less. in Linnæa, IV. 291, and VI. 673. Herbaceous, erect, 6 to 18 in. high, with more or less minute whitish pubescence everywhere; stems slender, striate. *Leaves* membranous with variable petioles, ovate or lanceolate, sometimes obovate or oblanceolate, the apex obtuse or acute, the edges obtusely or acutely toothed, the base narrowed, both surfaces olivaceous-cinereous when dry, the upper glabrous or nearly so, the lower more or less cinereous-pubescent; length 1·5 to 3 in.; breadth ·3 to ·5 in.; petiole ·1 to ·5 in. (in the lower leaves). *Heads* ·2 to ·25 in. in diam., on 10- to 20-flowered, loose, terminal, long-peduncled, corymbose cymes with divaricate branches; bracts of peduncle very few. *Involucral scales* linear-lanceolate, acuminate or almost awned, shorter than the florets, 1-nerved, ·1 in. long, densely pubescent. *Corolla* pubescent, the tube very narrow lavender. *Cypselas* minute; pappus copious, dirty white, the outer row very short. DC. Prod. V. 24, in Wight Contrib. 6; Wall. Cat. 3008; Hook. fil. Fl. Br. Ind. III. 234; Miq. Fl. Ind. Bat. II. 11; Prain Bengal Plants, 590. *V. conyzoides*, DC. in Wight Contrib. 6; Prod. V. 25. *V. rhomboidea* and *V. montana*, Edgew. in Trans. Linn. Soc. XX. 62. *V. albicans*, DC. in Wight Contrib. 6 (*in part*); Wight Ic. 1076. *V. abbreviata* and *leptophylla*, DC. l.c. 25. *V. laxiflora*, Less. in Linnæa, VI. 646; DC. l.c. 25. *V. physalifolia*, DC. in Wight Contrib. 6; Prod. Fl. Pen. Ind. Or. 24. *V. parviflora*, *linifolia*, and *fasciculata*, Reinw. in Bl. Bijdr. 893. *V. Zollingeriana*, Schultz-Bip. in Miq. Fl. Ind. Bat. II. 16. *V. cyanonioides*, Walp. in Linnæa XIV. 509. *Conyza abbreviata*, Wall. Cat. 3048; *C. bellidifolia*, id. 3047; *ineraseens*, 3062; *incana*, 3046; *linifolia*, 3063; *elegantula*, 3049; *ovata*, 3097, and *sub-simplex*, 3003. *C. cinerea*, Linn. Sp. Pl. 862; Wall. Cat. 3008. *C. prolifera* and *C. heterophylla*, Lam. Encyl. II. 84. *Serratula cinerea*, Roxb. Hort. Beng. 60. *Chrysocoma purpurea*, Forst. Prod. 54. *C. violacea*, Schum. Pl. Guin. 384. *Cyanopsis decurrens*, Zoll.

In all the provinces, in waste places near cultivation.—DISTRIB. All tropical countries.

2. ELEPHANTOPUS, Linn.

Perennial rigid herbs. *Leaves* alternate, sessile, penninerved, entire or dentate, mostly radical. *Heads* homogamous, each containing 1 to 5

flowers, and collected into ovoid or globose clusters, surrounded by several large leafy bracts. *Involucre-proper* compressed, its component bracts oblong, acute, about 8, dry, stiff, unequal, alternately flat and conduplicate; receptacle naked. *Flowers* all equally 4-lobed, and cleft on one side, and with the lobes spreading in a somewhat palmate manner. *Anthers* obtusely sagittate at the base. *Style-arms* subulate. *Cypselas* truncate, 10-ribbed; bristles of pappus few, rigid, shining, slender and dilated below or chaffy.—**DISTRIB.** 10 or 12 species, chiefly tropical American—one cosmopolitan.

ELEPHANTOPUS SCABER, Linn. Sp. Pl., 814. Stems dichotomous, from a few inches to 2 feet high, terete, finely strigose. *Leaves* membranous, the radical ones obovate, oblong to elliptic-oblong, tapering to the short petiole, the edges dentate or crenate, up to 6 in. in length and 1.25 to 2.5 in. broad; the cauline few, smaller, sessile, both sets scabrid on the upper surface and finely strigose on the lower; main-nerves 6 to 8 pairs in the cauline, more numerous in the radical leaves, all slightly prominent on the lower surface. *Collective heads* hemispheric, .5 to .75 in. in diam., solitary, terminal, on long peduncles. *Bracts* of the conjoined heads 3, leaf-like, about .5 in. broad, broadly ovate or reniform, apiculate, nervose and pubescent behind; bracts of the involucre-proper shining, glabrous; pappus of 5 shining tuberculate bristles, dilated at the base. Wall. Cat. 2979; DC. Prod. V. 86; Roxb. Fl. Ind. III. 445; Don Prod. 169; Wight Ic. 1086; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 590.

In all the provinces, in cultivated places.—**DISTRIB.** In most tropical countries.

3. ADENOSTEMMA, Forst.

Herbs, glandular-pubescent or glabrous. *Leaves* mostly opposite, petiolate. *Heads* homogamous, in lax corymbose cymes; involucre campanulate; its bracts numerous, sub-2-seriate, narrow, herbaceous, sometimes connate; receptacle flat, naked. *Corollas* all equal, tubular, regular, with short tube and campanulate 5-toothed limb. *Anthers* truncate, with glandular apiculus, their bases obtuse. *Style-arms* elongate, dilated near the apex. *Cypselas* obtuse, 5-ribbed, glandular; pappus of 3 to 5 short rigid, often clavate hairs, joined at their bases by a narrow ring.—**DISTRIB.** Species 5 or 6 American, 1 cosmopolitan.

ADENOSTEMMA VISCOSUM, Forst. Char. Gen. 20. An erect, rarely decumbent annual, slender or robust, glabrous; pubescent or viscidly pubescent. *Leaves* membranous, sessile or petiolate, opposite or the upper alternate, from linear to broadly ovate, acute sub-acute cuneate or cordate at the base, the edges serrate crenate or entire, the upper surface usually smooth but sometimes rugose; length from 2 to 6 in.;

petioles varying in length. *Heads* .3 to .4 in. in diam., in lax corymbose, pedunculate cymes. *Involucral bracts* oblong, obtuse or acute, glabrous, glandular or scabrid. *Corollas* white, pubescent near the mouth, styles much exerted, the arms clavate. *Cypselas* usually warted, crowned by a glandular ring, bearing pedicellate lobed glands. DC. Prod. V. 111; Clarke Comp. Ind. 28; Hook. fil. Fl. Br. Ind. III. 242; Prain Bengal Plants, 591.

In all the provinces, but not abundant in any of them.—DISTRIB. The tropics generally.

In the Flora of British India, III. 242, Sir Joseph Hooker recognises seven varieties of this widely distributed and variable species. And to one or other of these he reduces the following eleven species of De Candolle: *A. fastigiatum*, DC. Prod. V. 111, *A. leiocarpum*, *A. Roylei*, *A. elatum*, *A. latifolium*, l.c. p. 112, *A. macrophyllum*, *A. parviflorum*, *A. reticulatum*, *A. viscosum*, *A. madurense*, *A. erectum*, l.c. p. 113. He also reduces here the following: *Ageratum aquaticum*, Roxb. Fl. Ind. III. 415; *A. strictum*, Bot. Mag. t. 2410; *Lavenia fastigiata*, *macrophylla* and *parviflora*, Blume Bijdr. pp. 905 and 906; and the following Nos. of the Wallichian Catalogue, viz., *Lavenia erecta*, 3218; *carnea*, 3219; *alba*, 3220; *rugosa*, 3221; *viscida*, 3222.

4. AGERATUM, Linn.

Erect herbs. *Leaves* opposite in the lower part of the stem, alternate in the upper. *Heads* in panicles or corymbs, homogamous. *Involucere* narrowly campanulate; its bracts in 2 or 3 series, linear, subequal; receptacle convex, naked or with deciduous scales. *Corollas* all tubular, equal, regular, the limb 5-cleft. *Anthers* with slight apical appendages, their bases obtuse. *Style-arms* elongate, obtuse. *Cypselas* 5-angled; pappus of 5 short, free or connate scales, or of 10 to 20 narrow, unequal scales.—DISTRIB. About 20 species, all probably American, several introduced in the Tropics of the Old World.

AGERATUM CONYZOIDES, Linn. Sp. Pl. 839. Annual, 1 to 2 feet high, everywhere with sparse white, rather soft pubescence. *Leaves* membranous, ovate, sub-acute, the base broad and sub-truncate, sometimes cuneate; the edges coarsely crenate or dentate; both surfaces greenish when dry, the upper sparsely hispid; the lower glabrous, boldly reticulate; main-nerves about 2 or 3 pairs, ascending, curved, the lower one branching; length 1 to 3.5 in. *Heads* .25 in. in diam., in terminal or axillary corymbose cymes. *Involucral bracts* shorter than the flowers, narrowly lanceolate, acute, 3-nerved, puberulous. *Corollas* pale blue or white. *Cypselas* black; pappus of 5 shining, spreading scales, with broad, often serrate bases. DC. Prod. V. 108; Clarke Comp. Ind. 30; Wall. Cat. 3176; Hook. fil. Fl. Br. Ind. III. 243; Prain Bengal Plants, 591. *A. cordifolium*, Roxb. Fl. Ind. III. 415; Wall. Cat. 3177.

In all the provinces, in cultivated places.—DISTRIB. The tropics generally.

5. MIKANIA, Willd.

A twining herb (in Indo-Malaya). *Leaves* opposite, petiolate. *Heads* small, in spikes racemes or panicles, homogamous, usually 4-flowered. *Involucre* oblong, its bracts 4, narrow, sometimes with a small outer one; receptacle small, naked. *Corollas* all equal, regular, tubular, the tube narrow; the limb campanulate, 5-fid. *Anthers* appendiculate, the base obtuse. *Style-arms* long, acute. *Cypselas* with truncate apices, 5-angled; pappus with one or more rows of scabrid hairs, often connate at the base.—DISTRIB. About 60 species, all in the warm parts of America and Africa except the following.

MIKANIA SCANDENS, Willd. Sp. Pl. 1743. A glabrous or puberulous climber; young branches less than half as thick as a goose-quill, brown and striate when dry. *Leaves* membranous, on long petioles, ovate, acuminate; the base broad, cordate, often almost sagittate, the edges sinuate; main-nerves a single pair, ascending from the base and branching outwards; length 1 to 2 in.; breadth $\cdot 6$ to 1.25 in.; petioles $\cdot 5$ to 1 in., slender. *Heads* narrow, 4-flowered, in lax corymbose cymes, on slender peduncles much longer than the leaves, peduncles and branches angled when dry, puberulous. *Scales of involucre* chaffy, narrowly oblong, obtuse. *Cypselas* glabrous; pappus reddish. DC. Prod. V. 199; Clarke Comp. Ind. 34; Hook. fil. Fl. Br. Ind. III. 244; Prain Bengal Plants, 592. *M. volubilis* and *M. chenopodifolia*, Willd. l.c. 1745; DC. l.c. 199 and 201. *Eupatorium scandens*, Linn.; Jacq. Ic. t. 169.

In all the provinces, common.—DISTRIB. British India, Malay Archipelago, Tropical Africa.

6. DICHROCEPHALA, DC.

Annuals, with alternate toothed lyrate or pinnatifid *leaves*. *Heads* small, heterogamous, globose or hemispheric, not rayed, in panicles; *Outer florets* ♀, in many rows, slender, fertile, rigid, 2-3-toothed or cleft. *Disk-florets* ♂, fertile, narrow, 4- or 5-toothed. *Anthers* with truncate bases. *Style-arms* of ♂ florets short, flattened, the tips lanceolate; pappus none or (in the ♂) of 2 minute bristles.—DISTRIB. Species 5, Asiatic and African.

DICHROCEPHALA LATIFOLIA, DC. in Guill. Archiv. Bot. II. 518. An annual weed, 12 to 24 in. high, erect or spreading, glabrous pubescent or villous. *Leaves* very variable, ovate lanceolate or obovate, entire pinnatifid or lyrate, with the terminal lobe broadly ovate and coarsely

toothed; length 1 to 4 in.; petioles .25 to 1.25 in. *Heads* about .15 in. in diam., globose, on pedicels many times longer than themselves, in lax, few-branched, cymose panicles. *Ray-florets* ♀, filiform, obscurely 2-3-toothed, white. *Disk-florets* ♂, 4-cleft, yellow. *Cypselas* very small, smooth, with a callous margin, and often with 2 small bristles. DC. in Wight Contrib. 11, Prod. V. 372; Wight Ic. 1096; Clarke Comp. Ind. 36; Hook. fil. Fl. Br. Ind. III. 245. *D. gracilis* and *D. sonchifolia*, DC. l.c. 371, 372. *Cotula sinapifolia*, Roxb. Hort. Beng. 63, Fl. Ind. III. 437; Wall. Cat. 3237. *C. bicolor*, Roth Cat. Bot. II. 116. *C. latifolia*, Pers. Syn. II. 464. *Grangea latifolia*, Lam. Ill. t. 699. *Hippia bicolor*, Smith in Rees Cyclop. XVIII. *Ethulia integrifolia*, Don Prodr. 182.

PERAK: *Scortechini*.—DISTRIB. British India, tropical and sub-tropical Asia and Africa.

7. MICROGLOSSA, DC.

Slender shrubs, often scandent. *Leaves* alternate, entire. *Heads* small, heterogamous, collected in large corymbose panicles. *Ray-florets* ♀, in 1 or more series, fertile, the ligule minute, white. *Disk-florets* few or many, ♂, fertile, tubular, with dilated 3- to 4-fid limb. *Involuere* campanulate, composed of several series of narrow bracts, the outer shorter. *Receptacle* flat, naked or nearly so. *Corolla*, the ligulate or ray ones narrow, about as long as the style; those of the disk (the tubular) longer. *Anthers* with obtuse bases, entire. *Style-arms* of the ♀ flattened; their tips long, lanceolate. *Cypselas* angled; pappus hairs numerous, slender, silky, in one or two series, somewhat unequal.—DISTRIB. About 6 species, Asiatic and African.

MICROGLOSSA VOLUBILIS, DC. Prod. V. 320. A sub-scandent shrub; branches half as thick as a goose-quill, ridged, glabrous. *Leaves* membranous, ovate-lanceolate, acuminate, the base cuneate or rounded, the edges obscurely toothed; both surfaces brown when dry, glabrous, the lower sometimes slightly pubescent; main-nerves 4 or 5 pairs, little curved, ascending, prominent beneath; length 1.5 to 2 in.; breadth .65 to 1.25 in.; petioles .25 to .4 in., slender. *Heads* .35 in. in diam., on short peduncles, crowded in dense corymbose terminal cymes, much longer than the leaves. *Cypselas* compressed, 4-angled, puberulous; pappus copious, reddish, much longer than the minute achenes. Clarke Comp. Ind. 57; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 257. *Conyza volubilis*, Wall. Cat. 3057. *Erigeron pyriformis*, Benth. Fl. Hongk., 176.

PERAK: *Ridley* 2890; *Wray* 2472. PENANG: *Wallieh* 3057.—DISTRIB. British India, Burma, Malay Archipelago, China.

8. BLUMEA, DC.

Herbs, annual or perennial, glandular-pubescent or woolly. *Leaves* alternate, rarely entire, usually lobed or toothed. *Heads* in paniculate cymes, rarely in racemes, heterogamous, disciform, yellow or purplish. *Ray-florets* in several series, ♀, fertile, filiform, 2- or 3-toothed. *Disk-florets* ♂, few, fertile, with slender tube and 5-toothed limb. *Involucre* ovoid or campanulate; its bracts in several rows, narrow, acute, herbaceous, the outer smaller; receptacle flat, naked. *Anthers* with sagittate bases produced into small slender tails. *Style-arms* of the hermaphrodite flower flattened or filiform, rarely connate with the nearest anthers. *Cypselas* small, sub-terete or angular, with or without ridges; pappus hairs in a single row, slender, often caducous. —DISTRIB. About 60 species, in tropical and sub-tropical Asia, Africa, and Australia.

Scandent; pappus white	1. <i>B. chinensis</i> .
Large shrub; pappus red	2. <i>B. balsamifera</i> .
Erect herbs; pappus white:—	
Heads in small sessile clusters of 2 or 3 in the axils of small bracts on an elongated pseudo-spike	3. <i>B. glomerata</i> .
Heads few (1 to 6), in short, axillary, condensed, pedunculate cymes; leaves oblanceolate or obovate, dentate but not lobed; flowers purple	4. <i>B. Wightiana</i> .
Heads sessile or sub-sessile, in lax, shortly-branched, leafy cymose panicles; leaves oblanceolate, dentate but not lobed; flowers yellow	5. <i>B. lacera</i> .
Heads sessile or sub-sessile, in axillary spikes several inches long, arranged in a pseudo-panicle; leaves oblanceolate, dentate and sometimes lobulate; flowers yellow	6. <i>B. membranacea</i> .

1. BLUMEA CHINENSIS, DC. Prod. V. 444. Scandent; young branches half as thick as a goose-quill, glabrous, much striate and dark brown when dry. *Leaves* membranous, elliptic or oblong-elliptic, acuminate or acute, narrowed to the rounded base, the edges with remote, narrow, small sharp teeth, or sub-entire; both surfaces glabrous, the upper dark-brown and shining, the lower paler and tinged olivaceous; main-nerve 4 or 5 pairs, curved, ascending, thin but distinct on the lower surface, faint on the upper; length 2.25 to 3.25 in.; breadth .85 to 1.4 in.; petiole .2 to .3 in. *Heads* .35 in. across, sessile, in small pedunculate axillary cymes, 3 in. long, diminishing upwards to .75 in. in length; the peduncles and their branches everywhere pubescent, sometimes a small cyme with 2 to 4 heads in the same axil as a longer one. *Involucral bracts* of the outer two series short, ovate-lanceolate, blunt, densely pubescent, those of the inner two twice as long

(or more), linear-lanceolate, acuminate, puberulous or almost glabrous, 1-nerved, longer than the copious white pappus; corolla-lobes hairy; receptacle and *cypselas* silky, white. Hook. fil. Fl. Br. Ind. III. 268. *Conyza chinensis*, Linn. Sp. Pl. 862; Blume Bijdr. 898. *B. longispina*, Zoll. et Morr. Syst. Verz. 121. *C. serici-vestita*, Wall. Cat. 2996b. *Baccharis nitida*, Wall. Cat. 3043.

PENANG: *Curtis* 2824; *Wallich* 2996, 3043. SINGAPORE: *Ridley* 2744. PERAK: *Scortechini* 1471.

VAR. *riparia*, King & Gamble. Young leaves and stems somewhat hairy; main-nerves of leaves 3 to 4 pairs, depressed on the upper surface. *Blumea riparia*, DC. Prod. V. 444; Clarke Comp. Ind. 85. *Conyza riparia*, Blume Bijdr. 899.

PERAK: *King's Collector* 1214; *Scortechini*.—DISTRIB. Java, Borneo.

2. BLUMEA BALSAMIFERA, DC. Prod. V. 466. A shrub, 6 to 12 feet high; young branches nearly as thick as a goose-quill, tomentose, striate. *Leaves* thickly membranous or sub-coriaceous, elliptic-lanceolate, coarsely and unequally serrate dentate or sub-entire, acute or sub-acute, narrowed at the base; upper surface dark olivaceous-green, minutely tomentose or strigose, the lower surface with dense silky cinereous-yellowish tomentum; main-nerves 7 to 10 pairs, curved, ascending, faint on both surfaces, but especially on the lower; length 2 to 3 in.; breadth .75 to 1.5 in.; petioles .2 to .75 in. long, the longer ones often with lateral auricles; in the lower part of the branches the leaves often much larger. *Heads* sub-cylindric, sessile, or on short pedicels, arranged in large, lax, and spreading or dense, often leafy, corymbose or paniced, axillary and terminal tawny-tomentose cymes. *Involucral bracts* linear, acuminate, densely tomentose; hermaphrodite florets very numerous in the centre, narrowly tubular; receptacle naked. *Cypselas* 10-ribbed, silky; pappus copious, red. Clarke Comp. Ind. 89; Kurz For. Fl. Burm. II. 82; Hook. fil. Fl. Br. Ind. III. 270; Prain Bengal Plants, 598. *Conyza balsamifera*, Linn. Sp. Pl. ed. II. 1208; Wall. Cat. 2998; Roxb. Fl. Ind. III. 427. *C. vestita*, Wall. Cat. 2998. *C. appendiculata* Blume Bijdr. 895 (not of Lam.).

MALACCA: *Griffith* (K.D.) 3143; *Hervey*. PENANG: *Walker* 160; *Scott*; *Curtis* 29. PERAK: *Scortechini*; *King's Collector* 6343; *Wray* 1741. SINGAPORE: *G. Thomson*; *Hullett* 372; *Ridley* 2742. JOHORE: *King*.—DISTRIB. British India, Malay Archipelago.

VAR. *angustifolia*, King & Gamble. Leaves narrowly oblong, acute at both ends, less than .5 in. broad.

SINGAPORE: *Ridley* 2742.

3. BLUMEA GLOMERATA, DC. in Wight Contrib. 15. An erect

herb, about 18 to 24 in. high; stem at the base nearly as thick as a goose-quill, sparsely sub-glandular-pubescent, the hairs spreading. *Leaves* membranous, olivaceous, sparsely strigose on both surfaces, the hairs on the upper surface with bulbous bases; the lower sessile, lyrate-lyobed, the lobes dentate, the apex acute; the upper leaves much smaller, lanceolate, dentate. *Heads* from .2 to .25 in. in diam., in small sessile clusters of 2 or 3, all in the axils of small leaf-like bracts along the long slender branches, forming a pseudo-spike. *Involucral bracts* narrowly linear, pubescent, 1-nerved; receptacle glabrous. *Outer florets* with very slender corollas. *Cypselas* faintly 8-10-ribbed, glabrous; pappus in a single row, white, shining. DC. Prod. V. 443; Hook. fil. Fl. Br. Ind. III. 262. *B. fasciculata*, DC. l.c. 442; Clarke Comp. Ind. 81. *B. fistulosa*, Kurz in Journ. As. Soc. Beng. 1877, II. 187. *B. holosericea*, *racemosa*, *spinulosa*, *gracilis*, *purpurea*, and *leptoelada*, DC. l.c. 442, 443. *Conyza fistulosa*, Roxb. Fl. Ind. III. 429. *Conyza racemosa*, *sericea*, *glomerata*, *gracilis*, *purpurea* and *holosericea*, Wall. Cat. 3002, 3021, 3055, 3064, 3076, 3103.

PENANG: *Desehamps*.—DISTRIB. British India, Malay Archipelago, China.

4. *BLUMEA WIGHTIANA*, DC. in Wight Contrib. 14. An erect, little-branched herb, 1 to 3 feet high, covered everywhere with silky white, scanty or copious, soft, sub-adpressed hairs; stem terete, about as thick as a goose-quill at the base, striate, brown, and nearly glabrous (from the fall of the hairs) when old. *Leaves* diminishing in size from below upwards, thickly membranous, obovate-oblong or elliptic-obovate, the apex acute or sub-acute, gradually narrowed from about the middle to the short petiole; the edges with a few irregular coarse teeth, sometimes slightly lobed; both surfaces olivaceous-brown when dry, and clothed, but especially the lower, with adpressed, short white pubescence; main-nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.25 to 3 in.; breadth .5 to 1.25 in.; petioles from .1 to .25 in. long or even more, sometimes auricled about the middle. *Heads* paniculate, about .3 or .4 in. across, axillary, solitary or in pairs (reduced cymes), or 4 to 6 in very short rounded axillary cymes on peduncles of varying length, but always short, the upper few inches of the stem crowded by a dense mass of cymes. *Involucral bracts* in several rows, diminishing in size outwards, the inner linear, somewhat longer than the pappus, all pubescent and 1-nerved; receptacle naked. *Outer florets* very numerous, their corollas very slender. *Inner florets* about 4, much wider than the outer. *Cypselas* small, puberulous; pappus in a single row, white. DC. Prod. V. 435; Clarke Comp. Ind. 74; Kurz in Journ. As. Soc. 1877, II. 156 (excl. syn. *hymeno-*

phylla); Hook. fil. Fl. Br. Ind. III. 261. *B. trichophora*, *parvifolia*, and *phylostachya*, DC. l.c. 436, 437, 438. *Conyza lactucafolia*, *paniculata*, *bifoliata*, and *Wightiana*, Wall. Cat. 3088 (*in part*), 3090A, 3091, 3093. *Erigeron molle*, Don Prod. 172.

