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

No. 20.

The present Part contains the descriptions of three Families, No. 89 *Acanthaceæ*, which was only finished by the late Mr. C. B. Clarke, F.R.S., just before his lamented death in August, 1906, and Nos. 91 *Labiataæ* and 92 *Plantaginaceæ*, which have been done by Lt.-Col. Prain, C.I.E., F.R.S., Director of the Royal Gardens, Kew.

The 3 Families comprise 54 genera and 166 species. In the *Acanthaceæ* there are 35 genera and 134 species, of which 5 genera and 68 species are new. In the *Labiataæ* the genera are 18 and the species 31, one genus being newly described. But it is worthy of note that of the 31 species only 16 are really native in the Malay Peninsula, the rest being introduced plants. One species only is endemic, *Plectranthus Kunstleri*, Prain. In *Plantaginaceæ* there is merely one genus containing one species, an introduced weed.

It may here be usefully recorded that, in addition to his work on the Malay Peninsula *Acanthaceæ* herein given, the late Mr. Clarke also prepared an account of the species of the Malay Archipelago, which will shortly be published in the 'Journal of the Linnean Society.'

Part No. 21, which will contain two Families, No. 86 *Gesneraceæ* and No. 90 *Verbenaceæ*, and thus complete the Gamopetalæ, may be expected to issue about the New Year.

Family LXXXIX.—ACANTHACEÆ.

[By C. B. CLARKE.]

Herbs or shrubs, or twining plants (*Thunbergia*). *Leaves* opposite, often unequal, in *Polytrema* sometimes pseudalterate; stipules 0. *Inflorescence* various; spikes strobilate or heads or cymose or flowers solitary; bracts and prophylla large, small or 0. *Flowers* 2-sexual, irregular. *Calyx* inferior; segments 5 or 4, nearly free or more or less united. *Corolla* gamopetalous; tube campanulate or linear; limb 2-lipped or 5-lobed, more or less 1-sided. *Stamens* on the corolla 4 didynamous, or 2 (with or without rudiments); anther-cells 2 or 1; pollen ellipsoid (then usually ribbed or banded longitudinally) or globose (then often honeycombed or echinulate). *Ovary* superior, 2-celled; ovules 2 to 1, or several, superimposed in vertical rows (or 2 collateral in *Thunbergia*); style long, simple, minutely 2-fid. *Capsule* loculicidal, often elastically dehiscent; seeds usually nearly as many as the ovules, held up on rigid curved *retinacula* (outgrowths of the funicle); albumen 0.—DISTRIB. Species 2000, throughout the warmer parts of the world.

This Family is specially characterized by the retinacula and the seeds placed in a vertical line; this character fails in the first two Subfamilies. The plants of Subfamily II. NELSONIOIDÆ are frequently mistaken for those of SCROPHULARIACEÆ, from which they differ by the seeds being superimposed vertically.

CONSPECTUS OF THE SUBFAMILIES, TRIBES, AND GENERA.

- Subfamily I. THUNBERGIOIDÆ. Seeds 4 to 2 in the capsule without retinacula. Twiners 1. THUNBERGIA.
- Subfamily II. NELSONIOIDÆ. Seeds 8 to 16, vertically superimposed in 2 rows in the capsule on small soft papillæ (not on hard curved retinacula). Herbs small or of very moderate size :—
- Stamens 2 2. NELSONIA.
- Stamens 4 :—
- Flowers in spikes, racemes, or panicles 3. STAUROGYNE.
- Flowers axillary 4. CARDANTHERA.
- Subfamily III. RUELLIOIDÆ. Retinacula present. Corolla-lobes contorted in the bud :—
- Tribe 1. RUELLINÆ. Capsule with more than 4 seeds, which are hygroscopically shaggy on the margin :—
- Pollen honeycombed. Flowers axillary. Capsule clavate 7. RUELLIA.
- Pollen echinate. Capsule seed-bearing from the base 8. APORUELLIA.
- Pollen ellipsoid, with many longitudinal ribs. Capsule hardly stalked :—

- Corolla distinctly 2-lipped:—
- Spikes continuous or axillary clusters 5. HYGROPHILA.
 - Flowers in 1-sided axillary open racemes 6. NOMAPHILA.
- Corolla obscurely or scarcely 2-lipped:—
- Thyrusus terminal, 8 to 12 by .75 in. 9. STENOTHYRSUS.
 - Spikes terminal or short-peduncled heads 10. HEMIGRAPHIS.
- Tribe 2. STROBILANTHINÆ. Capsule with 4 (or 2) seeds:—
- Pollen ellipsoid, longitudinally ribbed:—
- Stamens 4 12. STROBILANTHES.
 - Stamens 2 11. ENDOPOGON.
 - Pollen globose, echinate. Stamens 4 13. ACANTHOPALE.
- Subfamily IV. ACANTHOIDEÆ. Retinacula present. Corolla with the posticous lip cut away; anticous lip 3-lobed, the middle lobe bifid 14. ACANTHUS.
- Subfamily V. JUSTICIOIDEÆ. Retinacula present. Corolla-lobes imbricated in the bud, *i. e.* one lobe wholly within, one wholly without, the others:—
- Tribe 1. GYMNSTACHYINÆ. Capsule with more than 4 seeds. Bracts inconspicuous, hardly as long as the small sepals, which rarely attain one-fifth inch in length. Stamens 2:—
- Capsule cylindric at base; seeds in the clavate top 16. PHLOGACANTHUS.
 - Capsule with parallel sides; seed-bearing from the base:—
 - Corolla-tube cylindric, scarcely inflated:—
 - Seeds hygroscopically hairy on the margin 15. GYMNSTACHYUM.
 - Seeds glabrous, stony 17. ANDROGRAPHIS.
 - Corolla-tube much inflated upwards 18. CYSTACANTHUS.
- Tribe 2. ASYSTASINÆ. Capsule with 4 seeds. Stamens 4:—
- Sepals united at base for at least one-third of their length 20. PHIALACANTHUS.
 - Sepals nearly free at base:—
 - Capsule at base cylindric; seeds in the upper wider part:—
 - Anther-cells at equal height 19. ASYSTASIA.
 - One anther-cell below the other 21. FILETIA.
 - Capsule conic; the 4 seeds near the base 22. LEPIDAGATHIS.
- Tribe 3. BARLERIINÆ. Capsule 2- to 4-seeded. Stamens 2, fertile. Calyx large, 4-partite to the base. Anther-cells 2, rounded at base. Pollen globose, reticulated. Corolla yellow, 1.25 in. long 23. BARLERIA.
- Tribe 4. ERANTHEMINÆ. Capsule 4- to 2-seeded. Stamens 2. Anther-cells 2, rounded at base. Corolla-tube linear; limb subequally 5-fid, spreading 24. ERANTHEMUM.
- Tribe 5. JUSTICIINÆ. Capsule 4- to 2-seeded. Corolla distinctly 2-lipped. Stamens 2. Calyx small, subequally deeply lobed. Seeds smooth or tuberculate, but without needle-like hygroscopic hairs:—
- Sect. 1. MONOTHECIÆ. Anthers 1-celled:—
 - Corolla 1.25 in. long, orange-red 25. CLINACANTHUS.
 - Sect. 2. TYPICÆ. Anthers 2-celled. The flower not appearing as though enclosed between two opposite bracts. Placentæ in fruit not rising elastically from the base of the capsule:—

- One anther-cell below the other, tailed 26. JUSTICIA.
 One anther-cell somewhat below the other, its base rounded or acute, scarcely tailed:—
 Corolla-tube broad. Shrub 27. ADHATODA.
 Corolla-tube linear; posticous lip small, twisted .. 28. RHINACANTHUS.
 Anther-cells at equal or nearly equal height, not tailed:—
 Corolla .3 to .7 in. long:—
 Spikes, racemes, or panicles terminal 29. LEDA.
 Cymes small, axillary 30. POLYTREMA.
 Corolla 1.25 in. long:—
 Corolla green-blue 31. ECBOLIUM.
 Corolla red 32. GRAPTOPHYLLUM.
- Sect. 3. HYPOESTÆ. Flower appearing as though enclosed between two bracts. Placentæ in fruit not rising elastically:—
 Anther-cells 2, one placed higher 33. PERISTROPHE.
 Anthers 1-celled 34. HYPOESTES.
- Sect. 4. SOLUTÆ. Placentæ rising in fruit elastically from the base of the capsule, and throwing out the seeds:—
 Flowers in spikes, with prominent bracts 35. RUNGIA.

1. THUNBERGIA, Linn. f.

[Character narrowed, as throughout *Acanthaceæ*, to the Malay Peninsula species.]

Twiners. *Leaves* petioled, opposite, subequal, undivided, often toothed or lobed. *Peduncles* solitary, axillary, running into terminal racemes, *i. e.* the upper floral leaves (or bracts) greatly reduced, inconspicuous or obsolete. *Bracteoles* (prophylla) large, often .5 in. long, broad-oblong from a truncate base. *Calyx* of 8 to 14 small lanceolate teeth, or obsolete (appears a mere rim). *Corolla* large; tube cylindrical or campanulate; limb of 5 subequal lobes, contorted in the bud. *Stamens* 4, subsimilar; anther-cells 2, parallel, sometimes strongly spurred at the base; pollen large (50 to 60 μ in diam.), globose, smooth, with faint spiral bands or strongly spinous. *Ovary* 2-celled, with 2 ovules in each cell; stigma of 2 equal, opposite, triangular lobes. *Capsule* globose, with a long oblong-linear beak; seeds 4, or by suppression 3 to 2, hemispheric, excavate on the plane face, wrinkled on the spheric face; sessile, not held aloft on retinacula.—**DISTRIB.** Species 100, in the warm parts of the Old World; most numerous in Africa, extending to Australia.

Sect. 1. Calyx a mere rim. Anther-cells spurred. Pollen smooth:—

- Leaves broad-oblong, entire or slightly toothed 1. *T. laurifolia*.
 Leaves round-ovate, toothed or often lobed 2. *T. grandiflora*.

Sect. 2. Calyx of 8 to 12 teeth. Anther-cells not spurred.

Pollen spinous:—

- | | | | |
|--|----|----|-------------------------|
| Petioles not winged. Corolla pure white | .. | .. | 3. <i>T. fragrans</i> . |
| Petioles often winged. Corolla yellow, with claret eye | .. | .. | 4. <i>T. alata</i> . |

1. THUNBERGIA LAURIFOLIA, Lindl. in Gard. Chron. p. 260 (1856). Scandent, up to 150 ft. long (Kurz). Leaves 3·5 by 1·5 in., broad-oblong, wide at base, truncate or ovate, glabrous, sub-3-nerved, entire or slightly toothed; petioles ·5 to 1 in. long. Peduncles axillary, solitary, distant or more often running into terminal close racemes 2 to 5 in. long; bracteoles (prophylla) 1 in. long, oblong, usually slightly pubescent. Calyx a mere rim. Corolla 2 in. long, blue or blue and white; tube campanulate, only contracted for a very short space at the base. Stamens 4, subsimilar; filaments glabrous; anther-cells with a rigid long spur at the base, fringed with many long pilose hairs; pollen globose, large (50 μ in diam.), smooth, with obscure broad spiral bands. Pistil glabrous; the two stigmatic lobes sub-opposite. Capsule globose, smooth, brown, ·25 in. in diam., with 4 to 2 seeds; beak 1 to 1·25 in. long, oblong-linear. Seeds hemispheric, cerebro-granular, excavated on the plane face. Hook. Bot. Mag. t. 4985; Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 392; Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, pp. 41, 42, and in Engl. & Prantl Pflanzenfam. IV. 3B, 292; Ridley in Trans. Linn. Soc. ser. 2, III. (1893) 332. *T. Harrisii*, Hook. Bot. Mag. t. 4998.

MALACCA: *Maingay* (K.D.) 1170; Thoban Isle, *Helper*; Goping, *King's Collector* 1064. PERAK: *Wray* 3145; *Scortechini* 2197; *King's Collector* 3030, 8418. PULAU MANIS: fide *Ridley*. PENANG and KEDAH: *Curtis*.—DISTRIB. Northwards to Arracan.

2. THUNBERGIA GRANDIFLORA, Roxb. Hort. Beng. 45 (1813 to 1814). Leaves ovate or rounded, 3 to 6 in. in diam., pubescent beneath, palmately 5- to 7-nerved from the base, usually angular or lobed, rarely nearly entire; otherwise as *T. laurifolia*. Roxb. Fl. Ind. III. 34; Hook. Bot. Mag. t. 2366; Nees in DC. Prodr. XI. 54 (*with all syn. except* Roxb. Cor. Pl. t. 67); Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 392; Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, pp. 37, 39, and in Engl. & Prantl Pflanzenfam. IV. 3B, 292; Hemsl. in Journ. Linn. Soc. XXVI. (1890) 237; Prain Beng. Plants 796. *Flemingia grandiflora*, Rottler in Neue Schr. Gesell. Nat. Freunde IV. (1803) 202.