PENANG and SINGAPORE: By roadsides, not common.—DISTRIB. British India and Ceylon, Malay Archipelago, tropical Australia and Africa.

5. BLUMEA LACERA, DC. in Wight Contrib. 14. An erect herb, 2 to 3 feet high; stems at the base nearly as thick as a goose-quill, adpressed-pubescent. *Leaves* thickly membranous, oblanceolate obtuse or sub-acute, much narrowed to the petiole, the edges unequally and remotely dentate; both surfaces olivaceous when dry, the lower somewhat the paler and with thin, pale pubescence; the upper glabrous, sub-scabrid; length 1.5 to 2 in.; breadth .5 to 1 in.; petiole .3 to .5 in. long. *Heads* .3 in. across, sub-sessile or sessile, in small rounded crowded cymes, on slender ebracteate axillary peduncles, 1 to 2.5 in. long, subtended by small leaf-like bracts, and occupying the upper half of the stem. *Involucral bracts* linear-oblong, tomentose, about as long as the pappus; receptacle naked. *Heads* .4 in. across, sessile or nearly so, in a lax, shortly-branched, leafy, cymose, pubescent panicle, 12 to 18 in. long. *Involucral bracts* nearly uniform, linear, acuminate, 1-nerved, puberulous, as long as the pappus. *Receptacle* slightly convex, naked. *Cypselas* narrowly oblong, glabrous, not ribbed; pappus in a single row, white. DC. Prod. V. 436; Clarke Comp. Ind. 76; Hook. fil. Fl. Br. Ind. III. 263. *B. Musra*, DC. l.c. 435; Deless. Ic. Sel. IV. t. 23. *B. villosa*, Schultz-Bip. in Pl. Hohenack. n. 2a. *Conyza lacera*, Roxb. Fl. Ind. III. 428; Wall. Cat. 3082. *C. thyrsiflora*, *villosa*, and *Musra*, Ham.; Wall. Cat. sub 3082, 3083, 3095. *C. lactucifolia*, DC. l.c. 435; Wall. Cat. 3088 (*in part*); Burm. Fl. Ind. 180, t. 59, f. 1.

PERAK: *Scortechini* 141, 1430. SINGAPORE: *Cantley*; *Hullett* 227.—DISTRIB. British India, Ceylon, Malay Archipelago, China, tropical Africa.

6. BLUMEA MEMBRANACEA, DC. Prod. V. 440. A rigid erect herb, 1 to 2 feet high; stem at the base half as thick as a goose-quill, minutely pubescent from base to apex, terete, striate. *Leaves* thinly membranous, oblanceolate, much tapered to the base, sub-sessile, the apex acute, the edges coarsely and often irregularly dentate, sometimes lobulate; both surfaces pale olivaceous-brown when dry, the lower paler, sparsely strigose; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; length 2 to 3.5 in.; breadth .8 to 1.5 in.; the leaves of the upper part of the stem smaller and bract-like. *Heads* .25 in. in diam., sessile or sub-sessile, in spikes several inches long, from the

axils of small leaf-like bracts, arranged in a narrow pseudo-panicle occupying the upper half of the stem. *Involucral bracts* linear, acuminate, pubescent, 1-nerved, as long as the inner pappus. *Corollas* very narrow; receptacle naked. *Cypselas* small, glabrous; pappus white, in two rows, the outer very short. Hook. fil. Fl. Br. Ind. III. 265. *B. hymenophylla*, DC. l.c. 440. *Conyza membranacea* and *hymenophylla*, Wall. Cat. 3019, 3038. *C. virens*, Wall. Cat. 3037D. *C. diffusa*, Roxb. Fl. Ind. III. 429.

PENANG: Curtis 2759; Deschamps.—DISTRIB. British India, Malay Archipelago.

9. LAGGERA, Schultz.-Bip.

Annual or perennial herbs. *Leaves* alternate, often rigid and decurrent. *Heads* paniced or axillary, heterogamous, disciform. *Outer flowers* ♀, in several rows, fertile, filiform, the mouth minutely toothed. *Disk-flowers* ♂, in several rows, fertile, tubular, 5-fid. *Involucre* campanulate; bracts many-rowed, narrow, often rigid, the outer shorter; receptacle flat, naked. *Anthers* 2-lobed or sagittate at the base; the auricles obtuse or acute, often unequal, not tailed or connate with the adjoining anthers. *Style-arms* of the hermaphrodite flowers and the pappus as in *Blumea*.—DISTRIB. 9 or 10 species, in tropical Africa and British India.

LAGGERA FLAVA, Benth. in Gen. Pl. II. 290. A glabrous or puberulous herb, 6' to 30 in. high; stems striate, simple or corymbosely branched. *Leaves* membranous, shining, glabrous; the radical sometimes on short petioles; the cauline sessile; the lower cauline oblong, acute, cordate and sub-amplexicaul at the base; the upper cauline smaller and narrower than the lower, lanceolate; all sharply and unequally toothed; main-nerves about 8 pairs, distinct, like the wide reticulations. *Heads* few, .25 in. in diam., on slender peduncles; receptacle glabrous; corollas yellow; anthers sagittate. *Cypselas* minute, glabrous. Clarke Comp. Ind. 90; Hook. fil. Fl. Br. Ind. III. 270. *Blumea flava*, DC. Prod. V. 439. *Erigeron falcatum*, Don Prod. 172; Kurz in Journ. As. Soc. Beng., 1877, II. 191 (*excl. syn.*). *Conyza fasciculata*, Wall. Cat. 3017.

PENANG: Wallich.—DISTRIB. British India.

This has not been collected within our area since Wallich's time.

10. PLUCHEA, Cass.

Shrubs or herbs, tomentose or glutinous. *Leaves* alternate, dentate or rarely entire, sometimes pinnatifid. *Heads* usually small, in terminal corymbose cymes, or large and sub-solitary, heterogamous, disci-

form, white yellow, or lilac. *Outer florets* ♀, in several series, fertile, filiform. *Disk-florets* ♂, few, sterile, tubular and 5-fid. *Involucre* broadly ovoid or campanulate; its bracts few or in many rows, imbricate, ovate or lanceolate, dry, rigid; receptacle flat, naked. *Corollas* of the ♀ flowers filiform, shorter than their own styles, their apices with 3 teeth; *corollas* of the ♂ flowers regular, tubular, the limb slightly widened, 5-cleft. *Anthers* sagittate at the base, their basal auricles tailed. *Style-arms* of the ♂ flowers filiform, entire or bifid. *Cypselas* small, 4- or 5-angled. Hairs of *pappus* slender, rigid, in a single series, free, or (in the sterile cypselas) connate in groups.—DISTRIB. About 30 species, tropical and sub-tropical.

PLUCHEA INDICA, Less.; DC. Prod. V. 451. A low shrub, glabrous or nearly so; stems smooth, terete. *Leaves* membranous, obovate or oblanceolate, the apex obtuse or acute, acuminate or apiculate, narrowed to the base; edges dentate, serrate or sub-serrate; both surfaces olivaceous-brown when dry, glandular; main-nerves 3 to 6 pairs, curving upwards, bold beneath; length .5 to 2.75 in.; breadth .3 to 1.25 in.; petioles .1 in. to .4 in. long. *Heads* .25 in. in diam., in compound terminal puberulous corymbose cymes, much longer than the leaves; involucre bracts few, rather broad, obtuse. *Florets* of the disk 3; those of the ray numerous. *Cypselas* minute, ribbed, nearly glabrous; pappus scanty, spreading, reddish-white. Wight Ill. t. 131; Clarke Comp. Ind. 93; Hook. fil. Fl. Br. Ind. III. 272; Prain Bengal Plants 600. *P. foliosa*, DC. l.c. 451. *Conyza corymbosa*, Roxb. Fl. Ind. III. 426; Wall. Cat. 3009. *C. indica*, Miq. Fl. Ind. Bat. II. 58. *Baccharis indica*, Linn.

MALACCA: *Griffith*. PENANG: *Wallich*. SINGAPORE: *Kurz*. DINDINGS: *Curtis* 3451. PERAK: *Scortechini* 848; *King's Collector* 2893.—DISTRIB. British India, Malay Archipelago, China, Australia

11. SPHÆRANTHUS, Linn.

Annual herbs with spreading branches. *Leaves* alternate, toothed, decurrent. *Flower-heads* proper, small, heterogamous, disciform, sessile, on a common receptacle, bracteate or not, and forming solitary, globose, or ovoid, a head-like terminal cluster, usually bearing at its base an involucre of a few empty bracts. *Outer florets* ♀, few or many, fertile, slender; *inner* solitary or few, ♂, fertile or sterile; involucre narrow, its bracts dry, narrow, unequal, acute; receptacle small, naked; pappus none. *Florets*: ♀ with filiform, minutely 2-3-toothed corollas; ♂ with regular corollas with thickened tube and 4-5-toothed limb. *Anthers* with sagittate bases acute or tailed. *Style* of ♂ florets with filiform arms or entire. *Cypselas* oblong, sub-

compressed, without pappus.—DISTRIB. About 8 species, tropics of Asia, Africa, and Australia.

SPHÆRANTHUS AFRICANUS, Linn. Sp. Pl. 1314. Annual, glabrous or pubescent, the stem and branches with long decurrent, entire wings. *Leaves* membranous, oblanceolate, acute or sub-acute, with a small bristle-point at the apex, the base narrowed and confluent with the wing of the branch, the edges bristle-serrate; length 1 to 3 in.; breadth .25 to 1.25 in. *Clusters of heads* globose, .3 to .4 in. in diam., pedunculate, their involucre few, scarious, rounded or jagged, not imbricate; the peduncles .25 to .4 in. long, glabrous, with a wing widening at the base. *Female florets* about 15, gibbous. Hook. fil. Fl. Br. Ind. III. 275; Prain Bengal Plants, 601. *S. africanus* and *S. microcephalus*, Willd. Sp. Pl. III. 2395. *S. microcephalus*, DC. Prod. V. 360; Clarke Comp. Ind. 97. *S. indicus*, Willd. l.c. 2394; Roxb. Hort. Beng. 62, Fl. Ind. III. 446. *S. africanus*, Wall. Cat. 3179 (*in part*).

MALACCA: *Griffith*. KEDAH: *King's Collector* 1701. SINGAPORE: *Ridley* 5069. PENANG: *Curtis* 1942; *Deschamps*. PROVINCE WELLESLEY: *Ridley* 7125. PERAK: *Scortechini* 1640.—DISTRIB. British India, Malay Archipelago, China, Philippines, Australia, Africa.

12. EMILIA, Cass.

Annual or perennial herbs, glabrous or hairy, often glaucous, sometimes sarmentose. *Leaves* alternate, radical, crowded, petiolate, entire, toothed or lyrate-pinnatifid; cauline few, stem-clasping. *Heads* on long peduncles, solitary or loosely corymbose, ebracteolate at the base, homogamous, discoid, yellow or red; florets all ♀, fertile, tubular, the limb elongate and 5-toothed. *Involucre* cylindric; its bracts in a single series, equal, free or cohering, striate; *receptacle* flat, naked. *Style-arms* sub-terete, their apices short and obtuse, or long and acute. *Cypselas* sub-terete, or 5-ribbed or -angled; pappus hairs numerous, white, silky.—DISTRIB. Species 14 or 15; all Indo-Malayan and tropical African.

EMILIA SONCHIFOLIA, DC. Prod. VI. 302. Annual, usually erect, sometimes diffuse and sarmentose, 12 to 30 in. high. *Leaves*: the lower lyrate-pinnatifid or sinuate-dentate, rarely elliptic, glabrous or puberulous, sometimes scaberulous, 1.5 to 4 in. long; petioles variable but rarely exceeding an inch in length; cauline leaves much smaller, hastate or linear-hastate, dentate, sessile and auriculate, more or less stem-clasping. *Heads* .4 in. long and the same in diam. when expanded, on long ebracteate or scantily bracteate peduncles, collected in lax terminal long pedunculate spreading corymbs. *Involucre* nearly as long as the purple florets, ecalyculate; its bracts linear-oblong, sub-

acute. *Cypselas* truncate at each end, minutely hairy. DC. in Wight Contrib. 24. *E. sonchifolia*, vars. α and β , Clarke Comp. Ind. 174. *Calealia sonchifolia*, Linn. Sp. Pl. 835; Roxb. Fl. Ind. III. 413; Don Prod. 180; Wall. Cat. 3144. *E. glabra*, Heyne in Wall. Cat. 3145. *Gynura ecalyculata*, DC. l.c. 298. *Prenanthes sarmentosa*, Wall. Cat. 3262E. *E. seabra*, DC. l.c. 303; Wight Ic. 1123. *E. mucronata*, Clarke Comp. Ind. 175.

SINGAPORE: *Hullett* 240. PENANG: *Deschamps*; *Scortechini*; *Stolickza*.—DISTRIB. British India, Malay Archipelago, China.

VAR. *minor*, King & Gamble. Little more than a foot high, lower leaves broadly ovate, truncate at the base, on long narrow winged petioles.

PERAK: *King's Collector* 301. PENANG: in Klang and Batu Gajah jungles: *Deschamps*.

In this variety the terminal lobe only of the leaf is developed, the lower part being long and narrow like a petiole.

13. GYNURA, Cass.

Succulent herbs, rarely undershrubs, sometimes climbers, glabrous or hispid. *Leaves* alternate, entire, toothed or pinnatisect. *Heads* solitary or in corymbs, bracteolate at the base, homogamous, disciform, yellow or purplish. *Florets* yellow: all the $\text{\textcircled{f}}$ tubular, fertile (rarely a few of the outer ones more slender and $\text{\textcircled{f}}$) the limb 5-toothed. *Involucre* cylindric or sub-campanulate; the bracts 10 or 12, in a single series, narrow, equal; their margins scarious; receptacle flat, pitted or shortly fimbriate. *Anthems* with bases entire or sub-aucricled. *Style-arms* slender; their apices long, slender, subulate, hispid. *Cypselas* narrow, many-ribbed; hairs of pappus copious, in many series, slender, white.—DISTRIB. Species about 20, Asia, Africa, and Australia.

Scandent; leaves subentire or slightly dentate, petiolate	.. 1. <i>G. sarmentosa</i> .
An erect herb; leaves always boldly dentate and often pinnatisect	
or pinnatifid, sessile and often sub-amplexicaul or auriculate	.. 2. <i>G. bicolor</i> .

1. GYNURA SARMENTOSA, DC. Prod. VI. 298. Stem and branches loosely twining, glabrous except the puberulous peduncles, thinner than a goose-quill, pale brown and striate when dry. *Leaves* succulent, elliptic to elliptic-lanceolate, acute or acuminate, the base cuneate, the edges subentire or slightly dentate, both surfaces brown when dry, glabrous; main-nerves 4 or 5 pairs, spreading, faint on both surfaces; length 1 to 3 in.; breadth $\frac{1}{4}$ to 1 in.; petioles of the lower leaves $\frac{1}{5}$ to $\frac{1}{4}$ in.; the small upper leaves often sessile. *Heads* few, $\frac{1}{65}$ to $\frac{1}{75}$ in. long, and as much in diam., on slender puberulous

pedicels usually in scanty, lax, long-peduncled, axillary and terminal cymes longer than the leaves; bracteoles of the panicle and of the calyculus at the base of the involucre few, small, linear. *Involucre* spreading little, its bracts narrowly oblong, subacute or blunt, glabrous; their edges scarious, nearly as long as the florets. *Cypselas* small, brown, with 10 puberulous ribs; pappus white. Hook. fil. Fl. Br. Ind. III. 335. *G. Finlaysonianana*, DC. l.c. 299; Deless. Ic. Sel. IV. t. 55. *Cacalia cylindrifolia*, *reclinata*, and *Finlaysonianana*, Wall. Cat. 3150, 3151, 3162. *Sonehus volubilis*, Rumph. Herb. Amb. V. t. 103 f. 2.

In all the provinces, common.—DISTRIB. Malayan Archipelago; Siam; Philippines.

2. GYNURA BICOLOR, DC. Prod. VI. 299. Herbaceous, 2 or 3 feet high, glabrous or sparsely and minutely glandular-hairy on the upper part; stems erect, branched, about the thickness of a quill near the base, boldly striate when dry. *Leaves* pinnatisect or pinnatifid, the lobules acutely dentate; the terminal lobe narrow and acuminate, narrowed at the base into a petiole varying in length from $\cdot 5$ to 1 in.; the upper sessile and often auriculate at the base, or shorter and narrowly obtuse with large teeth; length 2 $\cdot 5$ to 5 in.; breadth $\cdot 4$ to 3 in. *Heads* about $\cdot 5$ in. long, less in diam. Involucral bracts narrow, with scarious margins and acute often recurved tips. *Cypselas* very slender, much ribbed, sub-glabrous; pappus copious, white, tinged with pink. Hook. fil. Fl. Br. Ind. III. 335. *Cacalia bicolor*, Roxb. Fl. Ind. III. 412; Salisb. Hort. Parad. t. 25; Bot. Regist. t. 110.

SINGAPORE: *Ridley* 1618. JOHORE: *Ridley* 2741; *King*. PERAK: *Wray* 1445, 3599. PENANG: *Deschamps*. MALACCA: *Griffith* (K.D.), 3235.—DISTRIB. China, Moluccas.

14. SIEGESBECKIA, Linn.

Glandular-pubescent herbs. *Leaves* opposite, toothed. *Heads* in leafy panicles, heterogamous, sub-radiate, yellow or white. *Ray-florets* ♀, in a single series, fertile, the corollas short-tubed, with 2-3-fid limb or a short, broad ligule. *Disk-florets* ♂, fertile, or the inner ones sterile; the corollas regular, tubular, the limb campanulate and 5-fid or narrow and 3- to 4-toothed. *Involucre* campanulate or hemispheric, the bracts few, herbaceous, glandular, the outer usually 5, spatulate, spreading; the inner enclosing the ray-florets. *Receptacle* small; the pales membranous, concave. *Anthers* with entire bases. *Style* of ♂ *florets* with short, flattened, sub-acute arms. *Cypselas* obovoid-oblong, often incurved, their apices obtuse;

pappus none.—DISTRIB. Six species, one cosmopolitan, tropical and sub-tropical, the others South American and African.

SIEGESBECKIA ORIENTALIS, Linn. Sp. Pl. 900. An erect annual, 1 to 3 feet high, branching, the lower branches opposite, everywhere clothed with pubescence, often glandular and crisped. *Leaves* membranous, opposite, the lower ovate sub-rhomboid, the upper ovate-lanceolate, dentate or crenate, passing into linear-lanceolate, and sometimes entire; all cuneate at the base; both surfaces olivaceous when dry; the upper scabrid, hispid; the lower more softly hairy; main-nerves 3 or 4 pairs, curved, spreading; length 1 to 4 in.; petioles very short or absent. *Involucre* with the outer bracts longer than the inner. *Cypselas* black, the outer enclosed in the glandular involueral bracts. Boiss. Fl. Orient. III. 250; DC. Prod. V. 495; Wight Ic. 1103; Wall. Cat. 3182; Hook. fil. Fl. Br. Ind. III. 304; Prain Bengal Plants, 607. *S. glutinosa*, Wall. Cat. 3182. *S. brachiata* and *S. orientalis*, Roxb. Fl. Ind. III. 432. *Minyranthes heterophylla*, Turcz. in Bull. Soc. Imp. Nat. Misc. 1851, I. 181.

In all the provinces, near habitations.

15. ECLIPTA, Linn.

Strigose or hirsute annuals. *Leaves* opposite. *Heads* small, axillary or terminal, pedunculate, heterogamous, rayed. *Ray-florets* ♀, sub-2-seriate, fertile or sterile, ligulate, small, entire or bifid, white rarely yellow. *Disk-florets* ♂, fertile, tubular, 4-5-fid. *Involucre* hemispheric or broadly campanulate; its bracts sub-2-seriate, herbaceous, the outer large and broad; receptacle flat or nearly so, the outer pales enclosing several florets; the inner ones narrow, sometimes absent. *Anthers* with obtuse, almost entire, bases. *Style-arms* flattened, with short triangular or obtuse appendages. *Cypselas* of the ray narrow, triquetrous, sometimes barren; those of the disk stouter, somewhat compressed laterally, the apex entire, toothed or 2-aristate.—DISTRIB. 7 species in South America and Australia, and 1 cosmopolitan in the tropics.

ECLIPTA ERECTA, Linn. Mant. II. 266. An erect or diffuse branched slender herb, hirsute or strigillose. *Leaves* variable in form and size, sessile or with very short petioles; linear, oblong-lanceolate or narrowly elliptic; narrowed at both ends; main-nerves 3 or 4 pairs, spreading, faint; length 1 to 4 in.; breadth .2 to .5 in. *Heads* .3 to .4 in. in diam., solitary or in pairs from the leaf-axils; the peduncles .25 to 1.5 in. long, when in pairs always unequal. *Involueral bracts* equal to or longer than the flowers, unequal, ovate or obovate, apiculate. *Cypselas* scabrid, without pappus. Clarke Comp. Ind. 134; Hook.

fil. Fl. Br. Ind. III. 304; Prain Bengal Plants; 610. Lam. Ill. t. 687. *E. alba*, Hassk. Pl. Jav. Rar. 528; Clarke Comp. Ind. 134; Hook. fil. Fl. Br. Ind. III. 304. *E. marginata*, Boiss. Fl. Orient. III. 249. *E. prostrata*, Linn. Mant. II. 266; Roxb. Fl. Ind. III. 438. *E. prostrata*, *undulata*, and *parviflora*, Wall. Cat. 3209, 3210, 3213. *Verbesina alba* and *prostrata*, Linn. Sp. Pl. 902.

In all the provinces. In and near cultivated ground.—DISTRIB. The tropics generally.

16. WEDELIA, Jacq.

Hirsute or scabrid-pubescent herbs or undershrubs, sometimes scandent. *Leaves* opposite. *Heads* axillary or terminal, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate, spreading, entire, or 2-toothed at the apex. *Disk-florets* ♂, fertile or the inner sterile; the corolla tubular, regular, with elongate 5-toothed limb. *Involucre* campanulate or sub-hemispheric; its bracts sub-2-seriate, the outer 3 to 5 usually herbaceous, the inner dry; receptacle flat or convex, the pales enclosing the flowers. *Anthers* entire or sub-sagittate at the base. *Style* of ♂ florets with acute arms hirsute at their tips. *Cypselas* cuneate-oblong or obovoid, thick, smooth or tubercled, laterally compressed or the outer triquetrous, tip rounded, margins obtuse or thickened; pappus none, or reduced to a toothed cup or ring, or sometimes of short scales with occasionally a few bristles.—DISTRIB. Species about 70, tropical and sub-tropical.

WEDELIA BIFLORA, DC. in Wight Contrib. Fl. Ind. 18. Scandent; stem and branches hispid-puberulous when very young, afterwards almost glabrous, obtusely 4-angled, grooved when dry. *Leaves* membranous, broadly ovate or ovate-subrhomboid to lanceolate, apex acuminate, edges coarsely serrate except at the broad, slightly cuneate base; both surfaces dull olivaceous green when dry, minutely reticulate, sparsely hispid-puberulous; main-nerve one large pair ascending from the base of the midrib to near the apex branching outwards and one or two smaller pairs from above the middle of the midrib, all distinct on both surfaces; length 2 to 4.5 in.; breadth 1.25 to 2.75 in.; petioles .75 to 1.5 in., those of the branches smaller. *Heads* about .5 in. in diam., solitary on a short peduncle .75 in. or less in length, or 2 to 4 on peduncles two or three times as long. *Involucral* bracts in two rows, oblong or ovate-lanceolate, apiculate, concave, scabrid-puberulous outside like the peduncles, often recurved. Ripe *cypselas* triquetrous, scaberulous, the apex with some hairs and several short bristles, one longer than the others. Hook. fil. Fl. Br. Ind. III. 306. *W. scandens*, Benth.; Prain Bengal Plants, 612; Clarke Comp. Ind. 136 (*excl. syn.*). *Woolastonia*

biflora and *W. scabriuscula*, DC. Prod. V. 546, 547. *W. biflora*, Wight Ic. 1108. *Verbesina biflora*, Linn. Sp. Pl. Ed. II. 1272. Wall. Cat. 3207 (*in part*). *V. dichotoma*, Wall. Cat. 3024 (*in part*). *Eclipta scabriuscula*, Wall. Cat. 3212 (*partly*). *Acemella biflora*, Spreng. Syst. III. 591.

On the sea coast, common.

17. SPILANTHES, Linn.

Annual herbs. *Leaves* opposite. *Heads* axillary or terminal, usually on long peduncles, heterogamous and rayed, or homogamous and disciform. *Ray-florets* ♀, in a single series, fertile, ligulate, white or yellow. *Disk-florets* ♂, fertile, tubular, with 4- or 5-fid limb. *Involucre* ovoid or campanulate, the bracts sub-2-seriate; receptacle convex, elongate, the pales enclosing the flowers often connate with the ovary into a stalk. *Anthers* with truncate entire or bifid bases. *Style-arms* of ♀ florets truncate. *Cypselas* of ray-florets triquetrous or dorsally compressed, the margins and angles usually ciliate; pappus none or of 2 or 3 bristles.—DISTRIB. About 40 species, chiefly tropical American.

SPILANTHES ACMELLA, Murr. Syst. ed. XIII. 610. Erect or ascending, glabrous, branched, 1 to 2 feet long; the branches as thick as a crow-quill, striate, glabrous, pale brown when dry. *Leaves* membranous, ovate-lanceolate or elliptic, with sub-acute apex and cuneate base, the edges crenate serrate or entire; main-nerve a single pair, ascending; length .75 to 1.5 in.; petioles .1 to .3 in. long. *Heads* ovoid-conical, .35 to .5 in. long, on slender peduncles 1 to 2.5 in. long, solitary or in very lax panicles. *Involucral bracts* short, oblong, blunt or sub-acute, 3-nerved. *Ray-florets* minute. *Cypselas* sometimes marginate, scabrid or smooth; pappus of one or two bristles or absent. DC. Prod. V. 623; Prain Bengal Plants, 614; Wall. Cat. 3285; Clarke Comp. Ind. 138; Hook. fil. Fl. Br. Ind. III. 307. *S. calva*, DC. l.c. V. 625; Wight Ic. 1109. *S. pseudo-Acemella*, Linn.; DC. l.c. 625, and in Wight Contrib. 19; Wall. Cat. 3185. *S. olcracea*, Jacq. Hort. Vind. II. t. 135; Roxb. Fl. Ind. III. 410; DC. l.c. 624. *Bidens fervida* and *B. fixa*, Lamk. Dict. I. 415, 416. *Cotula conica*, Wall. Cat. 3185. *Verbesina Acemella*, Linn. Sp. Pl. 901. *V. pseudo-Acemella*, Linn. l.c. 901.

MALACCA: Griffith (K.D.) 3186; Cuning 2361. PERAK: Scortechini 1400. PENANG: Deschamps.

18. SYNEDRELLA, Gaertn.

Annual branched herbs. *Leaves* opposite, petiolate, dentate. *Heads* small, axillary and terminal, heterogamous, rayed. *Involucre* ovoid or

oblong, its bracts few; the outer one or two foliaceous, passing into the flat scarious pales of the small receptacle. *Ray-florets* few, ♀, ligulate, with short broad 2-3-toothed lamina. *Disk-florets* ♂, tubular, regular, the limb 4-toothed. *Anthers* syngenesious, their bases sub-entire. *Style-arms* of ♂ florets long, acute. *Cypselas* of ray-florets much compressed dorsally, smooth, their edges winged and with long teeth; those of the ♀ few, narrower, compressed or trigonous often muriccate; pappus in both consisting of 2 (rarely more) bristles.—DISTRIB. Species 2, tropical American, 1 also Asiatic and African.

SYNEDRELLA NODIFLORA, Gaertn. Fruct. II. 456, t. 171, f. 7. An erect dichotomous annual with terete wiry glabrous branches thicker than a crow-quill; all parts more or less scaberulous. *Leaves* membranous, opposite, petiolate, ovate, acute, the base cuneate, the edges serrate or crenate (sometimes obscurely so); main-nerves 3 or 4 pairs, the lower pair long and bold, the others short and faint; both surfaces minutely and sparsely strigose, and greenish when dry; length .75 to 3 in.; breadth .3 to 1.25 in.; petioles .1 to .4 in. often ciliate on the edges. *Heads* .25 in. in diam., axillary, solitary or in small clusters, usually sessile but sometimes on short peduncles; inner bracts of the involucre linear-lanceolate, shining. *Cypselas* of the inner flowers muriccate, with 2 unequal hispid pappus hairs longer than themselves and than the corolla; outer cypselas shorter, broader, smooth, black; their edges winged, deeply toothed, pale. Hook. Exot. Flora, t. 60; Clarke Comp. Ind. 139; Hook. fil. Fl. Br. Ind. III. 308; Prain Bengal Plants, 615. *Verbesina nodiflora*, Linn. Amoen. Acad. IV. 290.

Near cultivation, common.

19. BIDENS, Linn.

Herbaceous, annual or perennial, sometimes scandent. *Leaves* opposite, entire, irregularly lobed or 1-2-pinnatisect. *Heads* small and corymbose or larger and sub-solitary, heterogamous and rayed. *Ray-florets* in one series, neuter or rarely ♀, fertile, the corolla ligulate, yellow or white, spreading, entire or somewhat toothed. *Disk-florets* ♂, fertile, tube, cylindric, limb shortly 5-fid; occasionally homogamous from the abortion of the ray-florets. *Involucre* campanulate or sub-hemispheric, its bracts in two series, often slightly connate below; the outer short herbaceous or long and leafy, the inner membranous; receptacle flat or convex; its pales narrow, little concave. *Anthers* entire or bluntly sagittate at the base. *Style* of ♂ florets with arms hirsute upwards and short acute or long apices. *Cypselas* dorsally compressed or somewhat tetragonous, linear or cuneiform, often narrowed but not beaked above; pappus of 2 to 4 persistent,

retroscely barbellate arms.—DISTRIB. About 120 species, chiefly American.

BIDENS PILOSA, Linn. Sp. Pl. 832. An erect, very variable, glabrous pubescent or pilose herb, 6 to 24 in. high; stems when dry 4-angled. *Leaves* 3-fid to 3-partite, or 2-3-pinnatifid, their segments broadly or narrowly ovate to lanceolate, serrate. *Heads* .3 to .4 in. across, on long stout petioles of varying length, terminal or axillary. *Ray-flowers* when present white or yellow, often absent. *Involueral bracts* shorter than the flowers, broadly oblong, with scarious margins. *Cypselas* black, compressed, long, narrow, slender, ribbed; pappus of 3 or 4 bristles shorter than the cypselas, pale brown.

VAR. 1 *pilosa* proper, Hook. fil. Fl. Br. Ind. III. 309; leaves 3-fid or 3-sect, their segments broadly or narrowly ovate or lanceolate, serrate. *B. pilosa*, Linn.; DC. Prod. V. 597; Clarke Comp. Ind. 140; Prain Bengal Plants, 616. *B. leucantha*, Willd. *B. chinensis*, Willd.; Wall. Cat. 3189 (*in part*). *B. tripartita* and *B. bipinnata*, Wall. Cat. 3187 (*in part*).

VAR. 2 *bipinnata*, Hook. fil. l.c. 309; leaves bipinnately compound, their segments ovate lanceolate or linear, entire lobed or toothed. *B. bipinnata*, Linn.; Roxb. Fl. Ind. III. 411. *B. chinensis*, Wall. Cat. 3189 (*in part*). *B. Wallichii*, DC. Prod. V. 598.

VAR. 3 *decomposita*, Hook. fil. l.c. 310; leaves decompositly pinnatifid, segments linear, slender. *B. decomposita*, Wall. in DC. Prod. V. 602, Cat. 3188; Clarke Comp. Ind. 141 *excl. var. β*.

In all the provinces: in waste ground near cultivation, but not common.—DISTRIB. In all warm countries.

20. TRIDAX, Linn.

A perennial herb. *Leaves* opposite, pinnatisect, with few narrow segments. *Heads* solitary on very long peduncles, heterogamous, rayed. *Ray-florets* ♀, fertile, ligulate or bilabiate, the outer lip large 3-fid, the inner small and 2-fid or none. *Disk-florets* ♂, fertile, tubular, the limb elongate and 5-fid. *Involueral bracts* in few series, the outer short broad herbaceous; receptacle flat or convex; its scales membranous. *Anthers* with short acute auricles at their bases. *Style-arms* of the ♂ flowers hairy above, their apices subulate. *Cypselas* oblong or depressed-globose, silky; pappus of unequal aristate feathery bristles.—DISTRIB. 7 species, tropical American, 1 being an introduced weed in the tropics of Asia.

TRIDAX PROCUMBENS, Linn. Sp. Pl. 900. Procumbent, hirsute, with slightly branched stems as thick as a crow-quill. *Leaves* membranous, few, ovate-lanceolate, deeply and irregularly serrate, .5 to 2 in. long.

Heads .4 to .6 in. in diam., on slender erect solitary peduncles 3 to 8 in. long. *Cypselas* brown; pappus shining, white. DC. Prod. V. 679; Wall. Cat. 3197; Clarke Comp. Ind. 142; Hook. fil. Fl. Br. Ind. III. 311; Prain Bengal Plants, 618.

In cultivated and waste places: an introduction.

21. CENTIPEDA, Lour.

Annual or perennial herbs. *Leaves* alternate, entire or toothed. *Heads* small, axillary, sessile or racemose, heterogamous, disciform, yellow. *Outer florets* ♀, in many rows, fertile, their corollas minute, obscurely lobed. *Disk-florets* ♂, few, fertile, their corollas with short tube and campanulate 4-fid limb. *Involuere* hemispheric, its bracts in 2 series, spreading in fruit; receptacle naked. *Anthers* obtuse and entire at the base. *Style-arms* of ♂ flower short, truncate. *Cypselas* 4-angled, the apices obtuse, the angles hairy; the hairs sometimes hooked; pappus none.—DISTRIB. 43 species, Asiatic, Australian, and South American.

CENTIPEDA ORBICULARIS, Lour. Fl. Cochinch. III. 493. An annual prostrate herb with numerous thin rooting stems, glabrous or sparsely tomentose. *Leaves* obovate-oblong or cuneate, .2 to .5 in. long, sparsely toothed. *Heads* .1 to .15 in. in diam., globose, solitary, axillary, subsessile. *Florets*, ♀ minute, numerous, tubular, minutely 3-toothed; ♂ 10 to 12, 4-toothed. *Cypselas* with simple hairs. Hook. fil. Fl. Br. Ind. III. 317; Prain Bengal Plants, 620. *C. minuta*, Benth. in Bth. & Hook. fil. Gen. Pl. II. 230; Clarke Comp. Ind. 151. *Myriogyne minuta*, Less.; DC. Prod. VI. 139. *Cotula sternutatoria*, Wall. Cat. 3259. *C. minima*, Willd. Sp. Pl. III. 2170. *Dichrocephala Schmidii*, Wight Ic. 1610. *Artemisia sternutatoria*, Roxb. Fl. Ind. III. 423. *A. minima*, Linn. Sp. Pl. 849. *Sphaeromorphæa centipeda*, DC. l.c. 140.

In all the provinces: by the sides of roads in cultivated ground, not common.

22. ARTEMISIA, Linn.

Herbs or shrubs, usually fragrant. *Leaves* alternate, 1- to 3-pinnatisect, serrate or entire. *Heads* small, numerous, racemose or panicled, solitary or in fascicles (never corymbose), heterogamous or homogamous, disciform. *Outer florets* ♀, in a single series, fertile, very slender, 2- to 3-toothed. *Disk-florets* ♂, fertile or sterile, the limb 5-fid. *Involuere* ovoid, sub-globose or hemispheric; bracts in few series, the outer shorter, their margins scarious; receptacle flat or convex, naked or hairy. *Anthers* with entire obtuse bases. *Style-arms* of the ♂ florets with truncate, usually penicillate, tips. *Cypselas* very minute, oblong,

ellipsoid or sub-obovoid, faintly striate; pappus none.—DISTRIB. About 240 species in the north temperate regions mostly of the Old World.

ARTEMISIA VULGARIS, Linn. Sp. Pl. 848. A small shrub; stems as thick as a goose-quill, brown when dry, sub-glaucous and with sparse white pubescence. *Leaves* membranous, varying much in shape and size, those near the base several inches long, large pinnatifid or bi-pinnatifid, the pinnules oblong, the ultimate lobes entire with sub-aristate apices, leaves of the stem diminishing in size upwards, lacinate, and passing near the apex into simple linear bracts less than .5 in. long; all glabrous on the upper surface and white adpressed-pubescent on the lower. *Heads* about .15 in. long, cylindric or narrowly campanulate, sessile, solitary or in small clusters, in axillary sub-second spikes of varying length, the upper part of the stem forming a long spike. *Involucral bracts* only 5 or 6, broadly lanceolate or oblanceolate, the inner scarious. *Corollas* glabrous. DC. Prod. V. 112; Boiss. Fl. Orient. III. 371; Roxb. Fl. Ind. III. 420; Clarke Comp. Ind. 161; Hook. fil. Fl. Br. Ind. III. 325. *A. indica*, Willd.; DC. l.c. 114; Roxb. Fl. Ind. III. 419; Wight Ic. 1112; Wall. Cat. 3293. *A. dubia*, Wall. Cat. 3307; DC. l.c. 110. *A. myriantha*, Wall. Cat. 3297; DC. l.c. 112. *A. paniculata*, Roxb. Fl. Ind. III. 418. *A. leptostachya*, DC. l.c. 113. *A. grata*, Wall. Cat. 3294 (*in part*); DC. l.c. 114. *A. lavandulifolia*, DC. l.c. 110.

In all the provinces, near cultivation, not common and probably introduced.—DISTRIB. Europe, Northern Asia, India, mountains of the Malayan Archipelago.

23. CREPIS, Linn.

Annual or perennial herbs, glabrous or hairy, hairs all simple. *Leaves* alternate, radical or cauline, the latter often stem-clasping, entire toothed or pinnatifid. *Heads* pedunculate, solitary, fasciculate or corymbose, yellow or red, homogamous, ligulate. *Involuere* cylindric or campanulate; bracts either multi-seriate and regularly imbricate, or the outer smaller and shorter than the single series of inner; base of midrib often thickened after flowering; receptacle flat, rarely concave, naked or shortly fimbriate. *Corollas* ligulate, with broad 5-toothed apices. *Anthems* syngenesious, their bases sagittate, the auricles acute or shortly setaceous. *Cypselas* more or less fusiform or oblong, rarely short and cylindric, often slender, glabrous or scaberulous, 10- to 20-ribbed, the apex narrowed or beaked; pappus usually copious, short or long, the hairs simple, soft, usually silvery, rarely brownish and stiff or brittle.—DISTRIB. Species about 10, chiefly in the northern regions of the Old World.

CREPIS JAPONICA, Benth. Fl. Hongk., 194. Annual; glabrous or puberulous; stems one or more from the same root, 6 to 18 in. high. Radical *leaves* oblanceolate, runcinate-pinnatifid or sinuately toothed, 1 to 2.5 in. long, usually on petioles .5 to 1.5 in. long; cauline *leaves* few, much smaller and often sessile. *Heads* .2 in. long and .3 in. in diam. when expanded, on short, slender pedicels with linear minute bracteoles at their bases, collected at the apices of the long, slender stems in compact or lax corymbose cymes. *Involucre*s shorter than the florets, their bracts in two rows, the outer very short; the inner 6 or 7, narrowly oblong, blunt, with narrow hyaline margins and dark, thickened midribs. *Cypselas* .1 in. long, contracted below the apex, but not beaked, compressed, with many smooth or puberulous ribs, equal to or shorter than the soft, white pappus. Hook. fil. Fl. Br. Ind. III. 395; Prain Bengal Plants, 627. *C. lyrata*, Clarke Comp. Ind. 253. *Youngia lyrata*, Cass.; Thw. Enum. Pl. Ceyl. 168. *Youngia Thunbergiana*, *runeinata*, *napifolia*, *Poosia*, *ambigua*, *fastigiata* and *striata*, DC. Prod. VII. 192, 193. *Y. napifolia*, Wight Ic. 1147. *Laetuea napifolia*, DC. in Wight Contrib. 27. *Chondrilla runeinata*, Wall. Cat. 3272. *Prenanthes Poosia* and *napifolia*, Wall. Cat. 3265, 3277. *P. japonica*, Linn. Mant. 107. *P. striata*, Blume Bijdr. 885.

In all the provinces, near or in cultivated ground.

Order LXII. STYLIDIEÆ.

Herbaceous plants, rarely undershrubs. *Leaves* radical or scattered or fasciculate on the stem, more or less subverticillate, entire, often small and narrow, no stipules. *Flowers* in terminal racemes or thyrsoïd or corymbose panicles, irregular, perfect, pedicels bracteate. *Calyx-tube* adnate to the ovary; limb 2-lipped, upper lip 3-, lower 2-flowered. *Corolla* gamopetalous, 5-lobed, 4 lobes spreading, the fifth (lip) smaller, irregular, the lobes imbricate. *Stamens* 2, parallel, inserted on a glandular disk surmounting the ovary; filaments connate with the style into a column; anthers sessile on the column, the cells sub-confluent. *Ovary* inferior, 2-celled; style entire or divided into two stigmas; ovules many in each cell, on axile placentas on the middle of the dissepiment, anatropous. *Fruit* a 2-celled capsule, sometimes 1-celled by the suppression of the septum, the valves cohering at the base. *Seeds* minute, numerous, sub-globose; albumen fleshy; testa thin; embryo minute, next the hilum.—DISTRIB. Species about 100, Australian, with a few in tropical Asia, New Zealand, and Antarctic America.

STYLIDIUM, Sw.

Herbs, with the habit leaves and inflorescence of the Order. *Calyx-lobes* 5, bilabiate. *Corolla* irregularly 5-lobed, 4 lobes sub-erect in pairs, the fifth smaller, recurved. *Stamens* in an elongate column, often recurved or reflexed, especially when irritated. *Ovary* 2-celled, stigma entire.—DISTRIB. 85 Australian species and 3 Indian or Malayan.

STYLIDIUM TENELLUM, Swartz in Gesellsch. Nat. Berl. Mag. 1807, 51. t. 2, fig. 3, *not of Br.* A small erect herb; stem simple, leafy, glabrous, 4 to 8 in. high, dichotomous, compressed. *Leaves* scattered, alternate, oblong or oblong-obovate, lower ones broader .2 to .3 in. long, upper ones narrower, getting gradually smaller upwards and passing gradually into bracts; nerves of lower leaves 3, from the base. *Flowers* sessile, 2 to 5, alternate; bracts minute, linear. *Calyx* bilabiate, upper 3-, lower 2-lobed, lobes linear. *Corolla* irregularly 5-lobed, 4 lobes erect linear, the fifth recurved, spatulate. *Staminal column* exsert, stamens 2, anthers 2-celled, connivent. *Ovary* inferior, elongate, 2-celled, many-seeded, stigma entire. *Capsule* 2-celled, 2-valved, .5 to .7 in. long; seeds minute, papillose. DC. Prod. VII. 336; Hook. fil. and Th. in Journ. Linn. Soc. II. 8; Miq. Fl. Ind. Bat. II. 571; Kurz in Flora, 1872, 304. *S. roseum*, Kurz in Journ. As. Soc. Beng. XLV. ii. 137, XLVI. ii. 212; Clarke in Hook. f. Fl. Br. Ind. III. 420.

PENANG: *Ridley* 7103. PROVINCE WELLESLEY, at Butterworth: *G. King*. MALACCA: *Swartz*.—DISTRIB. Eastern Bengal and Burma, in Dacca, Chittagong and Mergui.

S. uliginosum, Swartz, is recorded in Fl. Br. Ind. as from "MALACCA *fide H. f. and T.*"; as we have seen no specimens, we consider it sufficient to record the fact. In Miq. Fl. Ind. Bat. it is *S. Kunthii*, Wall., that is recorded from Malacca, and it seems more likely that this is right as Griffith obtained it at Mergui.

Order LXIII. GOODENOVIÆ.

Shrubs, undershrubs, but chiefly herbs, juice not milky. *Leaves* alternate or radical, rarely opposite, entire dentate or occasionally pinnatifid; stipules none. *Flowers* hermaphrodite, axillary or in terminal spikes, racemes or panicles, regular or irregular, bracts and bracteoles occasionally present. *Calyx* with the tube adnate to the ovary or free; lobes 5, sometimes very small, sometimes connate in a ring or obsolete. *Corolla* gamopetalous, inserted on the calyx, usually white, yellow or blue, rarely red; lobes 5, valvate, usually induplicate-winged. *Stamens* 5, alternate with the corolla-lobes, inserted on the

disk crowning the ovary; free or connate in a ring around the style; anthers 2-celled, the cells parallel, dehiscing longitudinally and introrsely. *Ovary* 1-2-celled; style simple with a cup-shaped sheath including the stigma; ovules 1 or many in each cell, erect or ascending, rarely pendulous, inserted on the dissepiment or central. *Fruit* an indehiscent drupe or a capsule with 2 or 4 valves usually dehiscing irregularly. *Seeds* albuminous; testa thin crustaceous or thick and hard; embryo erect in the axis of the fleshy albumen, the radicle inferior.—**DISTRIB.** Over 200 species, mostly Australian, a few in New Zealand, Antarctic America, the Pacific Islands, or on the coasts of tropical Asia, Africa, and the West Indies.

1. SCÆVOLA, Linn.

Herbs, undershrubs or shrubs. *Leaves* simple, alternate, rarely opposite, entire or toothed. *Flowers* axillary, solitary or in dichotomously branched cymes, sessile or pedicellate. *Calyx* with the tube adnate to the ovary, turbinate, ovoid or globose; limb short, annular or 5-lobed, sometimes obsolete. *Corolla* oblique, split to the base behind, lobes sub-equal or the two uppermost shorter, at length digitately patent. *Stamens* free. *Ovary* 2-celled, with solitary erect ovules in each cell, or 1-celled with 1-2 erect ovules; sheath cupular; stigma truncate or divaricately 2-lobed. *Fruit* an indehiscent drupe, exocarp thin or fleshy, endocarp hard and woody rarely crustaceous. *Seeds* solitary; embryo smooth, cotyledons sometimes broader than the inferior radicle.—**DISTRIB.** About 60 species, 2 Asiatic, 8-10 of the Pacific Islands and the coasts of Asia, 1 extending to the coasts of Africa and the West Indies, the rest Australian.

SCÆVOLA KOENIGII, Vahl Symb. III. 36 (1794). An evergreen large glabrous shrub with stout stem and branches, soft spongy pith and coarse fibrous wood. *Leaves* alternate, sessile, obovate-oblong, obtuse at apex, decurrent at base, 3 to 6 in. long, about 2 in. broad, entire or obscurely crenate, more or less fleshy when green, membranous when dry, silky pubescent on both sides or somewhat glabrous on the upper surface, tufted hairy in the axils; midrib stout, prominent, broad, main-nerves 10-12 pair, slender, arching upwards and joining near the margin, secondary nerves few slender, reticulations many, indistinct. *Flowers* white, in axillary few-flowered dichotomous pubescent cymes shorter than the leaves; bracts small, subulate, about .1 in. long; common peduncle .5 to .6 in. long; pedicels .1 to .2 in. long; bracteoles 2, similar to the bracts. *Calyx-tube* adnate to the ovary, .2 in. long, densely villous; lobes .2 to .3 in. long, linear-lanceolate or spatulate, ciliate, pubescent, enlarged in fruit. *Corolla-tube* .7 to .8 in.

long, narrow, pubescent without, villous within; lobes valvately induplicate-winged, .25 to .4 in. long, lanceolate, prominently veined, villous-hairy within. *Stamens* erect, free, inserted around the ovary-sheath, .75 in. long; filaments thin, anthers ovate, introrse, cells parallel, connective produced above with short divergent lobes. *Ovary* 2-celled, crowned with the oblong bifid stigma which is surrounded by a long-fringed sheath; ovules 1 in each cell, erect. *Fruit* a 2-celled ovate-globose succulent drupe, .3 to .5 in. in diam., depressed above, ribbed, endocarp bony. Lamk. Ill. t. 124, fig. 2; DC. Prod. VII. 505; Hook. f. and Th. in Journ. Linn. Soc. II. 8; Hook. f. Bot. Mag. t. 2732; Blume Bijdr. 730; Miq. Fl. Ind. Bat. II. 580; Kurz in Journ. As. Soc. Beng. XLVI. ii. 212, For. Fl. II. 84; Clarke in Hook. f. Fl. Br. Ind. III. 421; Trimen Fl. Ceyl. III. 54; Cooke Bomb. Flora, II. 69; Benth. Fl. Austr. IV. 86. *S. sericea*, Forst.; DC. l.c. 506; Blume Bijdr. 750; Miq. Fl. Ind. Bat. II. 581. *S. Taceada*, Roxb. Hort. Beng. 15, Fl. Ind. I. 527; DC. l.c. 505; Dalz. and Gibs. Bomb. Fl. 134; Ham. in Trans. Linn. Soc. XVII. 250; Wall. Cat. 1314; Wight Ill. t. 137. *S. Lobelia*, Ham. in Trans. Linn. Soc. XVII. 250; De Vriese Goodenov. 20-26 and in Ned. Kruidk. Arch. II. 20, *not of Linn.* *S. Plumieri*, Blume Bijdr. 730, *not of Vahl.* *S. montana*, Lab. Sert. Austr.-Caled. 41, t. 42; DC. l.c. 506. *S. velutina*, Presl in Rel. Haenck. II. 57; DC. l.c. 506. *S. Bela-Modagam*, Rœm. and Sch. Syst. V. 163; DC. l.c. 505. *S. Leschenaultii*, DC. l.c. 506. *S. macrocalyx*, De Vriese Gooden. 26, tab. 3, figs. 1-4. *S. ehlorantha* and *S. Lambertiana*, De Vriese, l.c. 27, 28. *S. lativaga*, Hance in Walp. Ann. II. 1054. *Lobelia frutescens*, Linn. Fl. Zeyl. 148. *L. Taceada*, Gært. Fruct. I. 119, tab. 25, fig. 5. *L. Plumieri*, Burm. Fl. Ind. 186, *not of Linn.* *Cerbera Salutaris*, Lour. Fl. Cochinch. 136. *Buglossum litoreum*, Rumph. Herb. Amb. IV. 116, t. 54. "Béla-Modagam," Rheede Hort. Mal. IV. t. 59.