SINGAPORE: *Schomburgk* 84.—DISTRIB. Bengal to South China. Perhaps Schomburgk's specimen was from a cultivated plant.

This species runs excessively close to *T. laurifolia*, but Lindau has put *T. grandiflora* in a different Section because it has "flowers solitary, axillary." The inflores-

cence is exactly the same in both species; in *T. grandiflora* the flowers are very generally in terminal racemes, the upper bracts (floral leaves) being often only .25 to .5 in. long.

3. *THUNBERGIA FRAGRANS*, Roxb. Cor. Pl. I. 47 t. 67 (1795). Twining, often 4 to 8 ft. long. *Leaves* 3 by 1 to 1.5 in., oblong or elliptic, obtuse, rounded or hastate at base, nearly entire, nearly glabrous or (in form *javanica*) pubescent, sub-3-nerved; petiole .25 to .5 in. long. *Peduncles* 1 to 3 in. long, axillary, solitary, rarely two together; bracteoles (prophylla) .5 to .7 in. long, oblong-lanceolate. *Calyx* of about 12 narrow-oblong teeth .15 in. long. *Corolla* white; tube .5 to .75 in. long, narrow-oblong, contracted at top and bottom; limb of 5 obovate, emarginate, spreading lobes. *Stamens* 4, in the corolla-tube, glabrous; anthers not spurred; pollen globose (50 μ in diam.), the borders of the spiral bands carrying spines so long that the bands are obscured. *Pistil* glabrous; the 2 stigmatic lobes opposite. *Capsule* cuboid-globose, .4 in. in diam.; beak .8 in. long, oblong-linear. *Seeds* 4 (or by suppression fewer), hemispheric, cerebroid, granular, with a hole in the plane face. Nees in DC. Prodr. XI. 56; Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 390 (*with all syn.*); Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, pp. 36, 38, and in Engl. & Prantl Pflanzenfam. IV. 3 B, 292; Ridley in Trans. Linn. Soc. ser. 2, III. (1893) 332, and in Journ. As. Soc. Straits 121 (Singapore 1900); Hemsl. in Journ. Linn. Soc. XXVI. (1890) 237; Prain Beng. Plants 795.

PEKAN: fide *Ridley*. — DISTRIB. Throughout India, extending to Timor; Philippine Islands (Palawan, *Bernejos* 193).

FORMA β *javanica* (sp.), Gaertn. f. Fruct. III. (1805) 22 t. 183, fig. 4; leaves beneath, petioles, and peduncles pubescent (in Wray 52, rufous shaggy). Blume Bijdr. 806; Moritz! Verz. Zollinger Pfl. 46; Hassk. Cat. Hort. Bogor. 147.

SINGAPORE: *Kunstler* 25; Ulu Kenring, *Wray* 52. KEDAH: *Curtis*. — DISTRIB. Throughout Malaya to North Australia.

4. *THUNBERGIA ALATA*, Sims Bot. Mag. t. 2591 (1825). Villous. *Leaves* cordate-ovate, subentire; petioles 1 to 2 in. long, often winged. *Corolla* yellow or nearly white; tube with a dark claret mouth, exactly cylindric, twice as thick as that of *T. fragrans*, otherwise resembling *T. fragrans*. Bojer Hort. Maurit. 259 (1837); Hook. Exot. Fl. III. t. 177, Bot. Mag. t. 3512; Kurz For. Fl. II. 240; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 491; Lindau in Engl. Jahrb. XVII. (1893) Beibl. 41, 37, 40, and in Engl. & Prantl Pflanzenfam. IV. 3 B, 292; Burkill in Dyer Fl. Trop. Afr. V. 9, 16; Prain Beng. Plants 795; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900).

SINGAPORE: *Kunstler* 151; *Deschamps*.—DISTRIB. Native in warm Africa and Mascarenia, a common plant; runs wild as a weed in India and South-East Asia.

2. NELSONIA, R. Br.

A diffuse herb. *Leaves* opposite, subequal. *Flowers* small, in dense small spikes; bracts spiral or alternate (not opposite). *Calyx* small, sub-4-lobed. *Corolla*-tube slender; limb 2-lipped. *Stamens* 2; anthers 2-celled, subincluded in the corolla-tube. *Ovary* 2-celled; ovules about 8 in each, arranged vertically in two rows on the double placental line in each cell. *Capsule* ovoid-conic, with 8 to 16 seeds in the basal half; retinacula 0.—DISTRIB. Species 1, in warm parts of Africa, India, Australia, America.

N.B.—This plant is often sorted amongst SCROPHULARIACEÆ; nor does it differ except by the arrangement of the ovules and seeds in one vertical line on the margin of the carpellary leaf.

1. NELSONIA CAMPESTRIS, R. Br. Prodr. 481 (1810). Prostrate, hairy; branches often 12 to 18 in. long. *Leaves* of stem 2 to 3 in. long, oblong or obovate, nearly entire, long-petioled or nearly sessile; basal leaves often 6 in. long. *Flowers* in small heads, .5 in. in diam.; terminal or on axillary peduncles which lengthen out in fruit to 2 to 3 in.; bracts ovate, .15 in. long; bracteoles very small. *Calyx* .125 in. long, 2-lipped; one lip deeply 3-fid, the other shortly 2-fid. *Corolla* .15 in. long, rose or white. *Pistil* glabrous; style shortly 2-fid. *Stamens* 2; anther of 2 ellipsoid cells half-divergent; pollen globose, 25 μ in diam., subtetrahedral (almost as in *Scrophulariaceæ*). *Capsule* .15 in. long; seeds ellipsoid, brown, granular. Endl. Iconogr. t. 79; Benth. Fl. Austral. IV. 543; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 394 (*with all syn.*); Burkill in Dyer Fl. Trop. Afr. V. 28; Prain Beng. Plants 797. *N. tomentosa*, Nees in Wall. Pl. As. Rar. III. (1832) 79; Nees in DC. Prodr. XI. 65; Miq. Fl. Ind. Bat. II. 770. *N. brunelloides*, O. Kuntze Revisio I. 493; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 289, t. 110, fig. c.

KEDAH: *Ridley* 8312. PENANG: *Curtis* 50, 1750; *Deschamps*. PAHANG: *Ridley* 2181.—DISTRIB. In warm regions of both hemispheres.

The innovations are often densely white-hairy; there are also often long white hairs at the base of the flower. The var. *β vestita*, of Fl. Br. Ind. IV. 395 (which has large leaves, up to 8 to 10 in. long, on the branches), is frequent in Lower Burma, but there is no example of it from the Malay Peninsula.

3. STAUROGYNE, Wall.

Undershrubs, 6 to 24 in. (rarely 3 to 4 ft.) high, at base often woody, creeping, hairy (in *S. subglabra* nearly glabrous). *Leaves* opposite, equal, simple, entire; petioles usually long, rarely short, .25 to .5 in. *Flowers* in spikes (or spike-like racemes, the pedicels up to .15 in.), dense or lax; the spikes sometimes paniced. *Bract* usually a little longer than the calyx, sometimes considerably broader; two prophylla (often alternate), linear or nearly linear, a little shorter than the bract. *Calyx* .15 to .6 in. long, divided nearly to the base into 5 narrow persistent segments (often called sepals); of these one is often longer and sometimes much broader than the others. *Corolla* .5 to 1 in. long, tubular-campanulate, rather narrow; limb of 5 short rounded segments (often colorate). *Stamens* 4 didynamous, fertile; filaments sparsely hairy, and with gland-tipped hairs near the top; anthers of 2 ellipsoid cells, ultimately divaricate; pollen globose, with three longitudinal bands not reaching the poles, 25 to 30 μ in diam. *Ovary* oblong, surrounded at base by a disk, glabrous or rarely with minute scattered hairs; style long, sometimes with a few hairs in the lower part; branches 2, unequal. *Capsule* oblong, .2 to .25 in. long, ovoid at base, acute at top, glabrous or sometimes slightly minutely hairy, 2-celled, separating loculicidally into 2 valves, bearing seeds from the base; seeds 12 to 20 in each capsule, in vertical rows on the edges of the carpellary leaves. *Seeds* attached on very small papillæ, not on retinacula, short-ellipsoid, 400 μ long, yellow-brown ultimately black, smooth, more or less reticulate, minutely pitted.—**DISTRIB.** Species 40 in South-East Asia, 10 in Brazil.

Some of the Brazil species have flowers and capsules considerably larger than in the Asiatic species. The Asiatic species are so uniform in the corolla, stamens, and pistil—even down to the hairs thereon—that these are not described for the subjoined Malay species, which are separated mainly by characters of the bracts and calyx.—The posticous stigmatic lobe (both in the type species *S. argentea*, and in some others) is occasionally somewhat 2-lobed.

Calyx .3 to .7 in. long:—

Sepals awned or with a stiff mucro:—

Fruit-spikes 1 to 2 in. long:—

- | | |
|--|------------------------------|
| Spike in fruit ovoid; leaves 2.5 in. long .. | .. 1. <i>S. setigera</i> . |
| Spike in fruit oblong; leaves up to 4 to 5 in. long .. | .. 2. <i>S. lanceolata</i> . |

Fruit-spikes 2 to 3.5 in. long:—

- | | |
|---|--------------------------------|
| Awn of sepals with long several-celled hairs.. | .. 3. <i>S. malaccensis</i> . |
| Awn of sepals hardly microscopically scabrid .. | .. 4. <i>S. angustifolia</i> . |

Fruit-spikes 4 to 10 in. long:—

- | | |
|--|------------------------------|
| Awn of sepals hardly microscopically hairy.. | .. 5. <i>S. Kingiana</i> . |
| Awn of sepals with short spreading hairs .. | .. 6. <i>S. longifolia</i> . |

Sepals acute, hardly awned:—

Leaves at tip acute or subacute:—

- | | | |
|--|----|------------------------------|
| Spikes in fruit rather dense, often recurved .. | .. | 7. <i>S. comosa</i> . |
| Inflorescence of one poor terminal panicle .. | .. | 8. <i>S. pauper</i> . |
| Spikes in fruit long, very lax, panicked:— | | |
| Bracts and calyx with short hairs .. | .. | 9. <i>S. elongata</i> . |
| Bracts and calyx viscous, with gland-tipped hairs .. | .. | 10. <i>S. lasiobotrys</i> . |
| Leaves at tip rounded; bracts elliptic, obtuse .. | .. | 11. <i>S. Griffithiana</i> . |

Sepals with linear obtuse tip:—

- | | | |
|---|----|---------------------------|
| Leaves elliptic obtuse; sepals hairy .. | .. | 12. <i>S. arcuata</i> . |
| Leaves lanceolate-acute; sepals glabrous .. | .. | 13. <i>S. subglabra</i> . |

Calyx .125 to .175 in. long:—

Corolla .6 in. long:—

- | | |
|--|----------------------------|
| Leaves with triangular obtuse tip, upper surface pubescent | 14. <i>S. merguensis</i> . |
| Leaves lanceolate-acuminate, upper surface glabrate .. | 15. <i>S. racemosa</i> . |
| Corolla 1 in. long | 16. <i>S. macrantha</i> . |
| Corolla .75 in. long; leaves serrulate .. | 17. <i>S. serrulata</i> . |

1. STAUROGYNE SETIGERA, O. Kuntze Revisio I. 497 (1891). A weak herb, 4 to 12 in. long, often branched or decumbent. *Stem* pubescent, usually rusty upwards. *Leaves* 2.5 by .75 to 1 in.; tip triangular; base ovate or cuneate; mature nearly glabrous on both surfaces; petiole .25 to .5 in. long. *Inflorescence* of one terminal sessile head (a second on a short axillary peduncle sometimes added), ovoid, dense, .5 to .6 in. in diam., in fruit lengthening out to 1 in., rarely to 1.5 in. *Sepals* linear, very slightly unequal, the longest one .4 in. long, linear, scarcely linear lanceolate; its awn with many patent short hairs, and also long several-celled scattered hairs, but no gland-headed hairs. *Corolla* .6 in. long, from purple-pink to pink-white, nearly glabrous without in the bud. *Ovary* glabrous; style base with a few hairs. *Capsule* .2 in. long. *Ebermaiera setigera*, Nees in DC. Prodr. XI. 76; T. Anders. in Journ. Linn. Soc. IX. 451 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 398; Ridley in Trans. Linn. Soc., ser. 2, III. 332 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900). *E. trichocephala*, Miq. Fl. Ind. Bat. II. 774. *E. subcapitata*, C. B. Clarke in Bot. Tidskr. XXIV. 348 (Kjobenhaven 1902). *Adenosma uliginosa* var. β *erecta*, Nees in DC. Prodr. XI. 70; Miq. Fl. Ind. Bat. II. 771 *partly* (not of R. Br.).