PENANG: *Wallich* 1314. MALACCA: *Griffith*. JOHORE: *Jensen*. SINGAPORE: *Sir R. Schomburgk* 82; *G. King*; *G. Thomson*.—DISTRIB. Sea-shores of India from Sind to Ceylon; Burma; Malay Islands and eastwards to Australia and Polynesia.

Order LXIV. CAMPANULACEÆ.

Herbs, undershrubs, rarely shrubs; erect or climbing; often with milky juice. *Leaves* alternate or rarely opposite, entire toothed or rarely lobed, no stipules. *Inflorescence* axillary or terminal; flowers solitary, racemose or paniculate; bracts small; bracteoles none (present in *Sphenoclea*). *Calyx-tube* adnate to the ovary, limb few- or many-

lobed or -partite, lobes usually persistent in fruit, valvate or imbricate in bud. *Corolla* gamopetalous, tubular, rotate or campanulate, superior, sometimes bilabiate; lobes as many as those of the calyx, valvate or induplicate-valvate, sometimes 1, 2, or all free to the base. *Stamens* equal in number to the corolla-lobes and alternate with them; inserted on the epigynous disk or (in *Sphenoclea*) on the corolla-tube; filaments free or connate in a tube; anthers linear, oblong or ovate, free or connate in a tube, 2-celled, the cells parallel, dehiscing longitudinally and introrsely. *Ovary* usually inferior, 2-5- rarely more-celled; placentas axile, many ovuled; style simple, clavate, within the staminal tube; stigma-lobes as many as the ovary-cells; ovules anatropous, erect horizontal or pendulous. *Fruit* capsular or baccate, crowned by the persistent calyx-lobes, dehiscing vertically or laterally, or indehiscent. *Seeds* very many, small, albuminous; testa thin, coriaceous; embryo erect, radicle inferior.—DISTRIB. Over 1,000 species, scattered throughout the globe, chiefly in temperate regions.

Tribe I. LOBELIÆ. Corolla 2-lipped, cleft dorsally to the base; anthers connate.

Fruit a capsule, 2-valved at the summit 1. LOBELIA.

Tribe II. CAMPANULÆ. Corolla regular; anthers free or imperfectly connate.

Flowers solitary, peduncled 2. CAMPANULEA.
 Flowers in a dense scorpioid spike 3. PENTAPHRAGMA.
 Flowers in a dense cylindric spike 4. SPHENOCLEA.

1. LOBELIA, Linn.

Herbs of various sizes, sometimes very small, sometimes erect and very tall; undershrubs or shrubs. *Leaves* alternate, usually toothed. *Inflorescence* either 1-flowered, in the axils of leaves or bracts, or in a terminal leafy raceme; bracteoles very small or none. *Calyx-tube* adnate to the ovary, turbinate, hemispheric, obovoid or rarely oblong-linear; limb 5-partite or 5-fid, lobes often unequal. *Corolla* oblique, 2-lipped; upper lip 2-, lower 3-partite or -lobed. *Staminal tube* free from the corolla or adnate only at the base; anthers with 2 lower tipped with bristles, 3 upper naked, or else all penicillate. *Ovary* inferior, 2-celled; placentas hemispheric; ovules numerous; stigma shortly bifid. *Capsule* loculicidally 2-valved within the calyx-tube. *Seeds* very many, minute, ellipsoid, compressed or trigonous.—DISTRIB. About 200 species, throughout the world, though scarce in Europe and Western Asia.

LOBELIA AFFINIS, Wall. Cat. 1311. A prostrate often rooting herb with much-branched stem, pubescent or glabrate. *Leaves* ovate-

rotundate, acute at apex, rounded or truncate or cordate and more or less decurrent at base, .5 to 2 in. long, .5 to 1.5 in. broad, mucronate-dentate or -crenate, membranous, usually strigosely hairy on the nerves especially beneath, sometimes nearly glabrous; midrib slender, main-nerves 4-6 pairs; petiole .3 to .6 in. long, more or less winged by the decurrent margins of the blade, strigosely hairy. *Flowers* single, on slender pedicels about .6 to 1 in. long; bracts minute; pedicels usually deflexed in fruit. *Calyx-tube* adnate to the ovary, ribbed, strigose, obconical; lobes 5 linear spreading, .1 to .2 in. long, pilose. *Corolla* purple, .2 to .25 in. long, 2 upper lobes falcate-lanceolate, 3 lower connate, teeth short. *Staminal tube* as long as or longer than corolla, anthers all penicillate. *Ovary* 2-celled, style long, stigma bifid, lobes rounded, recurved, ovules many. *Capsule* ribbed, strigose. *Seed* small, ellipsoid trigonous. DC. Prod. VII. 360; Miq. Fl. Ind. Bat. II. 574; Hook. f. and Th. in Journ. Linn. Soc. II. 27; Clarke in Hook. f. Fl. Br. Ind. III. 424; Trimen Fl. Ceyl. III. 57; Prain Beng. Plants I. 633. *L. zeylanica*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 113; Kurz in Journ. As. Soc. Beng. XLVI. ii. 211, *not of Linn.* *L. subvevata*, Miq. Fl. Ind. Bat. II. 574. *L. succulenta* and *L. Heyneana*, Bl. Bijdr. 728.

PENANG: *Ridley* 7162, 10185; *J. Scott*. PERAK: *Ridley* 2902; *Curtis* 2025; *Seortechni* 309, 344; *King's Collector* 2376. SINGAPORE: *Kurz*.—DISTRIB. Eastern Bengal, Burma, Ceylon, Malay Islands, Southern China.

Isotoma longiflora, Presl, is an introduced West Indian plant found in shady places. PENANG: *Deschamps*. SINGAPORE: *Hullett* 29; *Kunstler* 90.

2. CAMPANUMÆA, Blume.

Perennial erect or climbing herbs with tuberous roots. *Leaves* opposite, petiolate, usually cordate. *Flowers* usually large, solitary, peduncled, terminal or axillary on short leafless flowering branches. *Calyx-tube* adnate to the ovary, or below it, persistent, 4- to 6-partite with spreading lobes. *Corolla* broadly campanulate, the base adherent to the calyx-tube, 4- to 6-lobed; white, greenish, or lurid-purple in colour. *Stamens* 4-6, inserted round the base of the corolla-tube; filaments dilated; anthers free. *Ovary* 4-6-celled, placentas thick, many ovuled; style cylindric, stigma 4-6-cleft with short broad lobes. *Fruit* a berry, sub-globose or with truncate top, indehiscent. *Seeds* very many, small, ellipsoid.—DISTRIB. 5-6 species, all of Eastern tropical and sub-tropical and temperate Asia.

CAMPANUMÆA CELEBICA, Blume Bijdr. 727. An erect herb reaching 4 to 5 feet in height, with horizontal spreading smooth branches.

Leaves ovate-lanceolate, acuminate, rounded at base or cuneate, often unequal, 3 in. long, .75 to 1 in. broad, serrate or almost entire, the serratures mucronate; chartaceous; glabrous above, glaucous and glabrous or with scattered pubescence beneath; midrib slender, main-nerves 4-6 pairs at about 30 degrees with the midrib, arching and joining near the margin; petiole short, .15 to .25 in. long. *Flowers* solitary, terminal or in the forks of a dichotomous cyme; peduncles .3 to .5 in. long, those of terminal flowers shorter; bracts small linear. *Calyx-tube* in bud shortly adnate to the ovary, in fruit often half-way up; teeth .2 to .3 in. long, linear-lanceolate, often serrate. *Corolla* epigynous, shortly campanulate, white or yellowish-white, .3 to .5 in. long; lobes 5, triangular acute. *Stamens* .15 in. long; anthers linear, .05 in. long, filaments dilated. *Ovary* 5-6-celled; style thickened upwards, then cylindric, angled; stigma about 4-cleft. *Berry* .3 to .4 in. in diam., globose, white, slightly succulent, becoming nearly dry, breaking up irregularly. *Seeds* very many, minute, ovoid, flattened, testa smooth. A. DC. Monog. Camp. 120, Prod. VII. 423; Clarke in Hook. f. Fl. Br. Ind. III. 436; Prain Beng. Plants I. 634. *C. truncata*, Endl. Gen. Pl. I. 515. *Codonopsis truncata*, Wall. Cat. 1301; DC. l.c. 123; Miq. Fl. Ind. Bat. II. 566. *C. leucocarpa* and *C. celebica*, Miq. l.c. II. 565, 566. *C. albiflora*, Griff. Notul. IV. 279. *Cyclocodon lanceifolium*, Kurz in Flora 303; Journ. As. Soc. Beng. XLVI. 210, partly. *C. truncatum*, Hook. f. and Th. in Journ. Linn. Soc. II. 18. *C. adnatus*, Griff.; Benth. in Gen. Pl. II. 558. *Campanula lanceifolia*, Roxb. Fl. Ind. I. 505; DC l.c. 485.

PENANG: *Curtis* 2089. PERAK: *Wray* 3236; *Seorteehivi*.—DISTRIB. India from the Sikkim Himalaya to Chittagong and Burma, Malay Islands, Southern China.

3. PENTAPHRAGMA, Wall.

Fleshy perennial herbs, with short, often rooting, little-branched stems. *Leaves* alternate, broad, rounded, sometimes very unequal at the base, petioles rather long. *Inflorescence* of axillary or lateral dense bracteate scorpioid spikes or racemes, the flowers generally in pairs between the bracts. *Calyx-tube* adnate to the ovary; lobes 4-5, superior, obtuse, persistent, unequal in size. *Corolla* campanulate, the tube short, lobes 4-5. *Stamens* 5 alternate with the corolla-lobes, epigynous or on the corolla tube; anthers ovate or oblong; filaments dilated, curved outwards when open. *Ovary* 3-5-celled; style short, cylindric; stigma large, cylindric or conical, obscurely 4-5-lobed; placentas bifid, ovules many. *Fruit* a more or less succulent berry, dehiscence unknown (cf. Roxb. Fl. Ind. I. 506). *Seeds* very many,

small, ellipsoid, testa reticulate-rugose.—DISTRIB. About 7 species, all from the Malay Archipelago and Peninsula.

Leaves markedly serrate, very unequal-sided	1. <i>P. begoniæfolium</i> .
Leaves entire or only slightly dentate, nearly or quite equal-sided :—	
Stem short, flower spikes from upper axils, calyx and corolla usually 5-lobed	2. <i>P. Scortechinii</i> .
Stem elongate, flower spikes from lower axils, calyx and corolla usually 4-lobed	3. <i>P. Ridleyi</i> .

1. *PENTAPHRAGMA BEGONIEFOLIUM*, Wall. Cat. 1313. A short-stemmed fleshy herb, with flexuose rooting stems and few branches covered with crispate ferruginous woolly hairs. *Leaves* alternate, ovate, the base obliquely excised on one side, cordate on the other, shortly acuminate at apex, 6 to 10 in. long, 4 to 5 in. broad, coarsely serrate, sparsely crispate-villous; midrib thick, near the excised side, main-nerves 1 on the excised side, 4–5 on the other, the nerves again branching outwards; petiole .3 to 1 in. long, crispate-villous as are the nerves beneath. *Inflorescence* a short, 1 to 4 in. long, scorpioid, shortly peduncled spike, with 2-ranked flowers between ovate membranous bracts .25 in. long, axillary in the uppermost leaves; flowers dull yellow supported by an oblong or spatulate villous bracteole .2 in. long, .1 in. broad. *Calyx-tube* adnate to the ovary, ovoid, crispate villous; lobes 5 obtuse, rounded, recurved, shorter than the tube, crispate villous without, glabrous within. *Corolla* white, campanulate, 5-lobed, the lobes spreading and recurved, marcescent, oblong obtuse glabrous. *Stamens* 5, free, .1 to .125 in. long; anthers oblong, filaments dilated at base. *Ovary* turbinate, 3-celled; ovules many, on axile placentas; style short, stigma cylindrically peltate, obscurely 3-lobed. *Fruit* a berry, dehiscence not known; seeds very many, testa prominently reticulate. DC. Prod. VII. 495; Hook. f. and Th. in Journ. Linn. Soc. II. 26; Miq. Fl. Ind. Bat. II. 568; Kurz in Journ. As. Soc. Beng. XLVI. ii. 210; Clarke in Hook. f. Fl. Br. Ind. III. 437; Baillon Hist. des Plantes, VIII. 323, t. 152–154; Schönl. in Engl. and Pr. Nat. Pflz.—Fam. IV. 5, 60, fig. 37. *Phyteuma begonifolium*, Roxb. Hort. Beng. 85, Fl. Ind. I. 505; Jack in Hook. Bot. Misc. I. 276, t. 57.

PENANG: *Wallieh* 1313; *Maingay* 2266 (K.D. 712); *Stoliczka*; *Deshamps*; *Hullett* 200; *Kunstler* 1598. PERAK: *Scortechinii* 336 (*part*); *Wray* 3668. SINGAPORE: *Lobb*.—DISTRIB. Mergui, *Griffith*. A plant of the undergrowth in dense shady forests. Ridley (Trans. Linn. Soc. III.) (1893, 315) says that it “grows on rocks along the Tahan River, and also far in the woods, in rocky valleys, common.”

2. *PENTAPHRAGMA SCORTECHINII*, n. sp., King & Gamble. A

short-stemmed fleshy herb, creeping and rooting below, afterwards erect; branches flexuose, more or less crispately pilose. *Leaves* alternate, ovate or oblong-ovate, blunt or very shortly acuminate at apex, usually cuneately narrowed below and partly decurrent, sometimes slightly excised on one side; 4 to 10 in. long, 2 to 6 in. broad, entire or faintly dentate, margin often recurved, fleshy, glabrous or slightly rough above, crispately pilose and pale beneath; midrib very thick, sometimes slightly to one side, main-nerves about 4 pair, arched upwards and again branched; petiole thick, 2 to 3 in. long, crispately pilose. *Inflorescence* a short, 1 to 2 in. long, scorpioid, very shortly peduncled spike, with 2-ranked flowers between ovate obtuse bracts, axillary either singly or in pairs from the axils of upper leaves, or lateral below them; flowers white with a yellow centre, bracteole wanting. *Calyx-tube* adnate to the ovary, ovoid, villous without; lobes 5, ovate obtuse, unequal in size, .15 to .2 in. long, 3-nerved. *Corolla* campanulate, tube short; lobes 5 spreading and recurved, marcescent, glabrous. *Stamens* free, .05 to .1 long, recurved; anthers linear; filaments narrowly winged. *Ovary* turbinate, 3-celled; ovules many immersed in fleshy axile placentas; style short, stigma conical, obscurely lobed. *Fruit* a berry, apparently indehiscent; seeds very many, ellipsoid, papillose-reticulate.

PERAK: *Scortechini* 336; *Wray* 352, 389; *King's Collector* 958, 2653. PAHANG: *Ridley*. Dense forest undergrowth in the hills at 2,000–4,000 feet, in moist places.

VAR. *parvifolia*, King & Gamble, a smaller more erect plant, scarcely more than 6 in. high; much less villous, the leaves smaller, oblong, obtuse or slightly acute, 4 in. long and 2 in. broad; the inflorescence shorter and the flowers smaller.

PAHANG, at Salian River: *Ridley*. SINGAPORE, at Bukit Timah: *Ridley*.

VAR. *floeculosa*, King & Gamble, leaves ovate rotundate, thick, younger ones densely clothed beneath with crispate villous felt, margins recurved; the main-nerves rarely more than two pairs, all starting from close to the base. *Inflorescence* short, much curved, usually supported by a pair of rounded reduced leaves. *Corolla-lobes* prominently recurved. *Anthers* oblong, cells often divaricate.

PERAK: *Scortechini*. JOHORE, at Goonong Pulau, 1,800 feet: *G. King*.

This species is a very variable one, and some forms almost run into *P. begoniaefolium*. Owing to the calyx and corolla being persistent and more or less marcescent, they vary much in size in different flowers on the same plant, and it is difficult to find characters for the varieties, one or both of which may eventually prove to be separate species.

3. *PENTAPHRAGMA RIDLEYI*, n. sp., King & Gamble. A fleshy herbaceous plant, 10 to 12 in. in height; stem .25 in. thick, smooth, at first creeping afterwards erect. *Leaves* ovate, equal-sided, bluntly acute at apex, cuneate at base, 6 to 8 in. long, 3.5 to 4.5 in. broad, glabrous on both surfaces, entire or only very minutely dentate on the margin; midrib broad, main-nerves 4-5 pairs nearly straight, slanting upwards; petiole 1 in. long. *Inflorescence* a short, 1 to 1.5 in. long, nearly sessile spike, with 2-ranked flowers between ovate-spathulate usually 3-nerved glabrous pale bracts; each flower with a .15 in. long, linear-spathulate, 1-nerved bractcole, ciliate at tip; flowers small, .2 to .25 in. long, *Calyx-tube* adnate to the ovary; lobes 4-5, equal or unequal in size, usually .1 in. long, 3-nerved, the nerves arching. *Corolla-tube* short, lobes 4-5, linear-oblong, emarginate, recurved, glabrous without, minutely pubescent within, white spotted at base with purple, nerves 3. *Stamens* adnate at base to the corolla-tube, .05 to .07 in. long, anthers club-shaped, filaments dilated below. *Ovary* turbinate, 3-celled; ovules many on axile placentas; stigma rounded, 3-5-lobed, on a very short conical style. *Fruit* a berry, conical at top, apparently indehiscent; seeds rather few and large; testa beautifully reticulate.

SINGAPORE: *Ridley* 103.—In damp ravines at Bukit Timah (Herb. Kew).

4. SPHENOCLEA, Gaertn.

An annual erect glabrous herb, of marshy places. *Leaves* alternate, lanceolate, entire. *Flowers* in dense cylindric terminal or leaf-opposed peduncled spikes; very small, sessile, each with one bract and two bracteoles. *Calyx-tube* adnate to the ovary, turbinate or hemispherical; lobes 5, sub-foliaceous. *Corolla* campanulate, 5-lobed, valvate. *Stamens* 5, inserted on the base of the corolla; filaments shortly dilated; anthers short, free. *Ovary* semi-inferior, 2-celled; placentas axile, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* semi-inferior, depresso-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, minute, oblong. A single species.

SPHENOCLEA ZEYLANICA, Gaertn. Fruct. I. 113, t. 24, fig. 5. An erect annual herb, 1 to 2 feet high. *Leaves* alternate, lanceolate, narrowed at both ends, 2 to 3 in. long, .25 to 1 in. broad, entire, sessile or shortly petioled, smooth, midrib and main-nerves faint. *Flowers* in dense, cylindric, terminal or leaf-opposed, peduncled spikes; peduncles .5 to 1 in. long; spikes .5 to 1.5 in., bract and bracteoles very small. *Calyx-tube* adnate to the ovary, turbinate or hemispherical, lobes 5, ovate, .05 to .06 in. long, somewhat enlarged in fruit and inflexed over

the disk. *Corolla* campanulate, 5-lobed, .07 to .1 in. long, greenish-white, lobes short, rounded. *Stamens* 5, inserted at the base of the corolla-tube; filaments short dilated; anthers 2-celled, rounded, about as long as filaments. *Ovary* semi-inferior, 2-celled; placentas axile, stalked, bearing many ovules; style short, stigma obscurely 2-lobed. *Capsule* depressed-globose, circumsciss at the margin of the calyx-tube, the crown and calyx-lobes deciduous. *Seeds* very numerous, oblong, minute, scabrous; testa reticulate with rectangular cells. Wall. Cat. 1516; Roxb. Fl. Ind. I. 507, Fl. Ind. ed. Carey and Wall. II. 116; Miq. Fl. Ind. Bat. II. 569; Kurz in Journ. As. Soc. Beng. XLVI. ii. 209; Clarke in Hook. f. Fl. Br. Ind. III. 438; Trimen Fl. Ceyl. III. 519; Baillon Hist. des Plantes, VIII. 327, t. 158-161; Cooke Bomb. Flora, II. 75; Prain Beng. Plants I. 635; Schönl. in Engl. and Pr. Pflz—Fam. IV. 5, 61, fig. 38. *S. Pongatium*, A. DC. Prod. VII. 548; Wight Ill. t. 138. *Pongatium indicum*, Lamk. Ill. II. 444; Encyc. Meth. Bot. V. 564. *Gaertnera Pangati*, Retz Obs. VI. 24. *Rapinia herbacea*, Lour. Fl. Cochinch. (ed. Willd.) I. 157. *Sphenoclea*, Griff. Notul. IV. 276. "Pongati," Rheede Hort. Mal. XI. 47, t. 24.

MALACCA: *Griffith.*—DISTRIB. Swampy places and wet fields, and along river banks in tropical regions of both hemispheres.

Order LXV. VACCINIACEÆ.

Shrubs or small trees, often epiphytic, with stems swollen at the base. *Leaves* alternate or in pseudo-whorls, entire dentate or serrate, evergreen, ex-stipulate. *Flowers* in terminal or axillary racemes, or solitary and axillary, hermaphrodite, usually regular; pedicels 1-bracteate and also often with 2 bracteoles, often articulate beneath the ovary. *Calyx* campanulate or cupular, the tube adherent to the ovary, its limb persistent on the fruit, usually 5-toothed. *Corolla* tubular (sometimes inflated), campanulate or globose, 5-toothed or 5-lobed, usually imbricate, deciduous. *Stamens* 10, epigynous, inserted at the base of the corolla-tube; anthers opening by apical pores, or often produced into 2 tubes, opening by slits, filaments flattened, free or connate by their bases. *Ovary* inferior, crowned by an epigynous disk, 5-celled or falsely 10-celled; style cylindric; stigma simple; ovules many (rarely few), the placentas axile or pendulous from the upper inner angle of each cell. *Fruit* baccate, rarely dry, 5- or falsely 10-celled. *Seeds* numerous or few (rarely only 1) in each cell, small, compressed, albuminous. Species about 350, natives chiefly of cold and temperate regions throughout the world.

Corolla long and tubular or campanulate, with long segments :—

Calyx-tube terete	..	..	..	..	1. AGAPETES.
Calyx-tube 5-winged or 5-angled	..	..	..	..	2. PENTAPTERYGIUM.
Corolla small, campanulate or ovoid, its lobes short	..	..	..	..	3. VACCINIUM.