MALACCA: *Cuming* 2355. PERAK: *Scortechini*; *Wray* 1878; Larút Perak, 500 to 800 ft., *King's Collector* 2192. GOPING: *King's Collector* 1132. PAHANG: *Ridley* 2178 (*partly*). SELANGOR: *Curtis* 2363; Kota Glanggi, fide *Ridley*.—DISTRIB. Common in Sumatra, also in Java, Borneo, Siam.

The dried specimens of this species are dusky green, often obscurely red-brown at top, the leaves sometimes whitened beneath. Kurz, in Journ. As. Soc. Beng. II.

78 (1870), united the three species, *S. setigera*, *S. argentea*, and *S. lanceolata*; they are undoubtedly very closely allied.

2. *STAUROGYNE LANCEOLATA*, O. Kuntze Revisio I. 497 (1891). *Stem* 6 to 14 in. high, erect, woody, undivided. *Leaves* 4 to 5 by .6 to 1 in. (or smaller), lanceolate or generally narrow-lanceolate, nearly glabrate on both surfaces. *Inflorescence* 1 in. long, in fruit 1.5 to 2 in. long, less dense than that of *E. setigera*, Nees. *Bracts*, *prophylla*, and *calyx* as of *E. setigera*, the longest sepal a trifle broader, linear-lanceolate at base. *Corolla* hairy without in the bud. *Adenosma lanceolatum*, Blume Bijdr. 756. *Ebermaiera lanceolata*, Hassk. Cat. Hort. Bogor. 147; Nees in DC. Prodr. XI. 76; Miq. Fl. Ind. Bat. II. 774 (not of C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 397). *E. longifolia*, Ridley in Trans. Linn. Soc., ser. 2, Bot. III. 332 (1893).

PAHANG: Ridley 2177, 2178 (partly). MALACCA: Derry 23.—
DISTRIB. Java (*Zollinger* 591).

3. *STAUROGYNE MALACCENSIS*, C. B. Clarke. Herbaceous, 4 to 8 in. high, often branched. *Stem* hairy, often rusty at top, carrying 1 to 4, sometimes 8, spikes. *Leaves* up to 4 by 1 in., elliptic-lanceolate; base cuneate; mature with nearly glabrate surfaces; petiole .5 to 1 in. long. *Heads* 1 to 1.5 in. long, dense, in fruit lengthening to 2 to 3.5 in., lax, sometimes interrupted at base. *Bracts* oblong or elliptic-oblong, conspicuous, somewhat persistent. *Sepals* .4 in. long, conspicuously unequal, the larger one lanceolate or elliptic-lanceolate, acuminate, hardly awned, the other 4 nearly linear; tips of all the sepals with many, short, patent hairs and scattered, long, several-celled hairs. *Corolla* .6 in. long, nearly glabrous without. *Ovary* with scattered minute gland-tipped hairs in the upper half, which remain till the seeds are quite ripe. *Ebermaiera argentea*, Nees in DC. Prodr. XI. 76 (partly); T. Anders. in Journ. Linn. Soc. IX. 451 (1867). *E. lanceolata*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 397 (exclud. syn.) (not of Nees). *E. Staurogyne*, T. Anders. MS. in hb. Calcutta (not of Nees).

KEDAH and KASOOM: Curtis. PENANG: Curtis 1931. MALACCA: Griffith 189; Ridley 1636. PROVINCE WELLESLEY: Ridley 6198.—
DISTRIB. Java; Tenasserim.

The type *Staurogyne argentea*, Wall. Pl. As. Rar. II. 80 t. 186 (1831), is the common Khasia species, remote from the present, but (as Wallich says) very near *S. angustifolia*, Wallich. *Staurogyne argentea*, O. Kuntze (and of Lindau), includes probably *S. argentea* and *S. angustifolia*, but not *S. malaccensis*.

4. *STAUROGYNE ANGUSTIFOLIA*, Wall. Pl. As. Rar. II. 81 (1831). *Stem* 8 to 12 in. long, suberect, little divided, hairy, almost woody at

the base. *Leaves* glabrate on the surface; blade 3 to 4 by .7 to 1 in., lanceolate, mostly narrowly lanceolate (but see the var. below), base attenuate, tip triangular, subacute; petiole 1 to 2 in. long. *Spikes* terminal and on short axillary peduncles, in flower ovoid or ellipsoid, dense, in fruit often 2 to 3 in. long. *Bract* narrow-oblong, aristate, with long hairs in the lower part. *Calyx* unequal, the largest sepal .6 in. long, the base narrow-lanceolate, with long hairs; the awn long, somewhat rigid, glabrous or with minute bristles (less than 40 μ long); the other 4 sepals nearly linear. *Corolla* .6 in. long, hairy without. *Capsule* .2 in. long, thicker than in the neighbouring species. *S. argentea*, O. Kuntze Revisio I. 497 *partim* (1891) (*not of* Wall.). *Ebermaiera angustifolia*, T. Anders. in Journ. Linn. Soc. IX. 451 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 398; Prain Beng. Plants 798. *E. Staurogyne* β *angustifolia*, Nees in DC. Prodr. XI. 75.

PERAK: *Ridley* 9766; *Curtis*. MALACCA: *Goodenough* 1689.—
DISTRIB. Mergui (*Falconer* 860), Tavoy (*Wallich* 4906).

T. Anderson has written "*E. angustifolia*" on Falconer 860; but his name "*angustifolia*" (as well as Wallich 4906) may include other nearly allied forms. The true *E. Staurogyne*, Nees, is a Khasia species, in which the bract and sepals have no long several-celled hairs. This plant is put with *S. longifolia*, not with *E. Staurogyne*, by collectors. The leaves in all the examples seen have dried brown-red.

5. STAUROGYNE KINGIANA, C. B. Clarke, n. sp. *Stems* 2 to 3 ft. high, pubescent. *Leaves* glabrous; blade up to 8½ by 2 to 3 in., elliptic, narrowed at either end; main nerves 12 to 15 pair; petioles 1 to 2 in. long. *Spikes* 3 to 6 on a stem, terminal and on short axillary peduncles, 4 to 10 in. long, undivided, dense even in fruit. *Bract* linear, .8 in. long. *Sepals* 5, nearly equal, linear, longest up to .75 in. long, very little dilated at the base, sparsely hairy at base, glabrous or minutely scabrous in the upper half. *Corolla* 1 in. long, "yellowish-white, lower lip pale red" (collector's note), glabrous without. *Stamens* and pollen of the genus. *Pistil* glabrate. *Capsule* .2 in. long, rather thick; the endocarp much thickened, almost corky. Allied to *S. angustifolia*, T. Anders.

PERAK: on limestone hills, 500 to 800 ft. alt., *King's Collector* 10704; Goenong Panti, *King's Collector* 208. PAHANG: *Ridley* 2176.

6. STAUROGYNE LONGIFOLIA, O. Kuntze Revisio I. 497 (1891). Sub-erect, 8 to 30 in. high, hairy. *Stem* (in large examples) woody, robust below, and with erect branches. *Leaves* glabrous on the upper surface; blade 5 by 1 in., lanceolate, attenuate at either end (in the type example, but the leaves are frequently longer, and there are examples with shorter, broader leaves); petiole 1 to 1.5 in. long. *Spikes* short-peduncled at the end of branches and in the axils, short-oblong (often nodding) when

young, in fruit 2 to 5 in. long, somewhat dense, erect. *Bract* and *calyx* softly hairy, without long, fine, several-celled hairs; bract narrow-lanceolate, aristate, .6 in. long; sepals all linear, the longest one .5 in. long, including its awn .16 in. long, the awn hairy to the tip with spreading hairs varying in length, but all short. *Corolla* long, hairy without; tube nearly white, segments and mouth pink to purple. *Pistil* glabrate. *Stamens* and pollen of the genus. *Capsule* .2 in. long. Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 288. *Ebermaiera longifolia*, Nees in DC. Prodr. XI. 76; T. Anders. in Journ. Linn. Soc. IX. 451 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 399; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893).

MALACCA: *Cuming* 2350; *Lemann*; *Griffith* (K.D.) 6079; *Hullett* 403. PERAK: *Scortechini* 155; *Wray* 1302; *Ridley* 1604; alt. 300 to 800 ft., *King's Collector* 5821, 8678. SELANGOR: *Ridley* 7590. NEGRI SEMBILAN: *Ridley* 10098. PAHANG: Tahan, fide *Ridley*.

This species is very close both to *S. angustifolia* and to *S. comosa*; the former differs by having the awns of the sepals glabrous or microscopically scabrous; the latter differs in that the sepals have lanceolate-linear soft tips, hardly awns.

7. STAUROGYNE COMOSA, O. Kuntze Revisio I. 497 (1891). *Stem* 1 to 3 ft. high, almost woody below, hairy. *Leaves*: blade up to 8 by 3 to 3.5 in., cuneate at either end; upper surface glabrous, obscurely minute-granular-tuberculate; petiole 1 to 2.5 in. *Spikes* short, peduncled, undivided, dense, in flower 1 to 4 in. long, nodding, in fruit up to 5 to 7.5 in. long, often deflexed, rather dense (scarcely interrupted at base), softly hairy. *Bract* and *sepals* softly hairy, with long several-celled hairs; bract .4 in. long in Wallich's type (often longer), lanceolate-acuminate, point linear (hardly awned), with soft white hairs; sepals .3 in. long in Wallich's type (often longer), the longest (wider than the others) lanceolate with a linear soft-hairy tip. *Corolla* in the bud densely clothed with deflexed hairs without. *Pistil* glabrous. *Stamens* and pollen of the genus. *Capsule* .2 in. long. Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 288. *Ruellia* ? *comosa*, Wall. Cat. 2414. *Ebermaiera axillaris*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 75; T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 399.

PENANG: *Wallich* 2414. PERAK: *Scortechini* 777; *Wray* 2192; *Ridley* 2893; 500 to 800 ft., *King's Collector* 10705; Larut, 100 ft., *King's Collector* 1834. SELANGOR: (*Ridley*) 7589, 8543, 10546.

King's Collector notes the calyx "velvety claret-coloured," the corolla "blue-white, darker inside." The corolla seems caducous, as the large well-collected material provides buds and fruit only. The type examples of Wallich from Penang

are unusually small specimens. This species is generally distinguishable from *E. longifolia*, Nees, by its much broader (elliptic) leaves.

8. *STAUROGYNE PAUPER*, C. B. Clarke, n. sp. *Stem* 18 in. long, undivided, glabrate, decumbent, woody at base. *Leaves* glabrate, with few scattered, white, adpressed bristles on the upper surface; blade 4.5 by 2 in. long, elliptic-lanceolate, acuminate, acute; base cuneate; petiole .25 to .5 in. long. *Inflorescence* of one terminal poor panicle, 3 by 1½ in., with few distant flowers; bracts .5 in. long, linear, soft, not awned. *Sepals* subequal, .5 in. long, linear, with soft hairs and many gland-tipped hairs. *Corolla* .6 in. long, pubescent without, "pale yellow with dark stripes" (King's Collector). *Pistil* of *Staurogyne*, glabrous except a few small hairs in the lower part of the style.

PERAK: alt. 200 ft., *King's Collector* 2832.

9. *STAUROGYNE ELONGATA*, O. Kuntze Revisio I. 497 (1891). Slightly hairy. *Leaves* glabrate; blade 6 by 2 in., oblong-elliptic, cuneate at either end; nerves 8 to 10 pair, thin; petiole 2 to 3 in. long. *Spikes* up to 4 to 7 by 1 in., panicle, lax; pedicels often .175 in. long, with alternate prophylla. *Bracts* nearly .5 in. long, lanceolate-linear, with short white hairs, no gland-tipped hairs. *Sepals* 5, linear, the longest nearly .5 in. long, slightly widened at base. *Corolla* (buds) .4 in. long, scarcely pubescent without. *Capsule* .2 in. long, the upper half with scattered minute hairs. Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 288. *Adenosma elongatum*, Blume Bijdr. 757. *Erythracanthus elongatus*, Nees in DC. Prodr. XI. 78, var. β excl. *Ebermaiera elongata*, Nees in DC. Prodr. XI. 721, var. β excl.; T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 400 (not of Miquel).

PENANG: *Wallich* (fide T. Anderson).—DISTRIB. Java.

The var. β of Miquel (here excluded) is *Ebermaiera debilis*, T. Anders. (in Journ. Linn. Soc. IX. 452, in note (1867)), a weak Philippine species. *E. elongata*, Miquel (Fl. Ind. Bat. II. 775), was (so Miquel says) = *E. Griffithiana*, T. Anders.; and, from Miquel's description, it must have been largely (or wholly) that species. As to *E. subpaniculata*, Hassk. (Retzia I. 77 (1855)), there are now here examples both of the Salak wild plant and of that cultivated at Buitenzorg; they may be varieties of *E. elongata*, Nees, but do not match it. The above description of *E. elongata*, Nees, is wholly from the Java type plant; no example from Penang has been seen.