1. AGAPETES, D. DON.

Shrubs, often epiphytic, the stems often much swollen near the base. *Leaves* usually coriaceous, alternate, sometimes in pseudo-whorls, from linear to elliptic, entire or toothed, sessile or with short petioles, often glandular near the base. *Flowers* axillary, solitary, corymbose or in fascicles; the pedicel often thickened or articulate under the ovary, bracts small. *Calyx* globose, the limb with 5 persistent teeth or lobes. *Corolla* tubular or campanulate, the limb with short or long lobes, red, but often with transverse marks or with greenish-white lobes. *Stamens* 10, usually with short filaments; *anthers* oblong, each with 2 long apical processes, opening by pores or slits, often spurred behind. *Disk* pulvinate, often lobed. *Ovary* 5-celled or falsely 10-celled; style cylindrical; stigma capitate; ovules numerous. *Berry* globose, nearly dry or succulent, 5- or 10-celled, sometimes opening by pores round the disk within the calyx-teeth. *Seeds* numerous, ellipsoid, testa lax.—DISTRIB. 30 species, mostly Himalayan, a few Malayan.

AGAPETES GRIFFITHII, Clarke in Hook. f. Fl. Br. Ind. III. 449. An epiphytic shrub, 3 to 15 feet long, with a tuberous stem; young branches half as thick as a goose-quill, terete, glabrous. *Leaves* thinly coriaceous, oblong-lanceolate to ovate-lanceolate, always caudate-acuminate, the base rounded, both surfaces pale olivaceous-brown when dry, glabrous, minutely reticulate; main-nerves 5 or 6 pairs, curved, ascending, faint on both surfaces; length 3·5 to 6 in.; breadth 1 in. to 2·65 in.; petiole ·15 in. long or under. *Flowers* ·3 to ·4 in. long, axillary, always on slender pedicels four or five times as long as themselves, with 1 or 2 narrow bracteoles near the base, glabrous, axillary, solitary, in pairs or in lax racemes. *Calyx* ·1 to ·2 in. long (enlarging in fruit), campanulate, with 5 deep spreading triangular lobes. *Corolla* ·25 in. long, tubular-campanulate, the mouth with 5 triangular sub-erect acute lobes. *Anthers* inserted at the base of the corolla-tube, linear, with 2 long apical beaks dehiscing longitudinally, and 2 posteriorly-projecting curved spurs; filaments shorter than the anthers, hairy. *Fruit* globular, glabrous, crowned by the small inflexed calyx-lobes. *Seeds* about 20, compressed, tubercled, black.

MALACCA: Griffith. PERAK: at elevations of 2,800 to 4,000 feet, Wray 1071; King's Collector 3831, 6363, 8051; Ridley 5532; Seortechini.

2. PENTAPTERYGIUM, Klotsch.

Shrubs, often epiphytic and with stems much thickened at the base. *Leaves* alternate, ovate or lanceolate, sub-entire or toothed, coriaceous, often with glands at the apex of the petiole. *Flowers* axillary, solitary, fascicled or corymbose; the pedicels thickened near the apex, cupular and jointed under the ovary, bracts small. *Calyx-tube* large, tubular, with 5 wings or prominent angles; its lobes 5, enlarged in fruit. *Corolla* tubular, the mouth with 5 short lobes, coloured red or yellow, and often transversely marked. *Stamens* 10, epigynous, the filaments short; anthers elliptic, produced into 2 long beaks, opening by apical pores or slits, and often spurred behind. *Ovary* 5-celled or spuriously 10-celled; style cylindric, often exserted; stigma sub-capitate; ovules very numerous. *Fruit* baccate, 5-winged or 5-ribbed, 5-celled or spuriously 10-celled. *Seeds* numerous, ellipsoid. —DISTRIB. About 6 species, natives of Eastern Himalaya, Khasia, Malay Peninsula.

PENTAPTERYGIUM SCORTECHINII, n. sp., King & Gamble. A sarmentose shrub, 4 to 10 feet long, growing on rocks or trees; young branches somewhat thinner than a goose-quill, terete, glabrous, pale brown when dry. *Leaves* thickly coriaceous, ovate to ovate-rotund, the apex blunt or sub-acute, the base broad and rounded but sometimes slightly emarginate, the edges much recurved when dry; upper surface shining, glabrous, pale olivaceous-brown; the lower darker; midrib strong, deeply depressed on the upper surface, prominent on the lower; main-nerves about 4 pairs, spreading, the two lower much the larger, all curved, mostly depressed on the upper surface and prominent on the lower; length 1.75 to 3 in.; breadth .8 to 2 in.; petioles .25 to 4 in. *Flowers* 1 in. long, few together, in axillary or terminal corymbs; their pedicels about .6 in. long, with 1 or more linear bracts at the base. *Calyx* inflated, tubular, narrowed towards the mouth, glabrous, lobes of the mouth triangular, acute, erect, the lower half of the tube attached to the ovary. *Corolla* inserted on the concave disk of the ovary, slightly exserted from the calyx, tubular, inflated towards the middle; lobes of the mouth short, lanceolate, reflexed; tube with rufous pubescence outside, glabrous within; style cylindric, glabrous, slightly exserted. *Fruit* unknown.

PERAK, at elevations of about 4,500 feet: *King's Collector* 8152; *Wray* 210; *Seorteehini* 309.

3. VACCINIUM, Linn.

Shrubs, sometimes epiphytic. *Leaves* usually small, alternate, but sometimes in pseudo-whorls, from lanceolate to ovate, entire or serrate.

Flowers usually small, axillary or terminal, in racemes fascicles or corymbs rarely solitary, usually bracteate and bracteolate. *Calyx-tube* globose, its teeth 4 or 5, small. *Corolla* urceolate, tubular or ovoid, 5-lobed, pink white or greenish-yellow. *Stamens* 8 or 10, free, inserted near the base of the corolla-tube; anthers oblong, with two apical cylindrical tubes dehiscing by terminal slits, sometimes appendiculate at the base (apical tubes very short in one or two species). *Disk* cushion-shaped, convex, sometimes lobed. *Ovary* 4- or 5-celled, or falsely 8-10-celled; style cylindrical; stigma simple; ovules few or several in each cell. *Fruit* a more or less globose berry, crowned by the persistent calyx-lobes, 5-celled or falsely 10-celled. *Seeds* small, 1 or more in each cell, ellipsoid, compressed; testa firm, smooth.—**DISTRIB.** Species about 140, in the Northern Hemisphere or on mountain ranges in the tropics.

Leaves broadly elliptic, ovate-rotund or oblanceolate, the apex broad, sometimes minutely apiculate but never acute, very coriaceous :—

- | | |
|--|----------------------------|
| Leaves under .75 in. in length, elliptic or obovate-elliptic; corolla .3 in. long, tapering to the mouth; a small glabrous tree or bush | 1. <i>V. Scortechinii.</i> |
| Leaves under 1 in. in length, ovate or elliptic; corolla .2 to .25 in. long, the mouth wide, truncate; an epiphytic shrub, glabrous except the scurfy branches | 2. <i>V. microphylla.</i> |
| Leaves elliptic, their apices sub-obtuse, the base truncate or minutely cordate, 1 to 1.35 in. long; flowers enveloped in large deciduous bracts | 3. <i>V. glabrescens.</i> |
| Leaves broadly oblanceolate or spatulate, much narrowed to the base | 4. <i>V. viscifolium.</i> |
| Leaves obovate-elliptic, slightly narrowed to the apex but never acuminate, coriaceous; flowers .35 in. long, in axillary racemes | 5. <i>V. Teysmanni.</i> |
- Leaves elliptic to elliptic-oblong, sub-acute acute or acuminate :—

Leaves entire :—

Leaves glabrous :—

Leaves coriaceous :—

- | | |
|---|-------------------------|
| Leaves with 4 or 5 pairs of main-nerves; flowers .2 in. long, in axillary and terminal racemes; mouth of corolla entire or obscurely toothed; a shrub or small tree; anthers with short broad beaks | 6. <i>V. bancanum.</i> |
| Leaves with 3 pairs of main-nerves; corolla .2 in. long; its mouth with 5 short, broad, recurved lobes; beaks of anthers truncate, shorter than the cells, epiphytic | 7. <i>V. Kunstleri.</i> |
| Leaves sub-coriaceous, their main-nerves 3 pairs; flowers .35 in. long; beaks of anthers more than twice as long as the cells; epiphytic | 8. <i>V. Hasseltii.</i> |

Leaves pubescent or puberulous beneath :—

- Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate, with very long caudate acuminate apices; under surface pubescent or puberulous 9. *V. acuminatissimum*.
 Leaves serrate (sometimes faintly so) sub-coriaceous, glabrous; flowers .3 in. long; beaks of anthers twice as long as the cells 10. *V. malaccense*.

1. *VACCINIUM SCORTECHNII*, n. sp., King & Gamble. A small tree or large shrub; young branches rather thicker than a crow-quill, dark and much angled when dry, glabrous. *Leaves* small, coriaceous, elliptic or obovate-elliptic, the apex rounded, the base slightly cuneate, the edges much recurved; upper surface olivaceous-brown, shining when dry; the lower brown, dull, faintly reticulate; sparsely scaly; main-nerves a single pair, rarely 2 pairs, curving upwards, converging at their apices, faint on both surfaces; the midrib depressed on the upper surface, prominent on the lower; length .3 to .45 in.; breadth .25 to .35 in.; petiole very short. *Flowers* about .35 in. long, solitary, axillary, their pedicels less than .1 in. long, minutely bracteate at the base, pubescent like the outside of the calyx and corolla. *Calyx* campanulate, the 5 teeth triangular, acute, erect. *Corolla* about .3 in. long, cylindric, inflated below and tapering to the mouth; the lobes short, broad, blunt, erect or reflexed. *Stamens* 10, each with 2 apical truncate beaks shorter than themselves, but no basal processes; filaments longer than the anthers, hairy. *Ovary* with a flat top, 5-celled, each cell with several ovules. *Style* cylindric, nearly as long as the corolla, pubescent in its lower third, otherwise glabrous. *Fruit* globular, crowned by the inflexed calyx-lobes, tomentose, many-seeded; seeds not compressed.

PERAK: *Scortechini*; *Wray*, at elevations of 6,000 and 6,700 feet, 888 and 356; *King's Collector* 8028.

By the fall of the leaves, in the axils of which they are produced, the flowers appear as if they were in racemes. This closely resembles *V. buxifolium* and *V. coriaceum*, Hook. fil., of which figures are given in Hook. Ic. Pl. t. 891 and 892, but this has much narrower flowers and broader leaves than either.

2. *VACCINIUM MICROPHYLLUM*, Blume Bijdr. 851. Epiphytic on tall trees; a small much-branched shrub; young branches as thick as a crow-quill, with small black deciduous scurf. *Leaves* coriaceous, ovate or elliptic, the apex and base blunt, the former sometimes with a minute apiculus; upper surface bright olivaceous and shining when dry, the lower pale-brown and dull, both faintly reticulate when dry; main-nerves usually a single pair, curving upwards from the base of the midrib and passing to near the apex a little inside the edges, depressed like the midrib on the upper surface when dry, but very faint on the lower;

length .5 to .75 in.; breadth .3 to .5 in.; petioles about .05 in. long, hairy. *Flowers* .2 to .25 in. long, axillary, usually solitary, decurved; pedicels .05 in. long, or less. *Calyx* inferior, about .2 in. across, flat, deeply divided into 5 broadly triangular, sub-acute, spreading lobes. *Corolla* glabrous, widely cylindric-campanulate, deeply cut into 5 broadly triangular acute or sub-acute erect lobes. *Stamens* 10, from the base of the corolla; anthers oblong, each with an apical process shorter than itself but with no basal appendage; filaments shorter than the anthers, curved, expanded at the base. *Ovary* superior, broad with flat apex. *Style* cylindric, as long as the corolla; stigma capitate; ovules few in each cell. *Fruit* globular, surrounded by and adherent to the calyx, .2 in. in diam. Miq. Fl. Ind. Bat. II. 1063. *Diplycosia microphylla*, Beccari, Malesia 212; Clarke in Hook. f. Fl. Br. Ind. III. 458.

MALACCA: *Griffith* (K.D.) 3484; *Maingay* (K.D.) 700; *Lobb*. PERAK, at elevations of 3,000 feet: *Wray* 470, 1105; *Scortechini* 1171; *King's Collector* 3660, 6390. KEDAH: *Ridley* 5528, 5529.—DISTRIB. Borneo, Celebes, Ternate.

3. *VACCINIUM GLABRESCENS*, n. sp., King & Gamble. Epiphytic; young branches rather thicker than a crow-quill, dark-coloured when dry, minutely pubescent. *Leaves* coriaceous, elliptic, the apex sub-obtuse, the base sub-truncate and minutely cordate; upper surface dark olivaceous-brown when dry, reticulate, smooth, shining; lower surface brown when dry, minutely pubescent like the petiole (glabrescent when old); main-nerves 3 or 4 pairs, pinnate, ascending, rather straight; length 1 to 1.35 in.; breadth .6 to 1 in.; petiole under .1 in. long. *Racemes* solitary, terminal, 3 or 4 times longer than the leaves, bearing at the base of each flower a large lanceolate pubescent deciduous bract .4 in. long and about .2 in. broad at the middle. *Fruit* sub-rotund or ellipsoid, baccate, softly and minutely pubescent, crowned by the inflexed triangular calyx-teeth, .2 in. long and .15 in. in diam., 5-celled, each cell with several angled seeds.

PERAK: *Scortechini* (without number).

4. *VACCINIUM VISCIFOLIUM*, n. sp., King & Gamble. Young branches half as thick as a goose-quill, striate and pale-brown when dry. *Leaves* very coriaceous, broadly oblanceolate or spatulate, the apex very blunt, narrowed from below the middle to the short flattened petiole, the edges slightly recurved; upper surface olivaceous when dry, the lower bright brown, both glabrous; main-nerves 2 or 3 pairs, originating from the midrib near its base, ascending, little curved, very prominent like the midrib on the upper surface but faint on the lower; length 2 to 2.75 in.; breadth .8 to 1.25 in.; petioles about .1 in. *Racemes* terminal and axillary, often forming, from the fall of the leaves, pseudo-

panicles several times longer than the leaves. *Flowers* not seen. *Fruit* on curved deflexed peduncles, .5 in. in length, globular, baccate, .2 in. in diam., crowned by the persistent disk and by the 5 minute triangular calyx-teeth, 10-celled, the cells with more than one small angled seed.

PERAK: *Scortechini* 405; *Wray*, at an elevation of 6,700 feet, 328.

VAR. *minor*, King & Gamble. Leaves only 1.2 to 1.6 in. in length, their 3 or 4 pairs of nerves not so much from the base of the midrib; racemes not much longer than the leaves; fruit only .15 in. in diam.; pedicels under .2 in. long.

PERAK, at elevations of 5,000 feet: *Scortechini* 404; *King's Collector* 8020.

5. VACCINIUM TEYSMANNI, Miq. Fl. Ind. Bat. II. 1062. A medium-sized tree; young branches somewhat thinner than a goose-quill, dark-coloured and striate when dry. *Leaves* coriaceous, broadly obovate, often almost rotund-obovate or elliptic, rarely oblanceolate, the apex obtuse or rounded, rarely retuse or sub-acute, the base cuneate and merging in the broad, sometimes glandular petiole; both surfaces glabrous and faintly reticulate, upper olivaceous when dry, shining, the lower dark-brown, the midrib broad on both; main-nerves 4 to 6 pairs, curving upwards and anastomosing freely, more prominent on the upper than on the lower surface; length 2.5 to 3.5 in.; breadth 1.25 to 2.25 in.; petiole .2 to .4 in. long. *Racemes* slender, often longer than the leaves, axillary and extra-axillary, their rachises somewhat compressed and angled, often puberulous; pedicels slender, curved, minutely bracteolate or ebracteolate at the base, .15 to .2 in. long. *Flowers* .35 in. long; their pedicels .15 in. long, decurved or not, puberulous like the outside of the calyx. *Calyx* less than .1 in. long, campanulate, with 5 acutely triangular spreading teeth. *Corolla* white, puberulous, narrowly cylindric, tapering slightly to the mouth; lobes 5, very short, spreading or reflexed. *Stamens* 8 or 10, included or sub-exserted; anthers narrowly oblong, with 2 long apical spurs, but without basal appendages, shorter than the tapering hairy filaments. *Ovary* hemispheric, deeply grooved; style as long as the corolla, grooved; stigmas 5, very short, linear. *Capsule* unknown.

PERAK: On Gunong Bubu, at elevations of 4,500 feet, *Scortechini* 428, 443; *Wray* 1117, 3909; *Curtis* 3703.—DISTRIB. Java.

6. VACCINIUM BANCANUM, Miq. Fl. Ind. Bat. Suppl. 587. A small tree; young branches twice as thick as a crow-quill, deciduously puberulous, pale and angled when dry. *Leaves* coriaceous, elliptic to elliptic-oblong, the apex sub-acute acute or acuminate, the base

cuneate; both surfaces yellowish-brown when dry and rather dull, the lower reticulate; the edges slightly recurved or not; main-nerves 4 or 5 pairs, ascending, slightly curved, faint on both surfaces; length 1 to 2·5 in.; breadth ·5 to ·8 in.; petioles ·1 in. long. *Racemes* axillary and terminal, twice as long as the leaves, their rachises puberulous, angled when dry. *Flowers* ·2 in. long; their pedicels slender, decurved, ·1 to ·2 in. long, puberulous, minutely bracteolate at the base. *Calyx* puberulous, cupular, ·15 in. across, deeply divided into 5 triangular sub-acute spreading lobes. *Corolla* ovoid or ovoid-globulose, with truncate, wide, entire, wavy or obscurely toothed mouth, puberulous outside. *Stamens* 10, shorter than the corolla and inserted at its base; anthers short, broad, with 2 short, trumpet-shaped, curved apical processes, opening by wide pores, and, at the base of these processes behind, 2 curved, slender filamentous spurs; the filaments longer than the anthers, flattened, tapering from the base upwards, pubescent. *Ovary* depressed, bearing a slightly convex 10-grooved disk and many hairs. *Fruit* ·2 to ·25 in. in diam., depressed-globular, crowned by the inflexed calyx-lobes, minutely pubescent, 5-celled; seeds numerous, triangular, reticulate, shining. Clarke in Hook. f. Fl. Br. Ind. III. 454. *V. exaristatum*, Kurz in Journ. As. Soc. Beng., 1873, Pt. II. 96; 1877, Pt. II. 215; For. Fl. Burm. II. 91.

PERAK, at elevations of from 5,000 to 6,500 feet: *Wray* 328, 1528, 3912; *King's Collector* 7018. MALACCA: Mount Ophir, *Moxon*; *Maingay* (K.D.) 699.—DISTRIB. Bangka.

7. *VACCINIUM KUNSTLERI*, n. sp., King & Gamble. Epiphytic; everywhere glabrous; young branches one-third of the thickness of a goose-quill, dark and striate when dry. *Leaves* coriaceous, lanceolate or narrowly elliptic, the apex acuminate, the base much narrowed, the edges slightly recurved; both surfaces brown when dry, the upper tinged with olivaceous and reticulate; main-nerves 3 pairs, ascending, little curved, slightly prominent on the upper surface only; length 2 to 2·5 in.; breadth ·5 to ·65 in.; petioles ·1 to ·15 in. long. *Racemes* about as long as the leaves, axillary, minutely bracteolate at the base of the flowers. *Flowers* ·2 in. long, their puberulous pedicels slender, ·1 to ·15 in. long. *Calyx* cupular-campanulate, about ·05 in. long, the limb spreading, wavy, with indistinct broad lobes. *Corolla* tubular-ovoid, ·15 to ·2 in. long, the mouth with 5 broad, blunt, short recurved lobes. *Stamens* 10, slightly shorter than the corolla or as long; anthers small, oblong, each with 2 short, diverging, apical truncate processes, but with none at the base; filaments three times as long as the anthers, tapering, flattened and hairy below, cylindrical above. *Ovary* 5-celled, with several ovules in each cell, depressed; disk slightly convex with radiating

grooves; style slightly exerted, hairy below; stigma small. *Fruit* globular, .2 in. in diam.

PERAK, on Maxwell's Hill, elevation 3,500 feet: *Scortechini* 39, 428; *King's Collector* 8415.

This closely resembles *V. bancanum*, Miq., but it is an epiphyte. Its leaves, moreover, are narrowly elliptic or lanceolate, and they have only 3 pairs of main-nerves. The flowers of this are puberulous, and the mouth of the corolla, instead of being entire, has 5 broad, short, recurved lobes. The apical processes on the anthers are also of a different shape from those in *V. bancanum*.

8. *VACCINIUM HASSELTII*, Miq. Ann. Mus. Lugd. Bat. I. 40. An erect shrub; young branches twice as thick as a crow-quill, dark-coloured and angled when dry, glabrous. *Leaves* elliptic to elliptic-oblong, thinly coriaceous, glabrous, the apex acuminate (often caudately so); upper surface olivaceous-brown, the lower paler; main-nerves 3 pairs, very slightly curved and erect or ascending, the lower pairs passing almost to the apex, faint but distinct on both surfaces, some of the nerves transverse, the others vertical; length 1.5 to 2.5 in.; breadth .6 to 1.25 in.; petioles .2 to .25 in. long, slender. *Racemes* axillary and terminal, usually slightly longer than the leaves, their rachises at first puberulous but ultimately glabrous, ebracteolate; flower-pedicels slender, curved or straight, about .15 in. long. *Calyx* shortly cupular, with 5 spreading, broad, sub-acute or blunt teeth. *Corolla* about .35 in. long, sub-cylindric, narrowing upwards to the mouth; the lobes 5, broad, blunt, erect or reflexed, very short, each bearing a small tuft of hairs. *Stamens* 10, as long as the corolla; anthers oblong, with 2 apical beaks more than twice as long as themselves but with no basal appendages; the filaments shorter than the beaks but longer than the anther-cells, broad and hairy at the base. *Ovary* much compressed, surmounted by a large, much corrugated disk; style as long as the corolla, tapering, boldly ridged. *Fruit* globular, smooth, glabrous, .3 in. in diam., crowned by the minute calyx-lobes. *V. bancanum*, Miq., var. *angustifolium*, Scheff.

PERAK: *King's Collector* 7515; *Derry* 3702; *Wray* 4012. PAHANG: *Ridley* 1363, 10895. JOHORE: *Ridley* 6316, 6323. SINGAPORE: *Ridley* 3030, 6316A, 8907.—DISTRIB. Bangka.

9. *VACCINIUM ACUMINATISSIMUM*, Miq. Ann. Mus. Lugd. Bat. I. 36. Epiphytic shrub, 3 to 8 feet long; young branches half as thick as a goose-quill or less, clothed with short cinereous pubescence. *Leaves* coriaceous, oblong-lanceolate to elliptic-lanceolate, the apex caudate-acuminate, the base cuneate, the edges when dry much recurved; both surfaces dark olivaceous-brown when dry: the upper

shining, faintly and minutely reticulate, glabrous except the puberulous midrib, lower surface dull, dark cinereous-puberulous, especially on the midrib and nerves; main-nerves 4 or 5 pairs, unequal, slightly curved, ascending, the second lowest pair much larger than the others and more erect, all (like the midrib) depressed on the upper surface and bold and prominent on the lower; length 3·5 to 5 in.; breadth 1 in. to 1·75 in.; petioles ·15 in. long, pubescent and with several short hispid axillary processes at their bases. *Racemes* axillary, shorter than the leaves, slender, pubescent; flower-pedicels ·1 in. long, pubescent like the calyx, minutely bracteate at the base. *Calyx* when nearly ripe ·15 in. in diam., with an ovoid-globular tube pubescent outside, the mouth with 5 triangular acute incurved lobes. *Corolla* not seen. *Seeds* several, compressed, black, pitted. *Eriaceae*, Wall. Cat. 7528.

PERAK, at elevations of from 5,000 to 6,000 feet: *Wray* 1159, 1418, 2821; *Scortechini* 472; *King's Collector* 3509, 6734, 7810. SINGAPORE: *Ridley* 6235.—DISTRIB. Sumatra (*Beccari* 516), Java, Borneo.