10. *STAUROGYNE LASIOBOTRYS*, O. Kuntze Revisio I. 497 (1891). *Stem* 18 to 20 in., suberect, hairy. *Leaves* glabrate; blade 5 by 1.5 in., oblong or elliptic-lanceolate, cuneate at either end, thin; petiole 1 to 3 in. long. *Spikes* up to 4 to 6 by 1 in., panicle, lax, softly viscous-hairy; pedicels often .16 in. long. *Bracts* .35 in. long, linear, with several-celled hairs ended by a coloured gland. *Sepals* 5, linear, the longest .35 in.

long, with several-celled gland-tipped hairs. *Corolla, stamens, capsule* as of *S. elongata*. *Ebermaiera lasiobotrys*, Nees in DC. Prodr. XI. 721; Wall. Cat. 9084; T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 400.

PERAK: *Curtis* 1350; *King's Collector* 8370 ("Flower dark-red tipped with pink"); Larut, 500 to 1000 ft., *King's Collector* 2292. SELANGOR: *Ridley* 7588.—DISTRIB. Moulmein, Mergui, Tavoy.

11. STAUROGYNE GRIFFITHIANA, O. Kuntze Revisio I. 497 (1891). *Stem* 4 to 8 in. long, creeping at base. *Leaves* (mature) shortly rather dense hairy on the upper face; blade 5·5 by 3 in. in Griffith's type (often smaller), roundly elliptic, very obtuse; base rounded or cordate (but cuneate in many examples); petiole ·5 to 2 in. long. *Inflorescence* simple or branched; main spike 6 in. long in Griffith's type, lax, only slightly hairy. *Bracts* up to ·5 in. long, elliptic, rounded, obtuse at top. *Sepals* 5, the longest ·4 in. long, linear; tip linear-acute, not awned, with sparse short several-celled hairs not gland-tipped. (In the Perak example the sepals are linear-ligulate-obtuse at the tip.) *Corolla* ·6 in. long, white, rarely tinged pink. *Capsule* ·2 in. long. *Erythracanthus Griffithianus*, Nees in DC. Prodr. XI. 78. *E. obtusus*, Wight Ic. t. 1491 (not of Nees). *Ebermaiera Griffithiana*, T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 400; *Ridley* in Trans. Linn. Soc. ser. 2, III. 332 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900). *E. elongata*, Miq. Fl. Ind. Bat. II. 775 (mainly).

MALACCA: *Griffith* (K.D.) 6078; *Goodenough* 1509. SINGAPORE: *Ridley*; *Hullett* 613; *G. King*. PAHANG: *Ridley* 2175. PERAK: alt. 600 to 1000 ft., *Scortechini* 40; *King's Collector* 10335. PAHANG: at Tahan, fide *Ridley*.

12. STAUROGYNE ARCUATA, C. B. Clarke, n. sp. *Stem* 4 to 8 in. long, villous, woody, creeping. *Leaves* with scattered hairs above or glabrate; blade 4·5 by 2·5 in., ovate elliptic, tip triangular obtuse; base cuneate or sometimes rounded; petiole ·5 to 1·5 in. long. *Spikes* often 2 or 3, lax, 2 to 4 in. long, arcuate in fruit; bracts linear or sublanceolate, ·5 in. long, hairy. *Sepals* subequal, ·5 in. long, linear or very narrow-ligulate, hairy, tip subobtuse. *Corolla* ·6 in. long, pubescent without, red (Wray). *Capsule* ·2 in. long.

PERAK: *Scortechini* 456, 728; *Wray* 48, 694; *Ridley* 2892.

13. STAUROGYNE SUBGLABRA, C. B. Clarke, n. sp. Nearly glabrous. *Stem* 6 to 12 in. *Leaves* glabrous, the upper surface sometimes obscurely puberulous; blade 4·5 by 1 to 1·25 in., lanceolate or broad-lanceolate, subacute; base cuneate; petiole ·5 to 1 in. long. *Spikes* often 2 to 4, very loose, up to 3 to 5 in. long; the rachis microscopically scabrous;

bracts .5 in. long, linear, or the lower ones oblong. *Sepals* subequal, .5 in. long, linear, or scarcely oblong-linear, subobtuse, glabrous, almost shining. *Corolla* .6 in. long, very white (King's Collector). *Capsule* .2 in. long.

PERAK: *Scortechini* 5386, 406; *Ridley* 5514; *Curtis*, alt. 3500 to 4000 ft.; *King's Collector* 8427.

This species is very similar to *E. arcuata* in all essential points; the two characters of hairy sepals with elliptic obtuse leaves, and glabrous sepals with lanceolate leaves, are, however, concomitant throughout the ample material.

14. STAUROGYNE MERGUENSIS, O. Kuntze Revisio I. 497 (1891). *Stem* 4 to 8 in. long, creeping at base, pubescent. *Leaves* minutely pubescent on the upper surface; blade up to 5 by 2.5 in. (much smaller in Helfer's type); tip obtusely triangular; base nearly always cordate; petiole .5 to 1.5 in. long. *Spikes* usually peduncled, often paniculate, 2 to 3 in. long, very lax, thin. *Bracts* scarcely .25 in. long, linear-lanceolate or linear. *Sepals* 5, subequal, united at the base, .125 to .175 in. long, linear, hispid. *Corolla* .6 in. long, light blue or violet and white, pubescent without. *Capsule* .25 in. long. *Ebermaiera merguensis*, T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 402.

PERAK: *Wray* 3966; *Scortechini* 285, 1356, alt. 400 to 600 ft.; *King's Collector* 8284; *Wray* 4158. TRANG: *Goldham*. KEDAH: *Curtis*. —DISTRIB. Mergui.

This species in habit much resembles *E. incana*, and there is little to separate it except the small bracts; the hairs on the upper surface of the mature leaves are similar but smaller.

15. STAUROGYNE RACEMOSA, O. Kuntze Revisio I. 497 (1891). *Stem* 1 to 2 ft. high, pubescent, creeping at base. *Leaves* glabrate, usually drying a red-brown; blade 4 by 1.25 in., broadly lanceolate, acuminate at either end; petiole .5 to 1.5 in. long. *Spikes* usually peduncled, simple or paniced, pubescent, up to 3 to 5 in. long, very lax; pedicels distant, exceedingly short; bracts lanceolate, hairy, .175 in. long. *Calyx* of 5 equal lanceolate lobes, .175 in. long. *Corolla* .6 in. long, white, tipped rose or purplish, pubescent without. *Capsule* .2 in. long, broad-oblong. T. Anders. in Journ. Linn. Soc. IX. 452 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 401; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 288. *Ruellia racemosa*, Roxb. Fl. Ind. III. 42. *Ebermaiera racemosa*, Miq. Fl. Ind. Bat. II. 775. *Erythracanthus racemosus*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 78.

PENANG: *Wallich* 2336; *Stoliczka*; *Deschamps*; *Hullett* 124; *Maingay* (K.D.) 1173; alt. 2000 ft., *King's Collector*; *Curtis* 406. MALACCA:

Griffith. SINGAPORE: Walker 197. INDRAGERI: Curtis.—DISTRIB. Moulmein.

16. STAUROGYNE MACRANTHA, C. B. Clarke, n. sp. *Stem* 3 to 4 ft. long, villous. *Leaves* glabrous, with a very few remote hairs on the upper surface; blade 4.5 by 1.75 in., elliptic-lanceolate, subacute; base cuneate; petiole .25 to 1 in. long, villous. *Peduncles* two, penultimate, 3 in. long, villous, carrying small few-flowered panicles; bracts .2 in. long, linear, very hairy. *Sepals* subequal, .175 in. long, linear, very hairy. *Corolla* 1 in. long, pubescent without.

PERAK: at Larút, alt. 4500 to 5000 ft., *King's Collector* 2417.

17. STAUROGYNE SERRULATA, C. B. Clarke, n. sp. *Stem* elongate, villous upwards. *Leaves* 4 to 5 by 1.75 in., elliptic, acuminate at either end; margin closely serrulate; both surfaces slightly pubescent; petiole .5 to 1 in. long, villous. *Peduncles* 4, from the penultimate axils, 4 in. long, villous; inflorescence 12- to 18-flowered, lax, pubescent; bracts hardly .125 in. long, linear. *Calyx* .125 in. long. *Corolla* .75 in. long, white, nearly straight, but the pedicels bent close under the calyx, so as to bring the corollas horizontal.

PERAK: Ulu Batang Padang, *Wray* 1599; *Scortechini*.

4. CARDANTHERA, Voigt.

Herbs. *Leaves* opposite; upper toothed, rarely entire; lower frequently pinnatifid. *Flowers* in axillary clusters (in non-Malayan species running into terminal inflorescences); bracts and prophylla often obscure or 0. *Sepals* narrow, often unequal. *Corolla* nearly straight; tube shorter than the calyx; limb 2-lipped; lobes contorted in the bud. *Stamens* 4, fertile; anther-cells oblong; pollen globose, small, with numerous striæ converging to the poles. *Capsule* sessile, narrow, seed-bearing from the base. *Seeds* 30 to 100, on small, straight, conic, soft funicles, hardly to be called retinacula (*i. e.* curved, rigid, pointed), glabrous or slightly glandular, *i. e.* not clothed with hygroscopic hairs.—DISTRIB. Species about 8 in India, 2 in Africa.

This genus should, according to Slater, be placed in the same Subfamily with *Staurogyne*, the pollen being identical in the two genera.

CARDANTHERA TRIFLORA, Voigt Hort. Sub. Calc. 482 (1845). Pubescent, decumbent. *Branches* up to 1 ft. long. *Leaves* ovate, crenate-serrate, the lower (when in water) often pinnatifid. *Flowers* 1 to 3 in the axils; bracts .3 to .35 in. long, obovate; prophylla .25 in. long, oblong. *Sepals* linear, unequal, about as long as the bract. *Corolla* .35 to .5 in. long, purple and white. *Capsule* .25 to .35 in., pubescent; style thinly hairy. C. B. Clarke in Hook, f. Fl. Br. Ind. IV. 405. *Ruellia triflora*,

Roxb. Hort. Beng. 46, and Fl. Ind. III. 52. *Adenosma triflora*, Nees in Wall. Pl. As. Rar. III. 79, and in DC. Prodr. XI. 68; T. Anders. in Journ. Linn. Soc. IX. 454 (1867).

SINGAPORE: *vide* C. B. Clarke (in Hook. f. *l. c.*).—DISTRIB. Abundant in Bengal, extending to Pegu.

I do not find now in the Kew Herbarium any example of this from Singapore; it is nearly sure to grow in the Malay Peninsula.

5. HYGROPHILA, R. Br.

Herbs, attaining 1 to 5 ft. high, more or less hairy. *Stems* quadrangular. *Leaves* opposite, equal, entire or crenate; the upper surface full of raphides. *Flowers* in continuous spikes or axillary clusters. *Calyx* .25 to .5 in. long, with 5 acute teeth, the lower half tubular in the bud, often with 5 lines of very thin tissue, and split deeply in the fruit; or 4-fid in *H. spinosa*. *Corolla* distinctly 2-lipped; lower lip trifid, the middle segment broader, emarginate. *Stamens* 4, didynamous, subsimilar, fertile (except in *H. polysperma*, where the two lower are filaments only or nearly obsolete); filaments glabrous or nearly so; anthers of two parallel subequal muticous cells; pollen globose, 15 to 35 μ in diam., with 12 to 18 longitudinal ribs. *Ovary* oblong, with 8 to 80 ovules; upper part of ovary and style more or less hairy; style with one linear branch, the other reduced to a small rudiment. *Capsule* .25 to .5 in. long, linear-oblong, seed-bearing from the base; seeds 8 to 80, ovoid, flat, 50 μ in diam., brown, nearly smooth on faces, shaggy, with hygroscopic hairs on margin.—DISTRIB. Species 40, in the warmer parts of the globe; these fall into three well-marked subgenera, the species of each of which are so closely allied as to be esteemed subspecies only by some competent botanists.

Subgenus 1. HEMIADELPHIS (genus), Nees. Unarmed. Flowers in terminal spikes:—

Fertile stamens 2:—

Bracts oblong or elliptic, as long as the calyx .. 1. *H. polysperma*.

Subgenus 2. EUHYGROPHILA. Unarmed. Flowers in distant axillary clusters:—

Leaves lanceolate acute or linear:—

Flowers in dense axillary clusters 2. *H. angustifolia*.

Axillary clusters small, often 3- to 1-flowered 3. *H. saxatilis*.

Leaves obovate or oblong, triangular or obtuse at tip:—

Leaves oblong, all sessile or nearly so 7. *H. subsessilis*.

Leaves, or at least lower leaves, petioled:—

Corolla .25 to .35 in. long 5. *H. meixanthos*.

Corolla .5 to .8 in. long:—

Capsule .75 to .8 in. long. Calyx sparingly hispid .. 4. *H. quadrivalvis*.