10. VACCINIUM MALACCENSE, Wight in Calc. Journ. Nat. Hist VIII. (1847) 172. An erect shrub; all parts except the inflorescence glabrous; young branches as thick as a crow-quill, angled, brown when dry. *Leaves* coriaceous, lanceolate or elliptic, the apex acuminate, the base cuneate or acuminate, the edges finely crenate-serrate; both surfaces brown when dry, the lower the paler; main-nerves 4 or 5 pairs, slightly curved, ascending, interarching within the edge, not prominent on either surface; length 1 to 2·25 in.; breadth ·6 to ·9 in.; petioles ·1 to ·15 in. long. *Racemes* axillary and terminal, longer than the leaves, many-flowered, puberulous like the pedicels and flowers; pedicels slender, curved downwards, ·15 in. long (lengthening in fruit), each with 1 concave, lanceolate, caducous bract at its base, and 1 or 2 smaller subulate bracteoles inside it. *Flowers* ·3 in. long. *Calyx* campanulate, under ·1 in. long, its lobes narrowly triangular, acuminate, spreading. *Corolla* ovoid-cylindric, slightly narrowed to the mouth; lobes of limb very short, reflexed. *Stamens* 10, shorter than the corolla; anthers with 2 apical beaks longer than themselves but with no basal processes; filaments longer than the anthers, bulbous and hairy at the base. *Ovary* depressed, the disk thick; style cylindric, ridged, a little shorter than the corolla. *Fruit* depressed-globose, glabrous, ·35 in. broad. Wight Ic. 1186; Miq. Fl. Ind. Bat. Suppl. 587; Clarke in Hook. f. Fl. Br. Ind. III. 454. *Epigynium malaccense*, Klotzsch in Linnæa, XXIV. 50.

MALACCA: *Griffith* (K.D.) 3458/1; *Maingay* (K.D.) 698; *Lobb*. SINGAPORE: *Ridley*. PAHANG: *Ridley* 1025. PERAK: *Ridley* 3605.—DISTRIB. Bangka, Java, Cochin-China.

Order LXVI. ERICACEÆ.

Shrubs, trees, or perennial herbs. *Leaves* alternate or in pseudo-whorls, ex-stipulate, entire or serrate. *Flowers* in racemes or fascicles or solitary; pedicels bracteate and sometimes bi-bracteolate. *Flowers* regular or (in *Rhododendron*) slightly irregular, hermaphrodite, sometimes dimorphous. *Calyx* free or (in *Diplycosia*) sometimes adnate to the ovary, with 5 rarely 4 or 6, teeth or lobes. *Corolla* hypogynous, persistent or deciduous, campanulate cylindric or urceolate, with 4 or 5 (rarely 6 to 10) imbricate or contorted, rarely valvate teeth or lobes (polypetalous in *Pyrola*). *Stamens* hypogynous or slightly attached to the base of the corolla; 10, or sometimes 5, 8, or 20 (in *Diplycosia* sometimes epigynous); filaments free or united into a tube by their bases; anthers 2-celled, basi- or dorsi-fixed, dehiscing by apical pores or slits, the cells often prolonged into apical tubes, sometimes dorsally spurred. *Disk* various, annular or convex, crenate or lobed, sometimes absent. *Ovary* 5-celled (rarely 4- to 16-celled); style slender, cylindric; stigma capitate or plane, entire or shortly lobed. *Ovules* numerous, rarely few, on placentas in the inner angles of the cells or pendulous from the upper corner. *Fruit* capsular, 5-celled, many-seeded, sometimes appearing baccate from the adherence of the enlarged succulent calyx. *Seeds* many, small, angled or compressed, albuminous; the testa often loose.—DISTRIB. About 1,200, in all parts of the world.

Fruit capsular:—

Capsule 5-valved, loculicidal:—

Calyx surrounding the capsule succulent in fruit:—

 Anthers with 2 horns at the apex 1. GAULTHERIA.

 Anthers not horned on the apex 2. DIPLYCOSIA.

 Calyx not succulent in fruit 3. PIERIS.

Capsule 5- to 20-celled, septicidal, calyx not succulent in fruit;

 anthers dehiscing by pores 4. RHODODENDRON.

Fruit baccate 5. PERNETTIOPSIS.

1. GAULTHERIA, Linn.

Erect or procumbent shrubs, rarely epiphytic. *Leaves* coriaceous, persistent, alternate, serrate or serrulate, penni-nerved. *Flowers* small, occasionally dimorphic, in axillary or terminal racemes, or axillary and solitary, bracteate and bi-bracteolate. *Calyx* with 5 teeth or lobes, enlarged, succulent and coloured in fruit and enclosing the capsule, and often with 2 simple or connate bracteoles at its base. *Corolla* ovoid-

tubular or campanulate, greenish-white or reddish, the mouth with 5 spreading or recurved imbricate lobes. *Stamens* 10, included, attached to the base of the corolla; anthers produced at the apex into 2 tubes, and often also with 1 or 2 dorsal spurs; filaments dilated at the base, usually pilose (in some flowers the stamens small and the anthers without appendages). *Ovary* 5-celled, sometimes 5-lobed; style cylindrical; stigma simple; ovules many in each cell. *Capsule* 5-celled, dehiscent loculicidally from the apex, enveloped in the succulent calyx; seeds many, minute, sub-globose, angled.—**DISTRIB.** Species about 80, mostly American, a few in the mountains of India and Malaya, a few also in Australia and New Zealand.

Leaves elliptic or oblong-elliptic, sub-acute 1. *G. fragrantissima*.
 Leaves broadly ovate, caudate-acuminate 2. *G. leucocarpa*.

1. **GAULTHERIA FRAGRANTISSIMA**, Wall. in As. Research. XIII. 397, *with figure*. A shrub; young branches twice as thick as a crow-quill, 3-angled, glabrous, pale brown when dry. *Leaves* thickly coriaceous, elliptic or oblong-elliptic, sub-acute, the base cuneate, the edges crenate-serrate; both surfaces pale brown when dry and dull, strongly reticulate, the upper always glabrous, the lower with sparse black scales and occasionally a few scattered hairs; length 1·5 to 2·25 in.; breadth ·75 to 1·2 in.; petioles ·15 to ·2 in. *Racemes* axillary, usually longer than the leaves, slender, many-flowered; pedicels ·15 in. long, deflexed, each with a small triangular acute bract at its base and two broader connate ones above its middle. *Flowers* ·2 in. long. *Calyx* campanulate, with 5 deep triangular lobes, puberulous, ·05 in. long or less at first, persistent and increasing to ·2 in. with age. *Corolla* ·15 in. long, widely tubular, the mouth contracted and with 5 short blunt lobes. *Stamens* 10; anthers elongate, included, the apex with 2 deeply bifid apical horns; filaments flattened at the base. *Fruit* depressed-globular, with 5 deep grooves, ·15 in. in diam., minutely pubescent, crowned by the long, persistent, slightly clavate, cylindrical style, many-seeded. DC. Prod. VII. 593; Wall. Cat. 765; Wight Ic. 1196; Bot. Mag. t. 5984; Clarke in Hook. f. Fl. Br. Ind. III. 457. *G. fragrans*, Don Prod. 151. *G. punctata*, Blume Bijdr. 850; DC. l.c. 593; Miq. Fl. Ind. Bat. II. 1055; Kurz in Journ. As. Soc. Beng., 1877, II. 215, For. Fl. Burm. II. 92. *G. ovalifolia*, Wall. Cat. 1523. *G. Lesehenaultii*, DC. l.c. 593; Wight Ill. t. 141c, and Ic. 1195. *Andromeda flexuosa*, Moon Cat. Pl. Ceyl. 35. *A. katagherensis*, Hook. Ic. Pl. t. 246. *Leuothoc* (?) *katagherensis*, DC. l.c. 606.

PERAK, on the summit of Gunong Batu Pateh: Wray 879, 1580; *Scortechini* 405 (*in part*).—**DISTRIB.** British India, Ceylon, Sumatra, Java.

2. GAULTHERIA LEUCOCARPA, Blume Bijdr. 856. A slender climber; young branches as thick as a crow-quill, smooth, glabrous, pale-brown when dry. *Leaves* thinly coriaceous, broadly ovate, shortly rather abruptly and sharply caudate-acuminate, the base broad, emarginate or sub-cordate; edges minutely crenate-serrate; upper surface olivaceous-brown when dry, much and boldly reticulate, the nerves minutely hairy; lower surface pale-brown, reticulate, glabrous; main-nerves 2 to 4 pairs, much curved, ascending, distinct on both surfaces; length 2 to 4 in.; breadth 1 to 2 in.; petioles .15 to .2 in. long. *Racemes* slightly supra-axillary, shorter than the leaves, their rachises compressed, glabrous or pubescent; flower-pedicels rather less than .1 in. long in flower, twice as long in fruit, each with a small ovate concave bract at its base. *Flowers* .3 in. long; their pedicels rather more than .1 in. long, deflexed, puberulous, ebracteolate. *Calyx* less than .1 in. long, puberulous, campanulate, with 5 small spreading sub-acute triangular lobes. *Corolla* sub-cylindric, widest at the base and gradually tapering to the mouth, teeth of the mouth very short, blunt, erect. *Stamens* 10; anthers linear, beaked, shorter than the densely hairy tapering filaments. *Ovary* inferior, depressed-hemispheric, crowned by a thick, very concave, marginally grooved disk; style cylindric, tapering to the apex, glabrous. *Fruit* closely adnate to the calyx-tube, 5-celled, many-seeded. Miq. Fl. Ind. Bat. II. 1056; Beccari Malesia, I. 213.

PERAK, at elevations of 5,000 to 6,700 feet: *Wray* 360, 1573, 4101; *Seorteehini* 1348; *King's Collector* 8025.—DISTRIB. Java, Sumatra.

2. DIPLYCOSIA, Blume.

Epiphytic shrubs, glabrous or setose, evergreen. *Leaves* coriaceous, alternate, entire or ciliate-serrate. *Flowers* small, axillary, solitary, on pedicels bracteolate at the base. *Calyx* with 5 teeth or lobes, free or half superior, accrescent in fruit, with 2 basal bracteoles connate into a calyculus. *Corolla* campanulate or urceolate, with 5 slightly imbricate recurved lobes. *Stamens* 10, as long as the corolla, and inserted at its base, quite included or with the tips of the anthers exerted; anthers elongate, oblong, produced at the apex into two straight valvularly-dehiscing tubes, but without dorsal appendages. *Disk* cupular, 10-lobed. *Ovary* 5-celled; style filiform; stigma simple; ovules in the cells numerous, attached to axile placentas. *Fruit* superior or half-superior, included in the succulent accrescent calyx, 2-celled, dehiscing by 5 valves, many-seeded. *Seeds* minute, cuneate; testa lax, reticulate; albumen fleshy; embryo axile, cylindric.—DISTRIB. Species about 14, all Indian or Malayan.

Leaves 2 to 5 in. long:—

Calyx-lobes broad, blunt	1. <i>D. latifolia</i> .
Calyx-lobes triangular, acute	2. <i>D. heterophylla</i> .
Leaves 1·5 to 2 in. long	3. <i>D. erythrina</i> .

1. *DIPLYCOSIA LATIFOLIA*, Blume Bijdr. 858. A small glabrous epiphytic shrub; young branches half as thick as a goose-quill, pale and angled when dry. *Leaves* thickly coriaceous, elliptic, the apex shortly and obtusely acuminate, the base cuneate or somewhat rounded, the edges recurved; both surfaces pale yellowish-brown when dry, the upper shining, the lower dull; the midrib bold, much raised on the lower surface, slightly depressed on the upper; main-nerves 2 or 3 pairs, curving upwards, the lower pair usually longer than the others, none of them very prominent on either surface, but more so on the lower than on the upper, reticulations obsolete; length 3 to 5 in.; breadth 1·35 to 3 in.; petioles ·2 to ·3 in. long. *Flowers* ·2 in. long, in axillary fascicles of 3 or 4; their pedicels slender, ·1 to ·15 in. long, inserted 3 or 4 together on minute tubercles surrounded by several small bracts. *Calyx* cupular, ·1 in. across, with 5 broad, spreading, obtuse, ciliolate lobes. *Corolla* ·25 in. long, narrowly campanulate, contracted into a short tube at the base, the limb deeply divided into 5 ovate sub-acute lobes, closely embracing the ovary. *Stamens* 10, included; anthers narrowly oblong, each with two short apical truncate beaks but no basal processes; the filaments slender in their upper halves, the lower halves dilated and cohering into a tube. *Ovary* 5-celled, the apex broad, concave; style cylindric, about as long as the corolla; stigma small, capitate. *Fruit* 5-celled; seeds numerous, elongate, black, closely enveloped by the persistent corolla. Miq. Fl. Ind. Bat. II. 1055.

PERAK, at elevations of 6,700 feet: *Wray* 364, 909, 2204; *Scortechini* 339; *King's Collector* 6797, 8023. SELANGOR: *Ridley* 7556.—
DISTRIB. Java.

2. *DIPLYCOSIA HETEROPHYLLA*, Blume Bijdr. 858. A shrub; young branches as thick as a crow-quill, coarsely rusty-pilose at first, afterwards sub-glabrous, when dry pale and angled. *Leaves* coriaceous, elliptic oblong-elliptic or lanceolate, acute or acuminate at apex and base, the edges recurved; both surfaces olivaceous-brown when dry, the upper sub-reticulate and shining, the lower dull and not reticulate; main-nerves 1 pair following the edge from base to apex, distinct and depressed like the midrib on the upper surface, indistinct on the lower; length 2 to 4 in.; breadth 1 to 2 in.; petiole rather more than ·2 in. long. *Flowers* axillary, fascicled, rarely solitary, about ·15 in. long, bearing under the calyx 2 broadly reniform, acute, spreading concave bracts.

Calyx campanulate, with 5 broadly triangular erect lobes, closely applied to the fruit. *Corolla* widely campanulate, .2 in. long, the teeth 5, broad, blunt, short, reflexed. *Fruit* superior, sub-rotund, smooth, many-seeded, crowned by the fluted style; seeds oblong, concave, compressed, numerous.

PERAK: *Seortechini*.

3. *DIPLYCOSIA ERYTHRINA*, King & Gamble. A small tree, 10 to 20 feet high; young branches twice as thick as a crow-quill, glabrous, pale-brown when dry, angled. *Leaves* thickly coriaceous, elliptic, the apex obtuse or sub-acute, the base acute, the edges recurved; both surfaces when dry pale-brown, the upper tinged with olivaceous, not reticulate, quite glabrous; main-nerves 2 to 3 pairs, ascending, rather straight, faint on both surfaces; length 1.5 to 2 in.; breadth .75 to 1 in.; petioles .1 in. long, stout. *Racemes* terminal, nearly twice as long as the leaves, with a large narrowly elliptic leaf-like bract .4 to .6 in. long, and .1 to .2 in. broad at the base of each flower-pedicel; pedicels decurved, .15 in. long in the flower, rather more than twice as long in the fruit. *Flowers* .4 in. long. *Calyx* .2 in. long, campanulate, with 5 spreading triangular acute lobes. *Corolla* .35 in. long, cylindric, narrowed towards the throat, glabrous; the mouth with 5 short, broad, blunt, recurved lobes. *Stamens* 10, slightly exserted; anthers broadly oblong, with neither apical nor basal appendages; the filaments three times as long, broadening towards the base, pubescent. *Ovary* inferior, its disk convex, hairy; style slightly exceeding the corolla, cylindric; stigma small, capitate. *Fruit* oblong-globose, .2 in. in diam., surmounted by the inflexed calyx-lobes, sub-glabrous, pericarp leathery; cells 5, each with several angular seeds. *Vaccinium erythrinum*, Hook. Bot. Mag. t. 4688.

PERAK, at elevations of 5,000 feet: *Wray* 3816; *King's Collector* 7349; *Seortechini*.—DISTRIB. Java, Sumatra.

3. *PIERIS*, D. Don.

Trees or shrubs, with terete branchlets. *Leaves* alternate, petiolate, entire or serrulate, persistent. *Racemes* axillary and solitary, or terminal and in panicles; pedicels bracteate and also with 1 or 2 bracteoles. *Calyx* free, with 5 teeth or lobes; the segments in bud open or valvate. *Corolla* ovoid or elongate-urceolate, with 5 short recurved teeth, white. *Stamens* 10; anther-cells ovoid-truncate; filaments each with 2 divaricate horns from its apex or ex-appendiculate. *Ovary* globose with a lobed disk, 5-celled; ovules numerous; style cylindric; stigma capitate or truncate. *Capsule* globose, dry, 5-celled, with 5-valved loculicidal dehiscence. *Seeds* many, linear-oblong, falcate, not

winged, albuminous; testa loose.—DISTRIB. Species 10; Himalaya and the mountains of Burma and of the Malayan Peninsula.

PIERIS OVALIFOLIA, D. Don in Edinb. Phil. Journ. XVII. (1834) 159. A tree; young branches whitish-puberulous at first, afterwards black and glabrous, about a third as thick as a goose-quill. *Leaves* thinly coriaceous, ovate, shortly acuminate, the base broad and rounded, the edges very slightly recurved; upper surface blackish-brown when dry, glabrous, the lower of a paler brown, minutely reticulate, puberulous on the midrib and nerves; main-nerves 12 to 15 pairs, spreading, curving slightly upwards, sharply prominent on the lower surface, indistinct on the upper; length 4 to 5.25 in.; breadth 2 to 2.75 in.; petiole .25 to .3 in. long, puberulous. *Racemes* simple, axillary, 4 to 10 in. long, sometimes by suppression of the leaves forming a terminal false panicle, more or less pubescent; bracts .2 in. long, linear or lanceolate. *Calyx-teeth* connate at the base. *Corolla* narrowly ovoid, white. *Capsule* globose, glabrous, .2 in. in diam. *Seeds* small, linear-oblong. DC. Prod. VII. 599; Loudon, Arb. Brit. 570, fig. 1070; Clarke in Hook. f. Fl. Br. Ind. III. 460. *Andromeda ovalifolia*, Wall. Cat. 763, and in Asiat. Research, XIII. 391 (*with fig.*); Don Prod. 148; Wight Ic. t. 1199; Brandis For. Flora, 280; Kurz in Journ. As. Soc. Beng., 1877, Pt. II. 216, For. Fl. Burm. II. 192. *A. elliptica*, Sieb. & Zucc. Fl. Jap. Fam. Nat. II. 126. *Thibaudia*, Griff. Ic. Pl. Asiat. t. 514.

PERAK, at an elevation of 5,000 feet: *Wray* 1522.—DISTRIB. Himalaya up to 8,000 ft.; Khasia Hills; Burma; Japan.

4. RHODODENDRON, Linn.

Shrubs or trees, often aromatic often scaly. *Leaves* coriaceous, entire, alternate, rarely sub-opposite or in false whorls, often clustered near the ends of the branches. *Flowers* in terminal fascicles or pseudo-corymbs, rarely solitary or axillary; bracts broad, usually caducous, bracteoles linear. *Calyx* persistent, 5-lobed, rarely cupular, sometimes small or obsolete. *Corolla* campanulate, salver-shaped or funnel-shaped, the tube long or short, the limb 5- to 10-lobed. *Stamens* usually 10 but sometimes 5 or 18; anthers oblong, dehiscent by terminal pores. *Ovary* 5- to 20-celled; style long or short, filiform; stigma capitate; ovules numerous in each cell. *Capsule* short or elongate, always woody, 5- to 20-celled, septicidally dehiscent, the valves separating from the placentas from above downwards. *Seeds* numerous, ellipsoid, albuminous, the testa often crested or tailed at one end or at both.—DISTRIB. Species about 160, in mountainous parts of Europe, Asia, and North America.

Corolla widely campanulate, tubular only at the base:—

All parts glabrous, leaves not glaucous and without scales;

capsule 1 to 1·5 in. long 1. *R. javanicum*.

Lower surfaces of leaves glaucous, the nerves and reticulations hairy; capsule ·5 in. long 2. *R. Wrayi*.

Corolla narrowly campanulate or funnel-shaped, the tube inflated upwards and passing gradually into the limb; flowers ·35 to ·85 in. long:—

Leaves obovate, ·6 to ·8 in., and rarely as much as 1 in. long:—

All parts glabrous except the inflorescence 3. *R. pauciflorum*.

All parts more or less scaly 4. *R. perakense*.

Leaves elliptic to elliptic-rotund, from 1·25 to 2 in. long 5. *R. Scortechinii*.

Corolla salver-shaped, the tube much longer than the limb:—

Tube of corolla from 1·25 to 1·6 in. long, and about ·15 in. in diam. from base to apex; leaves sub-sessile, whorled, sparsely scaly or glabrous 6. *R. jasmijniflorum*.

Tube of corolla 2 in. long, ·25 in. wide near the base, widening to ·4 in. or more near the mouth; petioles ·35 to ·5 in. long 7. *R. longiflorum*.

Tube of corolla ·6 in. long and about ·2 in. in diam.; petioles ·4 to ·6 in. long 8. *R. malayanum*.

Species imperfectly known 9. *R. dubium*.

1. RHODODENDRON JAVANICUM, Benn. Pl. Jav. Rar. p. 85, t. 19. An epiphytic shrub, 3 to 8 feet long; all parts glabrous, esquamose; young branches rather thinner than a goose-quill. *Leaves* thinly coriaceous, elliptic or elliptic-oblong, tapering to the acute apex and base; both surfaces brown when dry (the lower rather the lighter), shining, the midrib very prominent; main-nerves about 8 or 10 pairs, interarching rather far from the edge, faint on the upper surface, obsolete on the lower, the intermediate nerves almost as prominent; length 3·5 to 5·5 in.; breadth 1·25 to 2 in.; petioles ·3 to ·75 in. long. *Umbels* terminal, 5- to 7-flowered, enveloped in bud in broadly ovate apiculate bracts; pedicels ·5 to 1·5 in.; bracteoles linear. *Calyx* cupular, less than ·1 in. deep, the mouth wavy. *Corolla* red, widely campanulate, 1·25 to 1·5 in. long; the tube widely funnel-shaped, cylindric at the base; the limb 1·25 to 1·5 in. wide, with 5 large, broad, blunt spreading lobes. *Stamens* 10, shorter than the corolla-limb; the filaments slender; the anthers oblong. *Ovary* glabrous or slightly scaly (hairy in var. *Teysmanni*); style shorter than the stamens, clavate, hemispheric. *Capsule* narrowly cylindric, 1 to 1·5 in. long, and only ·25 in. in diam., glabrous, slightly ridged, crowned by the whole or part of the style. DC. Prod. VII. 721; Bot. Mag. t. 4366; Fl. des Serres (1847), t. 293; Miq. Fl. Ind. Bat. II. 1057; Miq. in Ann. Mus. Lugd. Bat. I. 42, t. 1b; Clarke in Hook. f. Fl. Br. Ind. III. 463. *Vireya javanica*, Blume Bijdr. II. 854.

MALAY PENINSULA: *Lobb* and others. PENANG: *Ridley* 129.

KEDAH: *Derry* 5531. PERAK: *Scortechini* 373, 1325; *Derry* 3705; *Fox* 129; *King's Collector* 2335, 3672, 6916, 7008; *Wray* 1023. SINGAPORE: *Ridley*.—DISTRIB. Sumatra, Java, Celebes.

VAR. *Teysmanni*, King & Gamble. Ovary densely hairy; filaments hairy near the base, corolla yellow. *R. Teysmanni*, Miq. Fl. Ind. Bat. Suppl. 585; Clarke in Hook. f. Fl. Br. Ind. III. 463.

PENANG: *Maingay* (K.D.) 1099, 10257; *Curtis* 530. PERAK: *Wray* 601, 623; *King's Collector* 3672.—DISTRIB. Sumatra, Java.

2. RHODODENDRON WRAYI, n. sp., King & Gamble. A bush; young branches as thick as a goose-quill, at first sparsely scaly, ultimately glabrous. Leaves very coriaceous, elliptic or sub-obovate-elliptic, the apex sub-acute, the base rounded, the edges recurved when dry; upper surface dark-brown when dry, glabrous, the midrib much depressed; lower surface white, glaucous, with short hairs on the minute reticulations, the main-nerves, and the bold midrib; main-nerves 6 to 12 pairs, spreading, curved, rather dark-coloured and conspicuous on the lower surface, invisible on the upper; length 1.75 to 3.5 in.; breadth .85 to 1.5 in.; petioles .4 to .8 in. long, stout, scaly. Umbels terminal, 8- to 12-flowered, unequal, .5 to .75 in. long, scaly. Flower-buds enveloped in obovate-oblong apiculate bracts, the inner tomentose externally, the outer glabrous, all deciduous. Calyx cupular, 5-toothed, less than .1 in. deep. Corolla glabrous, white, tinged with pale pink and spotted in the throat, widely campanulate from a tubular base, about 1.25 in. long, and rather more in breadth at the mouth; lobes of the limb 5, broadly ovate, spreading. Stamens 10; filaments shorter than the corolla, glabrous; anthers oblong. Ovary hairy; style glabrous, longer than the stamens; stigma hemispheric, lobed. Capsule only .5 in. long and about half as much in diam., not apiculate, tomentose, ridged, 5-celled.

PERAK, at from 3,500 to 7,000 feet: *Wray* 322, 886, 1569; *Scortechini*.

3. RHODODENDRON PAUCIFLORUM, n. sp., King & Gamble. A small shrub, all parts except the inflorescence glabrous; young branches as thick as a crow-quill, smooth. Leaves coriaceous, obovate, rarely rotund-obovate, the apex broad, usually minutely retuse, the base much narrowed, the edges recurved; upper surface olivaceous, the lower brown when dry; the midrib stout and prominent on the lower surface, depressed on the upper (when dry); main-nerves 3 or 4 pairs, indistinct on both surfaces; length .6 to 1 in.; breadth .4 to .65 in.; petioles less than .1 in. long. Flowers 1 or 2, terminal; their pedicels pubescent, .25 to .6 in. long, with 1 or 2 loose sheathing deciduous bracts at their bases. Calyx cupular, about .1 in. long, obscurely toothed. Corolla

bright red, infundibuliform-campanulate, .2 to .3 in. wide at the throat and from .5 to .85 in. long; the limb spreading, .5 to .75 in. across, divided into 5, broad, blunt lobes, the tube .35 to .5 in. long. *Capsule* unknown.

PERAK, on Gunong Batu Pateh at an elevation of 4,500 feet: *Wray* 231; *Scortechini* 345B.

4. RHODODENDRON PERAKENSE, n. sp., King & Gamble. Epiphytic; a small shrub with very scaly young branches as thick as a crow-quill. *Leaves* very coriaceous, obovate or broadly oblanceolate, obtuse, much narrowed to the base, the edges recurved; upper surface olivaceous when dry, at first with a few large scales but ultimately glabrous, reticulate, the midrib depressed; lower surface dark brown, with persistent large dark scales in pits, the midrib very thick and prominent; main-nerves 2 (rarely 3) pairs, spreading, very prominent on the under surface, and, like the midrib, with persistent large dark scales; length .6 to .8 in.; breadth .3 to .4 in.; petioles about .1 in. long. *Umbels* terminal, 3- to 5-flowered, covered in bud by broad rounded deciduous bracts with ciliate edges; pedicels .25 to .3 in. long, slightly scaly. *Flowers* .35 to .4 in. long. *Calyx* shallow, cupular, its edges wavy. *Corolla* bright yellow, narrowly campanulate, the mouth with broad, slightly spreading lobes. *Stamens* not exerted; filaments glabrous, anthers short. *Ovary* sub-glabrous; style not exerted; stigma clavate, truncate. *Capsule* .3 in. long, dehiscing by 5 straight untwisted valves.

PERAK, at an elevation of 7,000 feet: *Wray* 1574.

5. RHODODENDRON SCORTECHINII, n. sp., King & Gamble. Shrubby, epiphytic or terrestrial, when the latter sometimes sub-arboreous; young branches half as thick as a goose-quill, smooth, terete. *Leaves* very coriaceous, elliptic to elliptic-rotund or obovate, the apex obtuse and sometimes faintly notched, the base cuneate, the edges recurved; upper surface dark olivaceous-brown when dry, glabrous, shining, depressed-reticulate; lower surface of a uniform warm brown, not reticulate, pitted and minutely scaly; main-nerves 4 to 6 pairs, spreading, depressed on the upper surface, and raised on the lower (sometimes very much so); midrib much depressed on the upper surface and prominent on the lower (when dry); length 1.25 to 2 in.; breadth .75 to 1.25 in.; petioles .1 to .15 in. long, scaly. *Umbels* terminal, 4- to 7-flowered; the pedicels unequal, .5 to 1 in. long (longer in fruit). *Flowers* about .75 in. long. *Calyx* short, cupular, with many rounded teeth. *Corolla* yellow (sometimes very pale), .75 in. long, widely funnel-shaped, the mouth about .6 in. across, with 5 deep, broadly ovate, slightly spreading lobes, the outer surface with many dark-

coloured scales. *Stamens* about 8, slightly or not at all exserted; filaments glabrous; anthers elliptic, small. *Ovary* scaly; *style* slightly exserted, glabrous; *stigma* clavate-hemispheric, lobed. *Capsule* .5 in. long, scaly, shortly apiculate, 5-valved, the valves not twisted in dehiscence.

PERAK, at elevations of 5,000 to 7,000 feet: *Scortechini* 401B, 753; *Wray* 311, 1572, 3840; *Cantley*.

6. RHODODENDRON JASMINIFLORUM, Hook. Bot. Mag. t. 4524. Usually epiphytic; a small shrub, only a few feet high; young branches somewhat less than half as thick as a goose-quill, glabrous. *Leaves* in whorls, thickly coriaceous, almost sessile, broadly elliptic to elliptic-rotund, the apex acute, the base rounded and minutely cordate; upper surface when dry pale olivaceous-brown, sometimes with a few small loose scales, the 5 to 7 pairs of spreading main-nerves slightly distinct and (like the midrib) depressed; the lower darker brown, not olivaceous, the nerves very faint but the midrib pale and prominent; length 1.25 to 3 in.; breadth 1 to 1.5 in.; petiole .1 in. long. *Umbels* terminal, 8- to 20-flowered; the pedicels filiform, .75 to 1 in. long, scaly and hairy; bracteoles membranous, broad, glabrous, .25 to .5 in. long. *Calyx* a shallow toothed cup, less than .1 in. deep. *Corolla* white, salver-shaped; the tube narrowly cylindric, sparsely scaly or glabrous outside, about .15 in. in diam. and 1.25 to 1.6 in. long (when dry); the limb one-third as long, spreading, with 5 deep, broad, obovate-obtuse or rotund lobes. *Stamens* 10, the filaments shortly exserted, thin, pubescent; anthers short, broad. *Ovary* 5-celled, pubescent; style longer than the corolla-tube, pubescent; stigma depressed-capitate, grooved. *Capsule* about .75 to 1 in. long, narrowly sub-cylindric, much apiculate, ridged, its valves recurved to the base and often twisted. Lemaire, *Jard Fleur.* t. 41; *Illust. Hort.* (1859) t. 203; Clarke in Hook. f. *Fl. Br. Ind.* III. 463; *Miq. Fl. Ind. Bat.* II. 1059.

MALACCA, on Mount Ophir: *Griffith* (K.D.) 3504; *Maingay* (K.D.) 701; *Ridley*. PERAK: *Wray* 1635; *Scortechini*; *King's Collector* 3586, 3645, 6909; *Ridley* 124.—DISTRIB. Java, Sumatra.

7. RHODODENDRON LONGIFLORUM, Lindl. in *Journ. Hort. Soc.* III. 88 *with figure*. Epiphytic; 3 to 6 feet high; young branches half as thick as a goose-quill, densely scaly like the petioles. *Leaves* coriaceous, usually elliptic-oblong, sometimes elliptic or oblanceolate, sub-acute or acute, much narrowed to the base; upper surface when dry olivaceous-brown, coarsely and widely reticulate with broad black scales, especially on the depressed midrib, the 5 to 7 pairs of spreading main-nerves faint; lower surface brown, uniformly covered with black deciduous scales, ultimately glabrous; the main-nerves indistinct but the midrib

stout and prominent; length 2·25 to 3·5 in.; breadth ·8 to 1·5 in.; petioles ·35 to ·5 in. long, stout. *Umbels* terminal, 5- to 7-flowered; flower-pedicels ·5 to ·8 in. long, scaly or glabrous. *Flowers* about 2 in. long, glabrous outside, narrowly sub-campanulate, almost salver-shaped. *Calyx* small, cupular, with wavy edges, under ·05 in. deep. *Corolla* red, infundibuliform; its tube about ·25 in. wide near the base but expanding gradually to about ·4 in. or more near the mouth, about three times as long as the broadly bluntly 5-lobed limb. *Stamens* 10, the filaments slender, pubescent, slightly exerted; anthers short, blunt. *Ovary* densely hairy like the style; stigma clavate. *Capsule* unknown. Fl. des Serres, V. p. 477-480f.

PERAK: *Scortechini* 385, 553, 1409; *King's Collector* 1864, 5181.—

DISTRIB. Borneo, Sumatra.

8. RHODODENDRON MALAYANUM, Jack in Mal. Misc. II. n. 7, 17. An erect straggling shrub, 3 to 15 feet high, all parts more or less glandular and scaly; young branches less than half as thick as a goose-quill. *Leaves* narrowly elliptic or lanceolate, the apex and base acute or sub-acute, the edges recurved when dry; upper surface shining, glabrous, and olivaceous when dry, the 5 to 8 pairs of main-nerves faint, slightly depressed, the midrib much depressed and often scaly; the lower of a deep uniform brownish-cinereous colour and with numerous dark scales, the nerves obsolete but the midrib bold and prominent; length 1·75 to 3·25 in.; breadth ·75 to 1·25 in.; petioles ·4 to ·6 in. long, covered with large black scales. *Umbels* terminal, 3- to 5-flowered. *Flowers* ·8 in. long, their pedicels ·25 to ·35 in. long, slender, scaly. *Calyx* cupular, 5-toothed, less than ·05 in. deep. *Corolla* red, glabrous, ·8 in. long (when dry), salver-shaped, the tube about ·2 in. in diam. when dry, about ·6 in. long, the limb about ·5 in. across when dry, with 5 broad, blunt, cuneate lobes. *Stamens* 10, their filaments glabrous. *Ovary* 5-celled; style slightly exerted from the throat of the corolla, glabrous; stigma clavate. *Capsule* about 1 in. long, slender, ridged, the valves much recurved, twisted. Hook. Journ. Bot. I. 369; DC. Prod. VII. 725; Bot. Mag. t. 6045; Beccari Malesia, I. 205; Clarke in Hook. f. Fl. Br. Ind. III. 463. *R. tubiflorum* and *R. celebicum*, DC. l.c. 725; Miq. in Ann. Mus. Lugd. Bat. I. 44, t. 2AB; Fl. Ind. Bat. II. 1059. *R. lampongum*, Miq. Fl. Ind. Bat. Suppl. 585. *Vireya tubiflora* and *V. celebica*, Blume Bijdr. 855, 854.

MALAOCA: on Mount Ophir, 4,000 ft., *Griffith* (K.D.) 3503; *Maingay* (K.D.) 702; *Wray*; *Kurz*. PERAK: *Scortechini* 385, 2336; *Wray* 614; *King's Collector* 3227, 8076. PENANG: *Ridley* 125. SELANGOR: *Ridley* 7557.—DISTRIB. Sumatra, Java.

9. RHODODENDRON DUBIUM, n. sp., King & Gamble. A shrub or small

tree; young branches rather thinner than a goose-quill, pale brown when dry, slightly pubescent. *Leaves* coriaceous, glabrous, oblong-elliptic, the apex sub-acute, narrowed from about the middle to the acute or rounded base; both surfaces dull brown when dry and minutely reticulate, the lower pale; main-nerves 15 to 18 pairs, slightly curved, spreading, indistinct on the upper surface, rather distinct on the lower; the midrib very bold and prominent on the lower surface, faint and depressed on the upper; length 3·5 to 6 in.; breadth 1 to 2 in.; petiole ·75 to 1 in. long, stout. *Umbels* shortly stalked, 3- to 8-flowered; flower-pedicels unequal, ·75 to 1·35 in. long, stout, glabrous. *Flowers* unknown. *Calyx* cupular, ·1 in. deep, the mouth wavy. *Ovary* densely rufescent-pubescent. *Capsule* ·4 to ·7 in. long, rusty-pubescent, very slightly ridged, dehiscing by 5 straight valves, crowned by the persistent pubescent style.

PERAK, at an elevation of 3,400 feet: *Wray* 233, 460: *Scortechini* 367.

5. PERNETTYOPSIS, King & Gamble, nov. gen.

Small rigid epiphytic shrubs. *Leaves* alternate, on short hispid petioles, minutely sub-crenulate, coriaceous, persistent. *Flowers* solitary or in pairs, axillary, with 2 (rarely 3) rather large bracts at their bases forming an involucre; pedicels decurved in fruit. *Calyx* larger than the corolla, rotate, deeply 5-partite, persistent and unchanged in fruit. *Corolla* urceolate or ovoid, glabrous, the mouth constricted and with 5 short reflexed teeth. *Stamens* 10, free, included, the filaments slightly attached by their somewhat dilated bases to the bottom of the corolla-tube. *Anthers* short, inappendiculate at the back or base, oblong, the apices prolonged into 2 long porously dehiscing tubes. *Ovary* faintly 5-lobed, 5-celled; style columnar; stigma simple; ovules numerous, the placentas on the inner angles of the loculi. *Berry* globose, 5-celled. *Seeds* minute, compressed, numerous, angled; testa crustaceous.—DISTRIB. Species 2, both Malayan.

Calyx densely rusty-tomentose	1. <i>P. malayana</i> .
Calyx glabrous except the tips of the lobes	2. <i>P. sub-glabra</i> .

1. PERNETTYOPSIS MALAYANA, n. sp., King & Gamble. Epiphytic; a bush a foot or two in height; young branches half as thick as a goose-quill, sparsely clothed near their apices with flat adpressed black bristles less than ·1 in. long. *Leaves* thickly coriaceous, rotund, obovate to elliptic, the apex broad, minutely apiculate, the base slightly narrowed; upper surface olivaceous-brown when dry, shining, the midrib and main-nerves deeply depressed, the reticulations less so; lower

surface pale dull-brown, with sparse pits, each bearing a short adpressed dark hair, the edges wavy, sub-serrate and adpressed-ciliate; main-nerves 2 or 3 pairs, curving upwards and inwards and interarching, thick but faint on the lower surface; length 1.25 to 2 in.; breadth .75 to 1.35 in.; petioles .1 to .2 in., adpressed-bristly. *Flowers* solitary or in pairs, .4 or .5 in. long, axillary, pedicellate, the pedicels .3 to .4 in. long, twice as long (or more) in fruit, densely rusty-tomentose and recurved when young, erect and less woolly when old. *Involucral bracts* usually 2, thick, about .2 in. long, broad, glabrous inside, rusty-tomentose outside. *Calyx* larger than corolla, rotate, deeply divided into 5 lanceolate, somewhat spreading, lobes; rusty-tomentose outside and sub-glabrous inside. *Corolla* a little shorter than the calyx, glabrous, ovoid-globular, its mouth contracted and with 5 short reflexed teeth. *Stamens* 10, shorter than the corolla, and inserted near its base; *anthers* oblong, broad, cordate and inappendiculate at the base; the apex prolonged into 2 white apically porous tubes; filaments short, bent. *Ovary* sub-globular, laxly and deciduously tomentose, 5-celled; ovules numerous, oblong-concave, attached by the middle to the axillary placentas; style cylindric, slightly grooved, twice as long as the corolla. *Fruit* a berry with scanty pulp, blue when ripe, the seeds red.

PERAK, at elevations of about 6,500 feet, on the summit of Gunong Batu Pateh: *Scortechini* 402; *Wray* 312.

2. *PERNETTYOPSIS SUB-GLABRA*, n. sp., King & Gamble. A small, rigid, epiphytic shrub; young stems slightly thicker than a crow-quill, with a few adpressed bristles near the ends, otherwise glabrous. *Leaves* coriaceous, sub-rotund to elliptic-rotund, minutely apiculate; upper surface dull-brown, minutely reticulate, glabrous, the lower reddish-brown, with a few small adpressed hairs with black bases; main-nerves 3 or 4 pairs, curving upwards, deeply depressed on the upper surface like the midrib, less so on the lower; the edges minutely sub-serrate and sparsely adpressed-ciliate; length .8 to 1.5 in.; breadth .75 to 1.25 in.; petiole .15 to .25 in. long, adpressed-bristly. *Bracts* under the flower 2 or 3, broad, rusty-pubescent externally like the pedicel. *Calyx* longer than the corolla, rotate, with 5 deep lanceolate spreading lobes, glabrous except the rusty-pubescent tips. *Corolla*, stamens, ovary, and style as in *P. malayana*. *Fruit* unknown.

PERAK, at elevations of 5,000 feet: *Scortechini* 752; *King's Collector* 7407.

Order LXVII. MONOTROPEÆ.

[By D. PRAIN.]

Leafless, erect, white or coloured root-parasites ; stems herbaceous, scaly, simple or forked. *Flowers* solitary on the stem or branches, regular, hermaphrodite. *Sepals* usually resembling the scales, 2 to 6, often deciduous. *Petals* 3 to 6. *Stamens* 6 to 12, hypogynous, 2-seriate ; filaments filiform or flattened ; anthers 2-celled, or by confluence 1-celled. *Ovary* superior, globose or fusiform, 1- to 6-celled ; style cylindrical, stigma peltate ; ovules very many on axial or parietal placentas. *Fruit* capsular, loculicidally 4- to 6-valved, or indehiscent and baccate. *Seeds* very many, minute ; testa often loosely saccate ; embryo very minute, solid.—DISTRIB. Genera 9, in dense woods, mostly in temperate regions, all in the northern hemisphere.

1. CHEILOTHECA, Hook. fil.

Small herbs, with erect, simple or forked, white or coloured stems ; branches 1-flowered. *Sepals* 3 to 5, narrowly oblong like the uppermost stem-scales. *Petals* 3, erect, obtuse. *Stamens* 6 ; anthers linear, cells 2, confluent at the apex, dehiscing by marginal slits or pores. *Ovary* fusiform, 1-celled, narrowed into the cylindrical style ; stigma globose-conic, usually slightly lobed ; placentas 6, parietal, 2-fid, the segments covered throughout by numerous ovules. *Fruit* fleshy, indehiscent, baccate.—DISTRIB. Species 2, Indo-Chinese and Malayan.

1. CHEILOTHECA MALAYANA, SCOTT. in Hook. fil. Icon. Plant., XVI. t. 1564. A root-parasite in dense forest ; stem herbaceous, erect, simple or 2- to 3-forked, 6 to 9 in. high, stoutish. *Scales* ovate-oblong, obtuse, imbricated, gradually increasing upwards, lurid purple (*Scortechini*) or waxy white (*Kunstler*). *Flowers* terminal on stem and branches, 1 in. long, hidden inside the uppermost scales, and bright yellow (*Kunstler*), or with the tips of the petals exerted and white (*Scortechini*). *Sepals* 5, resembling the uppermost scales, imbricate, linear-oblong, obtuse or sub-acute, glabrous. *Petals* 3, rather larger than the sepals, rounded-cucullate at the apex, externally glabrous, internally more or less pilose. *Stamens* 6, filaments puberulous or pilose, alternately somewhat shorter and longer ; anthers short, innate, hippocrepiform, cells confluent at apex, dehiscing by marginal pores. *Ovary* narrowly fusiform ; stigma obscurely 4-lobed ; placentas 6, parietal. *Fruit* white, fleshy, baccate, .75 in. across, tipped by the persistent remains of the stout style. Prain in Journ. As. Soc. Beng. LXXIII. 2, 205.

PERAK, in heavy jungle at about 3,500 feet elevation: *Scortechini*; *Kunstler* 2715.

According to the field notes recorded by these two careful collectors the specimens gathered by Kunstler differ from those obtained by Scortechini; in the latter the scales were lurid purple and the flowers were white, in the former the scales were waxy white and the flowers bright yellow. The petals in Kunstler's plant are sparingly hirsute within and the anthers are nearly twice as long. In other respects, however, the two plants are identical, and the doubt that one feels in connection with the two is not so much as to whether they are conspecific, as it is as to whether this Malayan *Cheilothea* be really specifically separable from the species from the Khasia Hills upon which Hooker originally based the very distinct genus *Cheilothea*. The only very tangible differences are that in the Khasia plant only 3 to 4 scales can be with propriety considered sepals, whereas in the Malayan one the number of sepals, as apart from the upper scales or bracts, is 5; and that in the Khasia plant the anthers are long, like linear lips on each side of the connective, whereas in the Malayan plant the anthers are much shorter and distinctly hippocrepiform. The fruit appears to be quite indehiscent, and thus deviates from the fruit in other genera of *Monotropeæ*, which, so far as is known, is always loculicidally dehiscent.

Order LXVIII. EPACRIDÆ.

Shrubs or small trees. *Leaves* alternate, rarely sub-opposite or pseudo-verticillate, articulated with the branches, sometimes fascicled or imbricate, coriaceous or rigid, persistent, entire, with parallel longitudinal nerves; ex-stipulate. *Flowers* hermaphrodite, solitary and axillary or terminal, spicate or racemose, generally white or red; usually bracteate and usually 2-bracteolate, the bracteoles similar to the sepals. *Calyx* 4- to 5-partite, the segments coriaceous, striate, imbricate, persistent. *Corolla* 4- to 5-fid, monopetalous, deciduous or sometimes marcescent; the tube short or long, often cylindric or funnel-shaped; the lobes short or long, erect, patent or recurved, imbricate or valvate, persistent. *Stamens* 5, rarely 4, hypogynous or epipetalous, the filaments short or long, filiform or flattened, free; the anthers dorsifixed, oblong, dehiscing along their whole length by a single slit, 1-celled or spuriously 2-celled. *Disk* cupular, annular or of simple or bifid scales equal in number to the carpels. *Ovary* globose or ovoid, 1- to 10-celled; style terminal, short or long, filiform; stigmas punctiform, discoid or lobulate, sometimes annular or indusiate; ovules in each cell solitary, pendulous, rarely erect; or many on a central placenta. *Fruit* drupaceous, with 2 to 5 1-seeded pyrenes; or a many-seeded capsule. *Seeds* small, with fleshy albumen, testa membranaceous; embryo axile, orthotropous, smooth; cotyledons short; radicle elongate, near the hilum.—DISTRIB. About 320 species, nearly all Australian, a few in

New Caledonia and New Zealand, the Pacific Islands, or the Malay Archipelago.

LEUCOPOGON, Br.

Shrubs, erect or prostrate, branching, rarely trees. *Leaves* various, sessile or petiolate, striate-nerved. *Flowers* small, white, in axillary or terminal spikes or racemes, the rachis ending in an imperfect flower; bract 1, bracteoles 2 to 3 under the calyx. *Calyx* 5-partite. *Corolla*-tube funnel-shaped or campanulate; lobes 5, valvate in bud, patent or upper part recurved, hairy within. *Stamens* fixed to the top of the corolla-tube, filaments short, filiform; anthers dorsifixed, included or semi-exsert, linear or oblong. *Ovary* 2- to 5-celled; style short or elongated, terminal; stigma sub-capitate; ovules solitary in each cell, pendulous. *Fruit* drupaceous, with a crustaceous or bony endocarp, 1- to 5-celled, cells 1-seeded. *Seeds* small.—**DISTRIB.** About 130 species, all but about 20 Australian, the rest in New Zealand, the Pacific Islands, and the Malay Archipelago.

LEUCOPOGON MALAYANUS, Jack in Mal. Misc. I. v. 20, and Hook. Bot. Misc. II. 71. A small branching shrub, reaching 3 to 6 feet in height; branches grey, marked by the scars of fallen leaves, branchlets very leafy; branch-buds elongate, supported by imbricate parallel-veined ciliate deciduous scales. *Leaves* alternate, sessile, stiff, entire, narrowly lanceolate, acute and mucronate at apex, 1·5 to 2·5 in. long, ·3 to ·5 in. broad, shining and convex above, dull or glaucous beneath, ciliate when young; midrib none, nerves very close, slender, longitudinally parallel, in old leaves scarcely visible. *Flowers* in short axillary 3- to 7-flowered spikes, ·5 in. long, the last flower imperfect; rachis villous, sometimes flexuose; bracts ovate, recurved, bracteoles 2, ovate, acute, ciliate, closely embracing the calyx. *Calyx*-lobes 5, crustaceous, elliptic-oblong, ·125 in. long, ciliate. *Corolla* campanulate, ·1 to ·2 in. long; lobes 5, ·1 to ·15 in. long, spreading, villous within. *Hypogynous scales* 5, minute, free, obtuse. *Stamens* 5, short, alternate with the corolla-lobes; filaments inserted near the top of the anthers; anthers curved, pendent, opening longitudinally; pollen globose. *Ovary* 5-celled; ovule 1 in each cell, oblong; style erect, ·05 in. long, villous; stigma sub-globose. *Fruit* a 5-celled baccate drupe, ·1 to ·2 in. in diam., each cell 1-seeded. *Seeds* not seen. Wall. Cat. 3720; Wall. in Roxb. Fl. Ind., ed. Carey and Wall. II. 301; G. Don Gen. Syst. III. 777; DC. Prod. VII. 744; Miq. Fl. Ind. Bat. II. 1052; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217, and For. Fl. II. 95; Clarke in Hook. f. Fl. Br. Ind. III. 477. *Styphelia malayica*, Spreng. Syst. IV. Cur. post, 67.