Capsule .7 in. long. Calyx densely hispid .. 6. *H. phlomoides*.

Subgenus 3. *ASTERACANTHA* (genus), Nees. Each whorl of axillary flowers with some strong spines, often an inch long, round it:—

Leaves sessile. Corolla 1 in. long 8. *H. spinosa*.

1. *HYGROPHILA POLYSPERMA*, T. Anders. in Journ. Linn. Soc. IX. 456 (1867). Small, procumbent, divided, sparingly pubescent. *Leaves* 1 by .5 in., oblong or elliptic, nearly entire; base narrowed or shortly petioled; upper surface full of raphides. *Spikes* terminal, 1 to 2.5 in. long, rather dense; bracts .25 to .35 in., elliptic; prophylla .25 in., lanceolate. *Calyx* .25 in., divided nearly to the base; segments 5, linear, pubescent. *Corolla* .35 in. long, slender, pubescent, pale blue or white. *Stamens* 2; the two posticous filaments without anthers, sometimes nearly obsolete; anther-cells 2, oblong; pollen 25 μ in diam., globose, with 12 to 16 longitudinal ribs. *Ovary* hairy towards the top; style hairy; stigma of one linear and one suppressed branch. *Capsule* .25 to .35 in. long, oblong, hairy towards the top. *Seeds* 20 to 32, orbicular, 40 to 50 μ in diam., flattened, brown, shaggy on the margin with hygroscopic hairs. Boiss. Fl. Orient. IV. 519; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 406; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 297; Prain Beng. Plants 801. *Justicia polysperma*, Roxb. Hort. Beng. 3, and Fl. Ind. I. 119. *Hemiadelphis polysperma*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 80; Wight Ill. t. 164B, fig. 3, and Ic. t. 1492; Griff. Notul. IV. 135; Miq. Fl. Ind. Bat. II. 776.

MALACCA: *Griffith*.—DISTRIB. Common throughout India; Kabul; Tonkin.

2. *HYGROPHILA ANGUSTIFOLIA*, R. Brown Prodr. 479 (1810). *Stems* 2 ft. high, often decumbent at base. *Leaves* .3 by .7 in., lanceolate, attenuate at either end, subentire, glabrate; upper surface with many raphides; petiole .25 in., sometimes .5 in. long. *Flowers* in distant axillary dense clusters; bract .25 to .35 in. long, elliptic; prophylla scarcely .25 in. long. *Calyx* .35 to .5 in. long; lobes in flower hardly half as long as the tube, triangular-linear, densely clothed with conspicuous raphides, sparsely hispid or nearly glabrous. *Corolla* .5 to .7 in. long, pale purple. *Stamens* 4, fertile; anther-cells 2, oblong, muticous, at equal height; filaments glabrous; pollen 25 μ in diam., globose, with 12 to 16 longitudinal ribs. *Style* hairy; stigma of the genus. *Capsule* .5 to .7 in. long, a little exceeding the calyx, 20- to 28-seeded. Nees in DC. Prodr. XI. 91; Benth. Fl. Austral. V. 545; Ridley in Trans. Linn. Soc. ser. 2, III. 333 (1893). *H. salicifolia*, Nees in Wall. Pl. As. Rar. III. 81, and in DC. Prodr. XI. 92; Wight

Ic. t. 1490; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 407; Hemsl. in Journ. Linn. Soc. XXVI. 237 (1890); Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 297; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900); Prain Beng. Plants 801. *H. lancea*, Miq. in Ann. Mus. Bot. Lugd.-Bat. II. 123 (1865-66). *Ruellia salicifolia*, Vahl. Symb. III. 84; Roxb. Fl. Ind. III. 50.

SELANGOR: *Curtis* 2365. PAHANG: *Ridley* 1213. PEKAN and KELANTAN: fide *Ridley*.—DISTRIB. From South India to China and Japan.

The description above is taken from Wall. Cat. 2373A, which is Nees' "type" of *Hygrophila salicifolia*. The Selangor example differs from this in having the capsules .8 in. long, in which point it resembles *H. quadrivalvis*, Nees, below. T. Anderson esteemed the whole of the species in the present section to constitute but one polymorphic species (Journ. Linn. Soc. IX. 456 (1867)). They are described here shortly only, with reference to their differences from *H. salicifolia*, Nees, taken as the standard form.

3. *HYGROPHILA SAXATILIS*, Ridley in Trans. Linn. Soc. ser. 2, III. 333 (1893). Small, rigid, branched, 6 to 14 in. high. *Leaves* approximated, 1 to 1.5 by .175 to .2 in., linear, entire, nearly glabrous. *Flowers* in small axillary clusters, usually only 3 to 1 together. *Corolla* .35 to .5 in. long, hardly smaller than that of *H. salicifolia*, white without, violet within. *H. pusilla*, Blume Bijdr. 804?

PAHANG: *Ridley* 2179. PERAK: *Scortechini*; alt. 300 ft.; *Wray* 3319, 3489; *Curtis*.—DISTRIB. Ceylon (Thwaites 3109); Borneo; Philippines.

4. *HYGROPHILA QUADRIVALVIS*, Nees in Wall. Pl. As. Rar. III. 80 (1832). *Stems* stout, often 3 to 4 ft. long. *Leaves* with an obovate triangular or obtuse tip; obovate rather than lanceolate, often crenulated in the upper half. *Calyx* exactly as of *H. salicifolia*. *Corolla* .7 to .8 in. long. *Capsule* .75 to .8 in. long, often numerous in the whorl, very erect. Nees in DC. Prodr. XI. 89; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 408; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900); Prain Beng. Plants 801, 802. *H. obovata*, Wight Ic. t. 1489.

PENANG: *Deschamps*; *Curtis* 1757; Durian S.B., *King's Collector* 368 (flowers white). MALACCA: *Griffith*; *Maingay* 1979 (Kew 1178). SINGAPORE: *Lobb* 57; *Kurz*; *Hullett* 231. PERAK: *Scortechini* 64, 84, in salt swamps; *Wray* 2506; Mekong, *Scortechini* 1099; Durian S.B., *King's Collector* 364.—DISTRIB. India, common, especially near the sea; Java, Borneo, Tonkin.

5. *HYGROPHILA MEIANTHOS*, C. B. Clarke, n. sp. *Leaves* obovate, 2 in. long, nearly glabrous. *Bract* less than .25 in. long, oblong. *Calyx*

·25 in. long, divided half-way down; teeth sparsely white-hispid. *Corolla* (expanded) ·25 to ·35 in. long. *Anthers* small, round. *Capsule* scarcely ·35 in. long. *H. salicifolia* var. *assurgens*. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 407 (*partly*).

MALACCA: *Maingay* 3002 (K.D. 1177).

The examples are good with numerous flowers and ripe fruits, and appear "normal" in all respects.

6. *HYGROPHILA PHLOMOIDES*, Nees in Wall. Pl. As. Rar. III. 80 (1832). *Stems* often very hairy. *Leaves* 2 to 4 in. long, obovate; tip triangular, rarely subacute. *Calyx* divided half-way down; teeth densely white-hispid, so that the whorls resemble somewhat those of *Phlomis*; otherwise as *H. quadrivalvis*. Miq. Fl. Ind. Bat. II. 779. *H. phlomoides*, Nees in DC. Prodr. XI. 90; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 408; Prain Beng. Plants 801, 802. *H. hirsuta*, Roxb. Fl. Ind. III. 51. *H. phlomoides*, Wall. Cat. 2376.—Rheede Hort. Mal. II. 89, t. 46.

PENANG: *Deschamps*. SINGAPORE: *Ridley* 3612A. SELANGOR: *Ridley* 8547, 10499. PERAK: *Scortechini* 620, 1106, alt. 200 ft.; *Wray* 1748, 2432.—DISTRIB. India (common), Tonkin, Borneo.

VAR. β *Roxburghii*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 408. Smaller, often procumbent and more divided. *Leaves* 1 to 2 in. long, often scabrid, pubescent. Prain Beng. Plants 801, 802. *H. obovata*, Griff. Notul. IV. 134 (*not exactly that of Nees*). *Ruellia obovata*, Roxb. Fl. Ind. III. 51.

PENANG: *Deschamps*.—DISTRIB. Chittagong, Pegu, Mergui, Philippines.

I do not see how this var. differs from *H. radicans*, Nees in Wall. Pl. As. Rar. III. 81, and in DC. Prodr. XI. 92.

7. *HYGROPHILA SUBSESSILIS*, C. B. Clarke, n. sp. *Stem, leaves* and *inflorescence* with brown hairs. *Leaves* 1·5 by ·4 in., oblong, obscurely obovate; tip triangular; base narrowed; nerves beneath conspicuous; petiole, even in the lower leaves, 0 or hardly any; otherwise as *H. salicifolia*.

MALACCA: *Harvey*.

This resembles some forms of *H. undulata*, Blume, in which, however, the brown hairs are not present, and the lower leaves are petioled.

8. *HYGROPHILA SPINOSA*, T. Anders. in Thwaites Enum. Pl. Zeyl. 225 (1864). *Stems* stout, 2 to 5 ft. high. *Leaves* 3 to 6 in. long, lan-

ceolate to linear, hispid, sessile. *Flowers* clustered in the axils, 4 to 6 of the outer bracts being strong spines an inch long. *Bract* .5 to 1 in. long, lanceolate. *Calyx* .35 to .5 in. long, divided nearly to the base into 4 lanceolate lobes, one of which is broader and sometimes emarginate. *Corolla* 1 in. long, pale purple. *Anthers* and pollen of the genus. *Capsule* .35 in. long, linear-oblong, 4- to 8-seeded from the base. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 409; Burkill in Dyer Fl. Trop. Afr. V. 31; C. B. Clarke in Dyer Fl. Cap. V. 11 (*with all syn.*); Prain Beng. Plants 802; *H. longifolia*, Kurz in Journ. As. Soc. Beng. 1870, II. 78 (*non* Nees). *Asteracantha longifolia*, Nees in Wall. Pl. As. Rar. III. 80, and in DC. Prodr. XI. 247; Wight Ic. t. 449; Miq. Fl. Ind. Bat. II. 811; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 297. *A. auriculata*, Nees in DC. l. c. 248.

SINGAPORE: *King's Collector* 249.—DISTRIB. Abundant in India and Africa.

Hygrophila longifolia, Nees (in Mart. Fl. Brasil, IX. 22 (1847)), is a totally different plant; for this cause T. Anderson, when he transferred *Asteracantha longifolia* to *Hygrophila*, gave it the new name *H. spinosa*. Nevertheless, some botanists call the Asiatic *Asteracantha* by the name *H. longifolia*, thereby causing great confusion.

6. NOMAPHILA, Blume.

Inflorescence in numerous 1-sided, open, axillary racemes shorter than the leaves. *Bract* (and prophylla) inconspicuous, linear, or wanting. *Calyx* even in the bud deeply divided (two-thirds or three-fourths of the way down) into 5 lobes. Otherwise as *Hygrophila*.—Species 14, *viz.* 8 in South-east Asia, very closely allied, and 6 in Tropical Africa.

This genus is in essentials *Hygrophila*, and is sunk in *Hygrophila* by both Lindau and Burkill, but is easily distinguished from it, whether estimated a genus or a subgenus.

1. *NOMAPHILA STRICTA*, Nees in DC. Prodr. XI. 84 (1847). Nearly glabrous, drying a black-green. *Stems* 3 ft. *Leaves*: blade 3 to 4.5 in. long, narrowly elliptic, attenuate at either end; midrib beneath with fine patent hairs; petioles up to 2 to 3 in. long. *Corymbs* in many axils, 2 to 4 in. in diam., recurved in fruit; peduncles less than 1 in. long; pedicels nearly glabrous; bract and prophylla linear, inconspicuous or 0. *Calyx* .25 to .35 in. long, divided nearly to the base; segments 5, linear, glabrous or minutely scabrous or hispid (not viscid or glandular-hairy). *Corolla* .5 in. long or more, bright blue. *Filaments* glabrous; pollen 20 μ in diam., globose, with 12 to 16 longitudinal ribs. *Ovary* and style pubescent. *Capsule* .35 to .6 in. long;

seeds small, ovoid, flattened, brown, shaggy on the margin, with hygroscopic hairs. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 409. *Justicia stricta*, Vahl Symb. II. 6. *Cryptophragmium axillare*, Nees in DC. Prodr. XI. 96, cf. Vidal Phanerog. Cuming. Philipp. 61 *in nota*, 132. *Hygrophila stricta*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 297 (*non* Hassk.).

PERAK: King's Collector 367; Curtis 3152; Wray 4256; Scortechini. JOHORE: Ridley 4173, 11133.—DISTRIB. Borneo, Philippines.

Nees himself, in DC. Prodr. XI. 722, united this species to *N. corymbosa*, Blume Bijdr. 804 (1825); the latter is (when dried) a smoky grey-green; the pedicels and calyx have viscous (and often glandular) hairs. The two are very close together.