PERAK: *Scortechini* 760; *Cantley* 46; *King's Collector* 7428, 8056.

MALACCA: *Jaek*; *Griffith* (K.D.) 3453/1; *Maingay* (K.D.) 704; *Lobb*; on Mount Ophir, *Moxon*; *Ridley*. SINGAPORE: *Jaek*; *Sir R. Schomburgk* 50; *Wallich* 3720; *Ridley* 1832.—DISTRIB. *Bangka*, *Teysmann*; *Borneo*, *Ridley*.

VAR. *moluecana*, *Kurz* in *Journ. As. Soc. Beng.* XLVI. ii. 217, and *For. Fl.* II. 96. *Leaves* .5 to 1 in. long, subulate-pointed, venation more prominent, branchlets more slender. *L. moluecanum*, *Scheff.* *Obs. Phyt.* III. 97.

KEDAH peak: *Low*.—DISTRIB. *Tenasserim*, *Helper* (K.D.) 3453.

Order LXIX. PLUMBAGINEÆ.

Herbs or undershrubs. *Leaves* various, alternate or fascicled. *Flowers* in terminal scapes or branches, capitate, spicate, racemed or panicled; bracts scarious or leafy, often sheathing the flower, bracteoles 2. *Calyx* inferior, gamosepalous, tubular or funnel-shaped, 5- to 10-ribbed, often hyaline between the ribs; lobes 5, usually scarious. *Corolla* hypogynous; petals 5, free or connate at the base or united in a linear tube; lobes spreading. *Stamens* 5, opposite the petals; filaments free or adnate in a tube with the corolla; anthers ovate or oblong, dorsifixed, cells parallel, dehiscent longitudinally. *Ovary* superior, sessile or very shortly stalked, 1-celled, 5-angular above; styles 5, distinct from the base or connate below; stigmas sub-capitate; ovule 1, pendulous from a basal ascending funicle, anatropous. *Fruit* included in the calyx or elongate or exsert, dry or indchiscent, membranous or hardened at the apex, circumsciss or breaking near the thin base, the apex often 5-valved. *Seeds* cylindric or elongate, pendulous, albumen copious or little or 0, radicle superior; embryo straight, cotyledons linear or oblong.—DISTRIB. Species about 200, mostly of sea-coasts or desert places throughout the world.

Large shrubs with broad-petioled leaves; styles 5, distinct; stamens united in a tube with the corolla 1. ÆGIALITIS.
Perennial herbs with auriculate leaves; style 1, filiform, with 5 stigmatic branches; stamens free 2. PLUMBAGO.

1. ÆGIALITIS, R. Br.

Simple-stemmed, soft-wooded shrubs. *Leaves* orbicular, alternate, coriaceous, glabrous, entire, smooth, gland-dotted, reticulately-veined, with long, thick, winged, amplexicaul petioles. *Flowers* in axillary or terminal panicles of racemes; bract 1, sheathing, coriaceous, obtuse; enclosing the 2 bracteoles. *Calyx* tubular, folded; lobes 5, short, induplicate-valvate. *Corolla* usually shorter than calyx, lobes 5,

slightly cohering at base. *Stamens* adhering to the base of the petals. *Ovary* 1-celled; styles free, stigmas capitate. *Fruit* a capsule, linear, long-exserted from the calyx, pentagonal, 1-seeded.—*DISTRIB.* Species 2, one Indian the other Australian.

ÆGALITIS ROTUNDIFOLIA, Roxb. Fl. Ind. II. 111. A simple-stemmed, soft-wooded shrub, 3 to 8 feet high; stem about 3 in. in diam., conical in shape. *Leaves* alternate, orbicular, very slightly acute at apex, rounded or slightly cordate at base, diam. 2 to 3 in., entire, glabrous, coriaceous, minutely glandular-dotted, shining above, dull beneath; midrib thick and prominent, veins at an angle of 60 degrees with the midrib, closely reticulate; petiole very stout, 2 to 3 in. long, prominently winged, the wings sheathing, amplexicaul, leaving annular scars when they fall. *Inflorescence* of axillary or terminal paniced racemes; flowers pale yellow, nearly sessile, enclosed in sheathing bracts; bract 1, .3 to .4 in. long, concave, obtuse, enclosing the two similar but smaller bracteoles. *Calyx* cylindric, furrowed, .2 to .3 in. long; teeth 5, short. *Corolla* slightly longer than calyx; lobes 5, narrow. *Stamens* inserted on the base of the corolla; filaments shorter than corolla-tube; anthers linear-oblong. *Ovary* 1-celled, styles free, stigma capitate, ovule 1 pendulous. Wall. Cat. 7240; Griff. Notul. IV. 207; Clarke in Hook. f. Fl. Br. Ind. III. 479; Prain Beng. Plants I. 638. *Æ. annulata* var. *rotundifolia*, DC. Prod. XII. 621. *Æ. annulata*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 217; For. Fl. II. 96 (not of R. Br.). *Ægianilites rotundifolia*, Presl. Bot. Bemerk. 103.

MALACCA: Griffith (K.D.) 4156.—*DISTRIB.* Coasts of Bengal and Burma and the Andaman Islands, in mangrove swamps.

2. PLUMBAGO, Linn.

Perennial herbs or undershrubs, rarely annual, branches usually straggling or sub-scandent. *Leaves*, if present, alternate, entire, the petioles usually amplexicaul, auriculate at base. *Flowers* in terminal spikes or spicate racemes, forming sometimes a leafy terminal panicle; bract 1, bracteoles 2, usually small. *Calyx* tubular, glandular, 5-fid, the teeth erect. *Corolla* funnel-shaped; tube slender, lobes spreading. *Stamens* free; filaments filiform, inserted on hypogynous glands; anthers oblong, dorsifixed, usually exsert. *Ovary* attenuate at apex; style slender, divided into stigmatose branches; ovule 1, pendulous from a basal ascending funicle. *Fruit* a capsule, included in the persistent calyx and corolla, circumsciss near the base, hardened above; seed solitary, albumen very small, embryo slender, radicle superior, cotyledons oblong.—*DISTRIB.* About 10 species, found in the warm regions of both hemispheres.

PLUMBAGO ZEYLANICA, Linn. Sp. Pl. (1753) 151. A straggling perennial herb; branches rounded, striate, glabrous. *Leaves* alternate, ovate, shortly acute at apex, rounded at base and suddenly narrowed and decurrent, 2 to 5 in. long, 1 to 2.5 in. broad, entire, thin, glabrous above, somewhat scurfy beneath and often glaucous; midrib slender, prominent beneath, main-nerves 6 to 7 pairs, also prominent, curving upwards, secondary nerves and reticulations obscure; petiole .5 to 1 in. long, winged by the gradually narrowing decurrent base of the blade, auricled and amplexicaul at base. *Inflorescence* a terminal leafy panicle of spicate racemes, the rachis densely glandular; bract ovate, acuminate, bracteoles 2, linear-subulate; pedicels very short or none, bracts and pedicels glandular. *Calyx* narrowly tubular, about .5 in. long, more or less deeply 5-fid; lobes slender, hyaline on the margins, covered thickly on the back with prominent stalked red glands. *Corolla*-tube white, slender, funnel-shaped, membranous, about 1 in. long; lobes 5, nearly .5 in. long, ovate, acute, patent. *Stamens* 5, free; filaments very slender; anthers oblong, dorsifixed, exsert. *Ovary* ovoid; style filiform, dividing into 5 stigmatose branches. *Capsule* membranous below, thick above, 5-furrowed, sharply pointed; seed pendulous, oblong; cotyledons obtuse. DC. Prod. XII. 692; Roxb. Hort. Beng. 13, Fl. Ind. I. 462; Wall. Cat. 7241c; Wight Ill. t. 179; Miq. Fl. Ind. Bat. II. 994; Dalz. and Gibs. Bomb. Fl. 220; Kurz in Journ. As. Soc. Beng. XLVI. ii. 217; Clarke in Hook. f. Fl. Br. Ind. III. 480; Trimen Fl. Ceyl. III. 65; Prain Beng. Plants I. 639. *P. auriculata*, Bl. Bijdr. 736. *P. viscosa*, Blanco Fl. Filip. ed. I. 78. 'Tumbacodivéli,' Rheede Hort. Mal. X. t. 8.

PENANG: *Curtis* 93; *Deschamps*. NEGRI SEMBILAN: *Ridley* 10095. SINGAPORE: *Deschamps*; *King's Collector* 284.—DISTRIB. Tropical regions of the Old World, doubtfully indigenous in the Malay Peninsula or elsewhere.

Order LXXVIII. GENTIANACEÆ.

[By C. B. CLARKE.]

Herbs, erect, twining, or floating; glabrous except *Microrrhium*. *Leaves* entire; those of the lower main stem opposite except in the floating plants. *Inflorescence* in 2- to 3-divided cymes, or peduncles 1-flowered. *Flowers* symmetric in calyx, corolla, stamens (except in *Canscora*). *Calyx* tubular or campanulate; lobes 4 to 5 (or by accident (?) 6), oblong or linear. *Corolla* gamopetalous, tube long or short; lobes as many as calyx-segments, usually dextrorsely contorted in the bud. *Stamens* as many as the corolla-segments, all perfect (except in

Canscora); filaments on the corolla-tube; anthers of 2 parallel cells. *Ovary* 1- (or imperfectly 2-) celled; of 2 carpels, superior or stalked or slightly inferior; style linear or oblong; stigma capitate or shortly 2-lobed; placentas parietal, sometimes much intruded, partly coalescing in the axis; ovules very many. *Capsule* dehiscent or indehiscent, not rarely becoming more or less succulent; seeds many, albuminous.—DISTRIB. Species 700; found in all countries.

Erect herbs; lower stem leaves (often all the leaves) opposite:—

Glabrous; corolla blue	..	..	..	..	1. EXACUM.
Pubescent all over	..	..	..	..	2. MICRORPHIUM.
Glabrous; corolla rose-coloured or white	..	..	..	..	3. CANS CORA.
Twiner; corolla narrow, more than 1 in. long	..	..	..	..	4. CRAWFURDIA.
Floating (or creeping on mud); leaves round-ovate:—					
Peduncles solitary, from the axil of a long-petioled leaf	..	..	..	..	5. VILLARSIA.
Peduncles clustered, from the axil of a sessile leaf.	..	..	..	..	6. LIMNANTHEMUM.

1. EXACUM, Linn.

Glabrous erect herbs. *Leaves* opposite, usually 3- to 5-nerved. *Flowers* paniced, 4- to 5-merous. *Calyx* deeply lobed. *Corolla* rotate; tube globose; lobes ovate or oblong, blue or white. *Stamens* attached in the corolla throat; anthers large, of two oblong cells, which open first by terminal pores or short slits. *Ovary* more or less completely 2-celled; style linear; stigma sub-capitate. *Capsule* globose, septici-dally 2-valved; seeds numerous, minute, cuboid.—DISTRIB. Species 30, whereof 20 Indian, the others in China, Malaya, Africa.

Stem 1 to 4 feet; corolla-lobes $\frac{1}{2}$ in. long, azure blue	..	1. <i>E. tetragonum</i> .
Stem 4 to 12 in.; corolla-lobes $\frac{1}{2}$ to $\frac{1}{3}$ in. long, pale blue	..	2. <i>E. pedunculatum</i> .

1. EXACUM TETRAGONUM, var. β *stylosa*, C. B. Clarke in Hook. fil. Fl. Br. Ind. IV. 95. *Stem* 1 to 4 feet, quadrangular. *Leaves* 5 by 1 in., sessile, lanceolate, 3- to 5-nerved. *Panicle* many-flowered; bracts at its divisions .25 to .5 in. long, linear; flowers 4-merous, or rarely 5-merous. *Calyx-lobes* .25 in. long, ovate acuminate. *Corolla-lobes* .5 in. long, broadly elliptic acute, full azure-blue. *Anthers* .2 in. long, straight. *Style* .5 in. long. *Capsule* globose, .25 in. in diam. *E. stylosum* (sp.), Griseb. in DC. Prod. IX. 46. *E. chironioides*, Griseb. Gent. 109, in DC. Prod. IX. 45. *E. Horsfieldianum*, Miq. Fl. Ind. Bat. II. 556. *E. sulcatum*, C. B. Clarke in Journ. Linn. Soc. XIV. 425 (not of Roxb.). *E. tetragonum*, Vidal Fl. Filip. 191.

SINGAPORE: Lobb 473.—DISTRIB. From Burma to Borneo and the Philippines.

2. EXACUM PEDUNCULATUM, Linn. Sp. Pl. ed. I. 112; cd. II. 163.

Stem 4 to 12 in., quadrangular, often much-branched. *Leaves* 1·5 by ·5 in., sub-sessile, elliptic or lanceolate, 3-nerved. *Panicle* usually compound, many-flowered; lower bracts similar to the leaves, by degrees smaller, to the upper less than ·25 in. long; flowers 4-merous. *Calyxlobes* ·17 to ·2 in. long, ovate, acute, winged. *Corolla-lobes* ·25 to ·35 in. long, pale blue. *Anthers* ·12 in. long, dehiscent finally half-way down. *Capsule* globose, ·17 in. in diam. DC. Prod. IX. 46; Hook. fil. Fl. Br. Ind. IV. 97; Trimen, Fl. Ceyl. III. 182. *E. pedunculare*, Arn. in Ann. Sc. Nat. ser. 2, XI. 176; Wight Ic. t. 336. *E. sulcatum*, Roxb. Fl. Ind. ed. Carey & Wall. I. 415; DC. Prod. IX. 46 (*syn. excl.*).

SINGAPORE: *Lobb* 358.—DISTRIB. From Oudh and Bengal to Ceylon and Pegu.

2. MICRORPHIUM, C. B. Clarke, gen. nov.

A pubescent erect herb, repeatedly branched. *Leaves* alternate except a few distant opposite pairs on the main stem. *Flowers* numerous, solitary, pedicelled, in unilateral repeatedly branched cymes. *Calyx* short-cylindric, terete, sub-2-lipped, almost leathery; lobes 5, short. *Corolla* small; tube campanulate, lobes 5, equal, dextrorsely contorted in the bud. *Stamens* 5, equal, perfect; anthers exsert, cells oblong, parallel, dehiscent by a slit their whole length. *Ovary* 1-celled; placentas intruded; style linear, stigma sub-capitate. *Seeds* very small, ovoid, not angular.—DISTRIB. Species 1, Malayan.

1. MICRORPHIUM PUBESCENS, C. B. Clarke, sp. nov. *Stem*, leaves, inflorescence, calyx covered with a short thick grey pubescence. *Stem* (upper part seen) 14 in. long; the lower part with opposite pairs of leaves (and branches) 2·5 in. apart; all the other numerous stem-divisions and leaves alternate. *Leaves* of the main stem ·75 by ·35 in., elliptic, entire, obtuse, narrowed at base; petiole 0 to ·1 in. long; the other leaves similar but smaller. *Pedicels* ·25 in. long. *Calyx* ·2 in. long; opening at first in two lips, one emarginate 2-nerved, the other ovate 3-nerved. *Corolla-tube* broad, lobes short, round, soon reflexed over the calyx-margin. *Capsule* ovoid, ·2 in. long, dry; seeds 200 μ in diam. *Pollen* globose; 25 μ in diam.

KEDAH: *Curtis* 2528. "Height 1 to 2 feet; petals white; anthers yellow" (*Curtis*).

3. CANSORA, Lam.

Herbs, dichotomously branched, glabrous or very nearly so. *Leaves* opposite. *Flowers* mostly cymose. *Calyx* large, membranous, tubular, often winged; teeth much shorter than the tube. *Corolla-tube* cylindrical; lobes 4, unequal (except in *C. pentanthera*). *Ovary* 1-celled;

placentas intruded; style linear, lobes 2, hemispheric. *Capsule* 2-valved or breaking up irregularly. *Seeds* very small, polyhedral.—DISTRIB. Species about 25, extending from Africa through South-east Asia to Australia.

One stamen only perfect; corolla irregular 1. *C. diffusa*.
 All stamens perfect; corolla regular 2. *C. pentanthera*.

Sub-genus 1. EU-CANSCORA. Calyx 4-toothed. Corolla sub-bilabiate. Stamens 4; 1 larger perfect, 3 shorter smaller or obsolete.

1. CANSCORA DIFFUSA, R. Brown, Prodr. (1810) 451 in Obs. Erect annual, 4 to 20 in., much branched upwards. *Leaves* 1·5 by ·5 in., lanceolate or elliptic, 3-nerved, often petioled, upper smaller. *Cymc* diffuse; lower bracts at its divisions ·5 in. long, ovate, upper much smaller. *Calyx* $\frac{1}{5}$ in. long; teeth lanceolate-linear. *Corolla* rose-coloured; tube $\frac{1}{5}$ in., lobes $\frac{1}{5}$ in. *Capsule* oblong, as long as the calyx. DC. Prod. IX. 64; Benth. Fl. Austral. IV. 372; Hook. fil. Fl. Br. Ind. IV. 103; Trimen Fl. Ceyl., III. 184. *Exacum diffusum*, Willd. Sp. Pl. I. 637. *Orthostemon erectum*, R. Br. Prodr. 451; DC. l.c. 63. *O. Hugelii*, DC. l.c. 63. *Pladera virgata*, Roxb. Fl. Ind. ed. Carey & Wall. I. 417; Hook. Bot. Misc. III. 88 t. 25.

SINGAPORE: *Lobb* 345. A common species, extending from East Tropical Africa throughout India to Australia and the Philippines.

Sub-genus 2. PENTANTHERA. Stamens 5 (or 6), equal, anthers all similar, perfect. Corolla-lobes 5 (or sometimes 6), equal, dextrorsely contorted in the bud.

2. CANSCORA PENTANTHERA, C. B. Clarke, sp. nov. A slender under-shrub, 18 in. high, glabrous except the minutely gland-puberulous (young) petioles; stem terete with many opposite branches. *Leaves* opposite, 3 by 1 in., ovate-lanceolate, acuminate, attenuate at the base; petiole 0 to ·2 in. *Cymcs* loosely, repeatedly dichotomous, often carrying 10 flowers; bracts at the divisions similar to the leaves, but gradually smaller, becoming sessile, a few pairs connate into perfoliate bracts. *Flowers* solitary, ·5 in. long, on pedicels ·12 to ·5 in. long. *Calyx* ·35 in. long, membranous; tube triquetrous, narrowly 3-winged, ovoid-cylindric; lobes less than one-third the length of the tube, ovate, imbricate, apiculate. *Corolla* white (*Ridley*); tube as long as the calyx, lobes 5 (or not rarely 6), oblong-elliptic, equal, sub-erect, contorted dextrorsely (*sensu Linneano*) in the bud. *Stamens* 5 (or 6 in the 6-lobed corolla), equal, perfect; filaments inserted in the upper part of the corolla-tube from which the erect anthers are half-exsert; anther-cells 2, oblong or linear-oblong, opening by longitudinal slits; pollen 25 by 20 μ , ellipsoid, irregularly longitudinally striate. *Ovary* oblong, when young thin,

almost succulent; placentas much intruded; style linear, with 2 round stigmatic lobes. *Capsule* broad-ellipsoid, crustaceous, almost succulent (dehiscence not clear); style persistent; seeds 300 μ in diam., ovoid, somewhat angular, brown.

PERAK, Waterloo: *Robertson* 9088. SELANGOR: Sua Batu, *Ridley*; Gua Batu, *Ridley* 8218. KEDAH: Langkaui, *Curtis* 2516.

This species, the only one in the sub-genus, differs in the aestivation of the corolla, the number of the stamens, the anthers all equal, the persistent style, from the characters assigned to *Cunscora*.

4. CRAWFURDIA, Wall.

Glabrous twiners. *Leaves* opposite, petioled, 3-nerved. *Flowers* showy, axillary. *Calyx* tubular; teeth 5 (or 4), long, often very long. *Corolla* long, tubular-funnel-shaped; lobes 5, short. *Stamens* 5 on the corolla-tube; anthers oblong. *Ovary* stalked, 1-celled, placentas parietal; style linear, stigmas 2, short-oblong. *Fruit* globose or ellipsoid, berried or capsular; seeds many, 2- (or imperfectly 3-) angled.—**DISTRIB.** Species 10–12, extending from India to Manchuria.

1. CRAWFURDIA BLUMII, G. Don Syst. IV. 200. *Stem* often 3 to 4 feet long. *Leaves* (blade) 1·5 by ·75 in., ovate-lanceolate, acute, entire; base rounded or narrowed; petiole ·35 in. *Flowers* axillary, solitary, sub-sessile, or the pedicel ·25 to 1·5 in. long. *Calyx* narrow, angular; tube ·2 in. long, teeth ·25 in. long, linear. *Corolla* 1·25 to 1·5 in. long, light purple. *Fruit* ·6 in. long, ellipsoid, purple, succulent. *Seeds* imperfectly 3-angular, angles (or 2 of them) often narrowly winged. *Miq. Fl. Ind. Bat. v. II. 561 (Blumei)*. *C. trinervis*, Hassk. Cat. Hort. Bogor. 128, in *Tidjsh. Nat. Gesch. X. 126. Tripterospermum trinerve*, Blume Bijdr. 849; Griseb. in DC. Prod. IX. p. 121. [*Cf. C. B. Clarke in Fl. Br. Ind. IX. p. 107, sub Crawfurdia affini, Wallich.*]

PAHANG, 7,000 feet alt.: *Wray* 1570.—**DISTRIB.** Sumatra, Java.

5. VILLARSIA, Vent.

Floating, glabrous herbs. *Leaves* long-petioled, ovate, entire or sinuate. *Peduncles* solitary, 1- (or many-) flowered. *Calyx* deeply 5-lobed. *Corolla* broadly campanulate; tube short, lobes sub-rotate. *Stamens* 5; filaments filiform, on the corolla-tube; anthers sagittate. *Ovary* 1-celled; style short; stigma of 2 small lobes; placentas parietal. *Capsule* globose, 1-celled, 4-valved at the apex; seeds several (or numerous).—**DISTRIB.** Species 12, in Africa or in Australia, except the following Malay species.

1. VILLARSIA AURANTIACA, *Ridley* MS. A small herb; stems 2 in.

long, with leaves and peduncles at the nodes. *Leaves* all long-petioled, .35 in. in diam., widely excavated at the base, ovate, margin sinuate; petiole .5 to 2 in. long. *Peduncles* solitary, 1 to 2 in. long, ebracteate, 1-flowered. *Calyx* .17 in. long, lobes oblong. *Corolla* .35 in. in diam.

PAHANG: Kwala Pahar, *Ridley*.

This example shows no fruit, and the flowers are not in a state for dissection. This collection has been supposed to be near *Limnanthemum parvifolium*, Griseb., which has smaller flowers, with the peduncles (several) clustered in the axil of a sessile leaf. This plant of *Ridley* appears to come near the Swan River *Villarsia violifolia*, F. Muell.

6. LIMNANTHEMUM, S. P. Gmel.

Peduncles several in the axil of a nearly sessile leaf. *Capsule* thin, breaking up irregularly, otherwise as *Villarsia*.—DISTRIB. Species 20, dispersed throughout the Tropical and Temperate Zones.

1. LIMNANTHEMUM PARVIFOLIUM, Griseb. in DC. Prod. IX. 141. *Stem* 3 to 8 in. long, slender, with distant nodes. *Leaf* .75 in., round, ovate, excavated at base, gland-dotted on the under surface; petiole scarcely .08 in. *Pedicels* clustered, 0 to .25 in. long. *Calyx-lobes* .08 in. long, lanceolate, acute. *Corolla-lobes* .17 in. long, white, fimbriate. *Capsule* .17 in. long, ellipsoid, sessile, about 10-seeded; seeds smooth but with capitate papillæ sparsely irregularly scattered. Hook. fil. Fl. Brit. Ind. IV. 132; Trimen, Fl. Ceyl. III. 189.

SINGAPORE: *Cuming* 2280 (in Mus. Brit.).—DISTRIB. Malabar, Ceylon; Chittagong to Tavoy.