2. *NOMAPHILA MINOR*, C. B. Clarke, n. sp. Smaller in all its parts than *N. stricta*. *Leaves*: lamina scarcely 2 in. long. *Corymb*-branches slender, glabrate. *Corolla* .25 to .35 in. long. *Anthers* and pollen smaller. *Capsule* .25 to .35 in. long. *N. stricta* (*partim*), C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 409. *Ruellia*? *paniculata*, Herb. Rottler.

PERAK: Scortechini 1374.—The example in Herb. Rottler is without locality.

7. RUELLIA, Linn.

Herbs or undershrubs. *Leaves* opposite, subequal, entire; upper surface with raphides. *Flowers* axillary (or panicled in American species); bract 0; prophylla spatulate or subfoliaceous, exceeding the calyx. *Calyx* deeply 5-fid; segments subequal, linear. *Corolla* tubular-ventricose, blue to white; lobes rounded, twisted to the left in the bud. *Stamens* 4, didynamous; filaments glabrous; anthers of 2 oblong, subequal, parallel, muticous, glabrous cells; pollen globose, large (30 to 50 μ in diam.), honeycombed. *Ovary* glabrous; ovules 3 to 10 in each cell; style hairy, with one linear branch, the other obsolete. *Capsule* clavate; base solid, sterile; top ellipsoid or subglobose, with 6 or more close-packed seeds; retinacula large, hooked. *Seeds* ovoid, flattened, hygroscopically shaggy on margin.—Species 150 (Bentham) or 200 (Lindau), in the warmer parts of the world, more abundant in America.

But a considerable number of the species reckoned in *Ruellia* by Lindau have not "wabenpollen" (honeycombed pollen), but "stachelpollen" (prickly pollen); so that the species left in *Ruellia* may not be more than 120 to 150, and possibly may be much fewer, if (as in the above diagnosis) the genus is restricted to those plants which have a stalked clavate capsule [*Dipteracanthus* (genus), Nees].

1. *RUELLIA REPENS*, Linn. Mant. 89 (1767) (*not of* Burm.). Sparingly hairy or glabrate. *Stem* 6 to 20 in., weak, often much branched.

Leaves 1 by .35 to .5 in., lanceolate, nearly always narrowed at the base, entire; upper surface sprinkled with raphides; petiole .125 to .2 in. *Flowers* axillary, mostly solitary; bract 0; prophylla spatulate or foliaceous, exceeding the calyx. *Calyx* .2 in. long, divided nearly to the base into 5 subequal linear segments. *Corolla* .75 in. long. *Capsule* .5 in. long, contracted, sterile at the base; the seeds (usually 5 to 8) imbricated near the top. Blume Bijdr. 794; T. Anders. in Journ. Linn. Soc. IX. 460 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 412; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893); Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 310; Hemsl. in Journ. Linn. Soc. XXVI. 238 (1890); Ridley in Journ. As. Soc. Straits, 121 (Singapore 1900). *Dipteracanthus lanceolatus*, Nees in Wall. Pl. As. Rar. III. 82, and in DC. Prodr. XI. 124; Miq. Fl. Ind. Bat. II. 782. *D. subdenticulatus*, Miq. ! Journ. Bot. Néerl. I. 117 (1861). *Rostellularia sarmentosa*, herb. Buitenz. ! (non Nees).

PENANG: Curtis 1876. MALACCA: Griffith. SINGAPORE: Lobb; T. Anderson; Hullett; Ridley 2698, 10725. KEDAH: Ridley 5750. PAHANG: fide Ridley. PERAK: Scortechini 1283.—DISTRIB. A common Malay plant, extending to Tenasserim on one side, to China and the Philippines on the other.

The plate of Burmann (Fl. Ind. t. 41, fig. 1) is good, and represents a plant not of the genus *Ruellia*. In the Addit. to Mant. 515 (1771), Linnæus says his *Ruellia repens* was Burmann, t. 41, fig. 1; it may be more correct to call this species *R. repens*, Blume. Nees, in DC. Prodr. XI. 370, says his *Rostellularia sarmentosa* had the capsule "4-seeded from the base," so that there is probably some error in the *Rostellularia sarmentosa* issued from Buitenzorg.

VAR. β *linearis*, C. B. Clarke. *Leaves* 2.25 by .2 to .25 in.

PAHANG: Ridley 2182. IPOH: Deschamps.

Ruellia prostrata, Lam. Encycl. VI. 349 (cf. Hook. f. Fl. Br. Ind. IV. 411), differs a little from *R. repens*, Linn., by having larger flowers and capsules, and the leaves usually rather larger. In the Kedah example, Ridley, n. 5750, the flowers are more than 1 in. long, and the capsules more than .75 in. long; and Ridley has issued it as "*R. prostrata*"; the habit and small leaves are typical *R. repens*.

[*R. angustiflora*, Benth. & Hook. f. Gen. Pl. II. 1079 (*R. angustifolia*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 311), is a large-flowered American *Ruellia*, which appears to spread from gardens in Malaya; it was collected in Penang by Stoliczka, in Singapore by Deschamps and Hullett, n. 176.]

8. APORUELLIA, C. B. Clarke, n. gen.

Pollen with minute prickles or papillæ, or granulated; not honey-combed; otherwise as *Ruellia*.

To *Aporuella* may be referred *Ruellia flagelliformis*, Hemsley; *R. trichotoma*, Nees; *R. acaulis*, R. Brown; *R. spiciflora*, Benth.; *R. australis*, R. Brown; *R. Guppyi*, Hemsley; and several other South-east Asian unnamed plants. Whereas all the Hindostan species of *Ruellia* have honeycombed pollen, the species of *Aporuella* come from Malaya, South China, and Australia.

1. *APORUELLIA SUMATRENSIS*, C. B. Clarke, n. sp. *Stem* 11 in. high, with few or small leaves except at the base. *Lower leaves*: lamina 5 by 1·5 in., entire, sparsely puberulous; tip obtuse, triangular; base attenuated; upper surface dotted; the raphides obscure; petioles up to 1·5 in. long. *Flowers* in distant small clusters on long-peduncled spikes. *Floral leaves* passing into bracts, ovate or obovate, minutely pubescent, very variable in size. *Calyx* ·175 in. long, divided rather more than half-way down; teeth 5, linear. *Corolla* ·35 in. long; tube linear. *Stamens* 4, didynamous; anthers subsimilar, of two parallel muticous cells; filaments glabrous; pollen small, globose, 25 μ in diam., granular. *Style* hairy, one branch linear, the other nearly wanting. *Capsule* ·6 in. long, seed-bearing from the base; seeds about 12, ovate, compressed, shaggy, with hygroscopic hairs on the margin.

SUMATRA: R. Moesie, alt. 600 ft., *H. O. Forbes* 2636!

VAR. β *Ridleyi*, C. B. Clarke. *Leaves* more obovate than in the type, completely rounded at the top; *flowers* pure white (Ridley).

SELANGOR: Batu Caves, *Ridley* 8213; Kwala Lumpor, *Curtis* 2364.

2. *APORUELLIA AXILLARIS*, C. B. Clarke, n. sp. *Branches* (seen) 1 foot long, undivided; internodes 2 in. long. *Leaves* opposite, equal; blade 3·25 by 1·5 in., ovate-triangular, subobtuse, slightly hispidulous, suddenly attenuate at base; petiole ·25 in. long. *Flowers* in clusters of 1 to 3 in the axils, supported by oblong bracts ·25 to ·35 in. long. *Sepals* 5, linear, ·2 in. long, pubescent. *Corolla* ·8 in. long, narrowly-funnel-shaped. *Stamens* 4; anther-cells 2, parallel, oblong, obtuse at base; pollen globose, 45 μ in diam., papillose, subechinate. *Capsule* nearly ·5 in. long, stalked, with 7 flattened seeds in the clavate head.

MALAY PENINSULA: Songkah, *Curtis*.

This plant—in habit, leaves, inflorescence, corolla, capsule—simulates the very common *Ruellia prostrata*, Lam., var. *dejecta*; the pollen is unlike.

9. *STENOTHYRSUS*, C. B. Clarke, n. gen.

Inflorescence a terminal, peduncled, compound, many-flowered, nearly glabrous, subbracteate-linear panicle (8 to 12 by ·75 in.); otherwise as *Hemigraphis*.

This genus agrees in character very closely with the Tropical African genera *Mellera* and *Paulo-Wilhelmia*, but the habit and hairs are very different.

1. *STENOTHYRSUS RIDLEYI*, C. B. Clarke, n. sp. *Upper leaf*: blade up to 8 by 2 in., obovate-lanceolate, acuminate at either end, acute, nearly glabrous, entire, reticulate, full of raphides; main nerves 12 pair, oblique; petiole 1.5 in. long. *Peduncle* 1 to 4 in.; thyrus interrupted at base, of 20 to 50 flowers, clustered in very small opposite cymes; bracts inconspicuous, setaceous. *Calyx* .175 in. long; sepals 5, linear, full of raphides. *Corolla* 1 to 1.5 in. long, blue; tube cylindric, narrow-campanulate in the upper half, minutely hairy. *Stamens* 4, subsimilar; filaments glabrous, connected in pairs; anthers long, of 2 linear-oblong cells at equal height, pubescent, minutely 1- to 2-mucronate at the base, connective mucronate at tip; pollen globose, 40 μ in diam., longitudinally 20-ribbed. *Style* thinly hairy, with one oblong-linear and one suppressed branch. *Capsule* (not ripe) narrowly ellipsoid, glabrate, seed-bearing from the base, with eight ovate flattened seeds.

PERAK: Tambun Loh, *Ridley* 9770; Ipoh, limestone rocks, *Curtis* 3149.

Ridley placed this plant close to *Strobilanthes*; the numerous capsules are all 8-seeded. There are, on one sheet, three thyrsi 8 to 12 by 1 in., and one thyrus reduced (apparently accidentally) to a dense head.

10. HEMIGRAPHIS, Nees.

Herbs or undershrubs. *Leaves* opposite, subequal, often crenate, sometimes lobed; upper surface with raphides, which are sometimes altogether obscure. *Flowers* in terminal spikes, or rarely in 1- to 3-flowered small heads on axillary peduncles; bract usually exceeding the calyx, lanceolate or ovate; prophylla linear, short or 0. *Calyx* deeply 5-fid; segments lanceolate-linear or linear, subequal. *Corolla* tubular-campanulate, blue to white; lobes rounded, twisted in the bud. *Stamens* 4, didynamous; anthers of 2 oblong, subequal, parallel, mucous, glabrous cells; filaments glabrous, or the 2 longer with many long hairs; pollen rather large, from short-ellipsoid to oblong-ellipsoid; the 12 to 16 longitudinal ribs reaching to the poles; stopples 2. *Ovary* oblong, with 6 to 12 ovules, usually hairy at tip; style shortly hairy at base; stigma of one elongate and one suppressed lobe. *Capsule* oblong or linear-obovoid, slightly flattened, hardly stalked; seeds 6 to 12, ovoid, flattened, with much hygroscopic hair on the margin.—Species 30 perhaps, in South-east Asia and Polynesia.

To this genus belong *Ruellia repanda*, Linn.; *R. Ravacensis*, Nees; *R. nemorosa*, Zoll.; *R. colorata*, Nees; and, as Bentham says, most of Nees' first section of *Ruellia*.

Sect. 1. Flowers less than .75 in. long, 1 to 3 together in small short-peduncled heads 1. *H. Ridleyi*.

Sect. 2. Flowers less than .75 in. long, in rather loose spikes:—

Sepals softly hairy, tips ligulate-triangular:—

Mature leaves nearly glabrate 2. *H. confinis*.

Mature leaves hairy 3. *H. hirsuta*.

Sepals with linear-subulate white-hispid tips:—

Capsule hardly .25 in. long, nearly terete 4. *H. alternata*.

Capsule more than .25 in. long, obovoid, flattened 5. *H. platycarpus*.

1. *HEMIGRAPHIS RIDLEYI*, C. B. Clarke, n. sp. *Branches* (seen) 1 foot long, rambling or creeping, rooting, scabrid-pubescent with small sub-erect hairs. *Leaves* in equal opposite pairs; blade 2 by 1 in., ovate-elliptic, acute, crenate; upper surface with few scattered several-celled bristles (few of these bulbous at base), and with many conspicuous raphides; petioles .25 to .35 in. long. *Flowers* 1 to 3 in small heads on axillary peduncles .175 to .25 in. long; bract oblong .35 in. long; bracteoles (prophylla) linear, hardly half as long as the calyx. *Calyx* .175 in. long; sepals lanceolate-linear, with several-celled white hairs. *Corolla* .5 in. long. *Stamens* and anthers of the genus; filaments with long white simple hairs; pollen 60 by 30 μ , with 12 to 16 ribs and two large stopples. *Ovary* oblong, 8-ovulate, glabrous, but hairy at the top. *Style* slightly hairy at the base; one stigmatic branch elongate, the other suppressed. *Capsule* not seen.

PAHANG: *Ridley* 2180 (probably *H. confinis*, *Ridley* in *Trans. Linn. Soc. ser. 2, III. 332* (1893)).

This is allied, in inflorescence and habit, to *Hemigraphis ravacensis* (Nees sub *Ruellia*).

2. *HEMIGRAPHIS CONFINIS*, T. Anders. in *Journ. Linn. Soc. IX. 463* (1867). *Stem* 2 feet, branching, pubescent. *Leaves*: blade up to 4 by 1.7 in., elliptic, narrowed at either end, obscurely crenate, mature a grey-green and nearly glabrous; raphides in the upper surface obscure; petiole .25 in. long. *Spikes* 1 to 2 by .7 in., continuous but rather loose; bract .5 in. long, obovate or elliptic with triangular tip; prophylla linear, hardly half as long as the calyx. *Calyx* .35 in. long, softly hairy; sepals ligulate upwards with triangular tip. *Corolla* .5 in. long. *Stamens* of the genus; filaments nearly glabrous; pollen 50 by 30 μ , with 12 to 16 longitudinal ribs and no stopples. *Ovary* glabrous, except at the tip; style of the genus. *Capsule* .25 in. long, slightly flattened, glabrous except at the tip, 8-seeded nearly from the base. C. B. Clarke in *Hook. f. Fl. Br. Ind. IV. 423*. *Ruellia confinis*, Nees in *DC. Prodr. XI. 148*; *Miq. Fl. Ind. Bat. II. 788*.

MALACCA: *Cuning* 2354; *Griffith* (K.D.) 6188; *Hervey*; *Hullett*; *Maingay* 1754, 3147, (K.D.) 1174.—DISTRIB. Borneo.

3. HEMIGRAPHIS HIRSUTA, T. Anders. in Journ. Agri.-Hort. Soc. Ind. N.S. I. 270 (1868). Hairy. *Leaves* (even fully mature) hairy beneath; the upper surface densely clothed by conspicuous raphides; otherwise as *H. confinis*, T. Anders. *Justicia hirsuta*, Vahl Symb. II. 3, Enum. I. 121. *J. brunelloides*, Lam. Illustr. I. 40. *Nelsonia hirsuta*, Roem. & Sch. Syst. I. 172.

MALACCA: *Ridley* 10759.—DISTRIB. Java, Borneo.

This may be esteemed merely a hairy var. of *H. confinis*, but was kept up by T. Anderson. There are several other Malay sp. of *Hemigraphis* very closely allied.

4. HEMIGRAPHIS ALTERNATA, T. Anders. in Journ. Linn. Soc. VII. 114 (1864). *Stem* 12 to 18 in., rooting near the base, pubescent. *Leaves*: blade 2.5 by .75 to 1 in., narrowed at either end, obscurely crenate, mature, sparsely hispid-pubescent; upper surface sprinkled with raphides; petiole .25 to .5 in. long. *Spikes* .5 to 1.5 in. long, loose; bract .5 to .7 in. long, oblong subacute, hispid on margins. *Calyx* .35 in. long; sepals lanceolate with linear tips, lower part glabrate, densely covered with raphides; tips with some several-celled white hispid hairs. *Corolla*, *stamens*, *ovary*, as of *H. confinis*, T. Anders. *Capsule* scarcely .25 in. long, very little compressed, not obovoid, with 10 to 12 seeds placed subequally along its whole length, glabrous except at the tip. *Ruellia alternata*, Burm. Fl. Ind. 135 (excluding tab. *Rheedei*). *R. discolor*, Nees in DC. Prodr. XI. 149. *R. Blumeana*, Nees in DC. Prodr. XI. 149; Miq. Fl. Ind. Bat. II. 789 (as to his var. (Zollinger 660) only).

PAHANG: *Ridley* 2183 ("flower white"). JOHORE: *Ridley* 11129.—DISTRIB. Java, Sumatra.

Described from the Nees two types (Zollinger 343, 660) written up by his hand at Kew. Miquel's "*R. Blumeana*" (named by his hand, and the same plant issued as *R. Blumeana* from the Buitenzorg Garden) is *Hemigraphis Decaisneana*, T. Anders., a species that has the capsule hairy to the base, and the leaves tubercular-scabrous.

5. HEMIGRAPHIS PLATYCARPOS, C. B. Clarke, n. sp. *Spikes* longer, denser (than in *H. Blumeana*), with broader bracts, more softly hairy, less hispid. *Capsule* exceeding .25 in. long, linear-obovate, much flattened, with 8 seeds, sterile at the base; otherwise as *H. Blumeana*.

PAHANG: *Ridley* 1408. JOHORE: *Ridley* 11128.

11. ENDOPOGON, Nees.

Fertile stamens 2; otherwise as *Strobilanthes*.—Species 20, in South (or East) India, extending to Singapore.

This genus is hardly worth re-establishing as a split-off from *Strobilanthes*, but Lindau has introduced the point of "2 fertile stamens only" into his diagnosis of *Pseudostenosiphonium*; so that it is necessary either to call *Endopogon* a genus or to re-unite both in *Strobilanthes*. *Strobilanthes* is so very large that it is as convenient to treat it under 4 genera as under 4 subgenera.

1. ENDOPOGON RIDLEYI, C. B. Clarke, n. sp. Puberulous. *Leaves* opposite, unequal, up to 6 by 2 in., elliptic, acuminate at either end, subentire; upper surface with scattered raphides; petioles up to 1 in. long. *Peduncles* 0 to .7 in. long, one from each axil (*i.e.* in opposite unequal pairs), each carrying one green strobilate spike, pendent in flower, 1 to 1.5 in. long; bracts .75 in. long, elliptic, acute, almost papery, loosely but closely imbricate, adnate at the base. *Flowers* 2, sessile, under each bract, without prophylla. *Calyx* .125 in. long, 5-fid to the base; sepals pubescent, 2 lanceolate-linear, 3 linear. *Corolla* .25 in. long in the bud (perhaps not much longer when expanded), white. *Stamens* 2, fertile; filaments glabrous; pollen 60 by 40 μ , longitudinally ribbed. *Ovary* (and style) glabrous, with 2 ovules in each cell.

SINGAPORE: Stagmount, *Ridley* 5987, 11255.

Allied to *S. adnatus*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 436, which is an *Endopogon*.

12. STROBILANTHES, Blume.

Herbs or undershrubs. *Leaves* opposite, often very unequal, sometimes falsely alternate, crenate serrate or subentire; the upper surface usually full of raphides. *Inflorescence* various; the flowers often in heads or strobilate, sometimes solitary in lax panicles, sometimes in small clusters which are paniced; floral leaves prominent or small, persistent or caducous, often passing into true bracts ("deckblaetter") in the upper part of a spike; bracteoles (prophylla) 2, often similar to the sepals, or wanting (but in the axil of a bracteole a bud is sometimes to be found). *Calyx* of 5 (usually rather large) segments, subequal, divided nearly to the base in the Malay species. *Corolla* tubular-campanulate; lobes rounded, twisted in the bud. *Stamens* (fertile) 4, didynamous; anther-cells 2, mucicous; pollen large, ellipsoid (rarely subglobose), with 16 to 20 (rarely few) longitudinal ribs and 2 stopples. *Ovary* oblong or ellipsoid with 2 ovules in each cell, sometimes stalked; style with one long branch, the other suppressed. *Capsule* oblong or

narrow-ellipsoid, short-stalked, 4-seeded, or in many species with only 2 seeds.—Species about 200, *i.e.* after the genera *Endopogon*, Nees, *Pseudostenosiphonium*, Lindau, and *Acanthopale*, C. B. Clarke, have been taken out; extending from warmer Africa to China and Australia.

Sect. 1. Heads capitate, ocluded (except the corollas) between two erect persistent bract-like floral leaves:—

- | | | |
|---|-------|-----------------------------|
| Leaves scarcely hairy; bracts obtuse | .. .. | 1. <i>S. Maingayi</i> . |
| Leaves pubescent; bracts produced in a strongly crenulate tip | .. .. | 2. <i>S. bibracteatus</i> . |
| Leaves rufous-ciliate on margins; bracts with some rufous hairs | .. .. | 3. <i>S. hirtisepalus</i> . |

Sect. 2. Flowers strobilate or in short heads, with conspicuous rufous hair:—

- | | | |
|---|-------|---------------------------------|
| Heads ovoid, .1 in. long; bracts .5 in. long, linear | .. .. | 4. <i>S. rufo-sepalus</i> . |
| Heads strobilate, 2-25 in. long; bracts .7 in. long, spatulate-oblong | .. .. | 5. <i>S. rufo-strobilatus</i> . |
| Heads capitate, 1.5 in. long; bracts .75 in. long, linear | .. .. | 6. <i>S. rufo-capitatus</i> . |
| Heads 2- to 3-flowered, very small; bracts .25 to 1 in. long, spatulate | .. .. | 7. <i>S. rufo-pauper</i> . |

Sect. 3. Flowers strobilate, with grey hairs

Sect. 4. Flowers paniced; bracts caducous or inconspicuous:—

- | | | |
|---|-------|------------------------------|
| Panicle 8 by 5 in.; the flowers in opposite distant parts | .. .. | 9. <i>S. collinus</i> . |
| Panicle 6 by 1 in.; branches scarcely .25 in. long | .. .. | 10. <i>S. pachyphyllus</i> . |

1. STROBILANTHES MAINGAYI, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 448 (1884). Perennial, 2 to 4 ft. high, sparingly pubescent. Leaves opposite, often very unequal, the larger 3 by 1 to 1.25 in., crenulate, tip acuminate; midrib beneath minutely scabrid; surface beneath often microscopically furfuraceous-puberulous, rarely at all hairy; petiole .125 to .25 in., pubescent. Flowers 1 to 5, capitate, in an ovoid sessile head enclosed by two ovate erect floral bract-like leaves; bract 1 by .25 in., quadrate-oblong, keeled, tip rather wide, subobtuse, crenate; prophylla similar to sepals. Sepals .4 in. long, glabrous, oblong-subacute, membranous. Corolla 2 in. long, white (so noted on several collections); tube long, narrow, funnel-shaped, linear at base. Stamens 4, fertile, subsimilar; anthers oblong; filaments glabrous, except sometimes 2 or 3 hairs close to the base; pollen ellipsoid, large (70 by 40 μ), with 12 to 16 longitudinal ribs and 2 stopples. Style with a few scattered hairs. Capsule (not seen in the type examples) oblong, .5 in. long, with 4 seeds, shaggy all over with hygroscopic hairs.

PENANG: *Maingay* (K.D.) 1182; alt. 1800 to 2000 ft., *Ridley* 7167; *King's Collector* 1545, 1791. KEDAH: *Curtis* 298. PERAK: 3000 to 4000 ft., *King's Collector* 8316. SELANGOR: *Kelsall* 2004.

The "type" of *S. Maingayi* (K.D. 1182) has supplied neither flower nor fruit; the above description is taken largely from Curtis 298. In King's Collector 1545, the collector notes "flowers dark blue, white inside"; but I can find no difference between this n. 1545 and n. 1791 (noted as having white flowers) collected by the same collector in the same locality.

2. *STROBILANTHES BIBRACTEATUS*, Blume Bijdr. 799 (1825). Rather more pubescent than *S. Maingayi*. Leaves often with scattered hairs on the surface beneath. Tips of the bracts produced, conspicuously toothed. Filaments, in their whole lower half, with long, deflexed several-celled hairs; otherwise as *S. Maingayi*. Miq. Fl. Ind. Bat. II. 801. *Goldfussia bibracteata*, Nees in DC. Prodr. XI. 174. *Dicliptera ? crenata*, Miq. Fl. Ind. Bat. II. 844.

PERAK: Maxwell's Hill, Ridley 5516; Wray 174, 1674; *Scortechini* 337, 1413.—DISTRIB. Java, Sumatra.

There is another closely allied plant collected in Sumatra (Forbes 1906), which differs little but by having the flowers "pale purplish blue." *S. erosus*, Nees in DC. Prodr. XI. 181, appears to be this species, as Nees suspected; but I have seen no authentic example of *S. erosus*.

3. *STROBILANTHES HIRTISEPALUS*, C. B. Clarke, n. sp. More hairy than *S. bibracteatus*. Leaves minutely rufous-hairy on the margins. Floral leaves (involucral bracts) with rufous hairs. Sepals linear, very hairy, with rufous several-celled hairs. Otherwise as *S. bibracteatus*.

PERAK: Larút, alt. 1000 to 1500 ft., King's Collector 2215; *Scortechini* 940.

4. *STROBILANTHES RUFO-SEPALUS*, C. B. Clarke, n. sp. Branches 18 in. long, rufous-hairy, procumbent, divided, rooting near the base. Leaves opposite, one about twice as long as the other, longer one 2.25 by .25 in.; elliptic-acuminate, crenate, sparsely hispid on the upper surface; raphides obscure; petiole .2 in. long. Heads 1 in. long, ovoid, few-flowered, terminal and axillary. Bracts linear, .5 in. long, with several-celled bright-rufous hairs. Sepals .35 in. long, linear-subulate, with several-celled bright-rufous hairs in the upper half. Corolla 1 in. long; tube campanulate from a short linear base. Stamens 4; longer filaments hairy in their lower half; pollen 50 by 30 μ , longitudinally ribbed. Style glabrous, except close to the apex of capsule. Capsule .35 in. long, glabrate, with 4 young seeds.

PENANG: alt. 2000 ft., Ridley & Curtis 2761. PERAK: *Scortechini*; Ipoh, Curtis.

This species is near *Strobilanthes anamiticus*, O. Kuntze Revisio, I. 498 (1891).

5. *STROBILANTHES RUFO-STROBILATUS*, C. B. Clarke, n. sp. Branches rufous-hairy, creeping, rooting at the base. *Leaves* opposite, nearly equal, 4 by 2 in., cuneate at either end, crenate, nearly glabrate on the upper surface; petiole .5 in. long. *Heads* strobilate, 2 to 2.5 in. long; bracts (floral leaves) prominent even to the top of the head, .7 by .25 in., narrowed at either end; bracts .5 in. long, linear-spathulate, densely rufous with several-celled hairs. *Sepals* .4 in. long, linear, rufous-hairy. *Corolla* 1.25 in. long; tube campanulate, curved; lobes "purple" (Scortechini). *Stamens* 4; filaments hairy. *Ovary* pubescent at the apex, 4-ovulate; pollen 70 by 40 μ , longitudinally multi-striate.

PERAK: *Scortechini* 225.

6. *STROBILANTHES RUFO-CAPITATUS*, C. B. Clarke, n. sp. "Shrubby creeper, 6 to 8 ft. long." Branches rufous-hairy. *Leaves* subequal or very unequal, up to 8 by 3.5 in., cuneate at either end, crenate; upper surface nearly glabrate; petioles .35 in. long. *Heads* sessile or peduncled, 1 to 2 in. long, densely clothed with bright rufous several-celled long hairs; bracts (floral leaves) .75 by .125 in., linear, shaggy on the margin, with rufous hairs .125 in. long; bracts .25 to .35 in. long; rufous-hairy; sepals linear, .25 in. long, rufous-hairy. "*Corolla* white."

PERAK: alt. 2500 to 3000 ft., *King's Collector* 10935; *Scortechini* 568.

7. *STROBILANTHES RUFO-PAUPER*, C. B. Clarke, n. sp. Slender, procumbent, rooting at the nodes, pubescent. *Leaves* opposite, more or less unequal, up to 2 by .7 in., elliptic-lanceolate, crenate; upper surface nearly glabrous; petioles .125 to .25 in. long. *Heads* very small, 2- to 3-flowered; bracts (floral leaves) .25 to 1 in. long, very narrowly spatulate, sparingly or obscurely hairy; bracts .25 in. long, linear, more or less rufous-hairy. *Calyx* .2 in. long; sepals linear, pubescent, with long several-celled straight rufous hairs at the tips. *Corolla* 1 in. long, "blue" (Ridley), nearly straight, narrow-funnel-shaped. *Stamens* 4; filaments glabrous; pollen 70 by 40 μ , longitudinally ribbed. *Ovary* and style glabrous. *Capsule* with 4 hairy seeds.

PERAK: Maxwell's Hill, alt. 3000 ft., *Wray* 4192; the Cottage, alt. 5000 ft., *Ridley* 5515.

8. *STROBILANTHES DYERIANUS*, Masters in Gard. Chron. ser. 3, XIII. 442 (1893). Shrubby, vagant. *Leaves* opposite, unequal, sessile; blade of the larger one up to 7 by 3 in., elliptic-lanceolate, subacute, crenulate, nearly glabrate, often auricled at the base. *Peduncles* axillary, 1 to 3 in. long, with scattered, small, ovate leaves (.75 in. long), each terminated by a strobilate spike 1 to 2 in. long, pubescent (without rufous hair). *Bracts* .25 to .35 in. long, round-obovate. *Corolla* 1.3 in. long, violet-blue, *Stamens* 4; filaments glabrous; anther-cells short-oblong;

pollen 50 μ long, 30 μ broad, with 12 to 14 strong longitudinal striations. Kew Bull. 1894, Append. II. 51; Hook. Bot. Mag. t. 7574.

PENANG: *Curtis*.

This may not be indigenous in the Malay Peninsula. A note of Curtis says "originally collected in Burma by Boxall."

9. *STROBILANTHES COLLINUS*, Nees in Wall. Pl. As. Rar. III. 86 (1832). Attains 4 ft. *Leaves* opposite, equal, up to 10 by 3 in., elliptic, acuminate at either end, serrate, nearly glabrous, clothed with raphides on both surfaces; petiole hardly 1 in. long. *Panicles* terminal, open, often 8 by 5 in.; the flowers sessile, distant, in opposite pairs along the pubescent branches; bracts narrowly obovate-oblong, obtuse, .75 in. long, early falling. *Sepals* 5, subequal, .25 in. long, linear, hairy. *Corolla* 1.5 in. long, narrow, tubular-campanulate, white tinged pink. *Stamens* 4; filaments hairy; pollen ellipsoid, longitudinally striate. *Ovary* and *style* pubescent. *Capsule* .7 in., linear-oblong, pubescent; seeds 4, hairy. Nees in DC. Prodr. XI. 192; Miq. Fl. Ind. Bat. IV. 801; T. Anders. in Journ. Linn. Soc. IX. 476 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 465. *Ruellia collina*, Wall. Cat. 2343.

SINGAPORE: *Lobb*. PENANG: *Wallich* 2343. PERAK: alt. 2000 ft., *Curtis* 1313; alt. 300 to 800 ft., *King's Collector* 7271, 8490.

10. *STROBILANTHES PACHYPHYLLUS*, C. B. Clarke, n. sp. Shrub, up to 4 ft. high. *Leaves* opposite, equal, 5.5 by 2 in., elliptic, obscurely obovate, acute at either end; under surface pubescent ("silvery grey" when fresh), densely clothed with raphides, obscurely crenate, remarkably thick, hard in texture; petiole 1.5 in. *Panicle* terminal, long-peduncled, 6 by 1 in.; lateral branches scarcely .25 in. long. *Sepals* 5, subequal, .25 in. long, linear, glabrous, full of raphides. *Corolla* 1.25 in. long, very narrowly tubular-campanulate, light-blue. *Stamens* 4; filaments hairy in the lower half; anthers oblong, muticous; pollen exactly globose, 40 μ in diam., 20-ribbed, 2-stopped. *Style* thinly hairy.

PERAK: hill-top, *Scortechini* 1786; alt. 1600 to 2000 ft., *King's Collector* 7150.

The material represents the species imperfectly; it appears allied to *S. collinus*, Nees; the texture of the leaves is distinctive, and the globose pollen is very unusual in the genus *Strobilanthes*.

13. *ACANTHOPALE*, C. B. Clarke, n. gen.

Pollen globose, echinate, without ribs; otherwise as *Strobilanthes*. Species 8, in tropical Africa with Madagascar; and many Indian.

Among the *Strobilanthes* to be removed to *Acanthopale* are *S. lanceolatus*, Nees; *S. pulneyensis*, C. B. Clarke; *S. Zenkerianus*, T. Anders.; *S. Arnottianus*, Nees;

S. exsertus, C. B. Clarke; *S. iziocephalus*, Benth.; *S. Gardnerianus*, T. Anders.; *S. vestitus*, Nees; *S. laxus*, T. Anders.; *S. Hookeri*, Nees; *S. Andersonii*, Benth.; *S. bolamputtensis*, Bedd.; *S. acrocephalus*, T. Anders.; *S. radicans*, T. Anders.; *S. debilis*, Hemsl.; *S. divaricatus*, T. Anders.; *S. oliganthus*, Miq.; *S. japonicus*, Miq.

1. ACANTHOPALE? MALASICA, C. B. Clarke, n. sp. *Branch* nearly round, glabrate, at the tip sparsely hairy. *Leaves* opposite, equal; blade 2·5 by 1 to 1·5 in., elliptic-triangular, nearly entire, scarcely pubescent; upper surface with raphides; tip hardly acute; base deltoid; petiole ·25 in. long. *Flowers* in poor, axillary, sessile or short-peduncled spikes; floral leaves caducous, not seen; bract ·5 in. long, linear-ligulate, glabrous; bracteoles (prophylla) ·25 in. long, linear, glabrous. *Sepals* 5, equal, ·25 in. long, linear, slightly hairy at the tips. *Corolla* ·75 in. long at least, nearly glabrous. *Stamens* 4, perfect; filaments glabrous; anthers oblong, mucous, parallel, at equal height; pollen globose, 50 μ in diam., with bluntish spines, not ribbed. *Ovary* glabrous; style thinly hairy, one branch long, the other suppressed. *Capsule* ·7 in. long, with a long sterile base; seeds 4, crowded in the globose head, hygroscopic-shaggy.

KEDAH: Lankawi Island, *Ridley* 8298.

The doubt as to the genus of this plant arises because the specimen is in such a state that I am not sure that the grain of pollen described may not have been a stray grain.

14. ACANTHUS, Linn.

Harsh glabrous shrubs. *Leaves* often prickly. *Flowers* showy, spiked; bract ovate; prophylla (bracteoles) 2 or 0. *Calyx* 4-partite nearly to the base; 2 inner segments much narrower than the 2 outer, subopposite. *Corolla* strongly 2-lipped; the posticous lip 0, *i. e.* truncated close to the base; anticous lip 3-lobed, nearly flat, blue or white; the mid-lobe bifid. *Stamens* 4, subsimilar; filaments glabrous. *Anthers* 1-celled, oblong, mucous, conspicuously fringed by white hairs; pollen ellipsoid, with 3 narrow longitudinal chinks. *Ovary* with 2 to 4 ovules in each cell. *Capsule* ellipsoid, woody, large, shining brown, 2- (rarely 4-) seeded; seeds discoid, without hairs.—DISTRIB. Species 8 or 10, extending from South Europe and Africa to Polynesia.

Stiff, erect shrubs:—

| | | |
|---|-------|----------------------------|
| Corolla 1·25 in. long, blue; prophylla ·25 in. long | .. | 1. <i>A. ilicifolius</i> . |
| Corolla ·75 in. long, white; prophylla 0 | .. | 2. <i>A. ebracteatus</i> . |
| Twining, subscented | .. .. | 3. <i>A. volubilis</i> . |

1. ACANTHUS ILICIFOLIUS, Linn. Sp. Pl. 639 (1753). Shrub with many stout branches, 1 to 5 ft. high. *Leaves* 4 to 7 by 1 to 3 in.,

subpinnatifid, spinous, nearly sessile. *Spikes* 6 by 1·5 in.; bracts ·3 in. long, ovate; prophylla ·25 in. long, triangular-lanceolate. *Calyx-segments*; 2 outer subsimilar, ·5 to ·7 by ·3 in., round-ovate; 2 inner (alternate with the outer) shorter, much narrower. *Corolla* 1·25 in. long or more, blue. *Capsule* 1 by ·5 in.; seeds large, with close brain-like convolutions. Benth. Fl. Austral. IV. 548 (*partly*); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481 (*with syn.*); Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 319; Hemsl. in Journ. Linn. Soc. XXVI. 242 (1890); Prain Beng. Plants 800.

PENANG: *Deschamps, King*. MALACCA: *Griffith*. SINGAPORE: *Ridley* 8097. PERAK: *Wray* 2494, 2499; *Scortechini*.—DISTRIB. In saline mud, from Africa to Polynesia.

VAR. β *integrifolia*, T. Anders. *Axillary peduncles* numerous, running into large terminal panicles; leaves elongate, lanceolate, entire or nearly so.—DISTRIB. Andamans.

2. ACANTHUS EBRACTEATUS, Vahl Enum. II. 75, t. 40 (1791). *Bracts* caducous; prophylla 0. *Calyx* ·3 in. long. *Corolla* ·75 in. long, white; otherwise as *A. ilicifolius*, Linn. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 319; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900).

MALACCA: *Griffith, Maingay* 3084. PAHANG: *Ridley* 1276.—DISTRIB. Salt marshes, from the Andamans to Cochin-China and Java.

Bentham doubts whether this species is distinct from *A. ilicifolius*, Linn. Ridley n. 1276 is a typical example of *A. ebracteatus*, with flowers very much smaller than those of *A. ilicifolius*.

3. ACANTHUS VOLUBILIS, Wall. Pl. As. Rar. II. 56 t. 172 (1831). Twining, unarmed. *Leaves* oblong or elliptic, entire, glabrous. *Spikes* linear-oblong; prophylla 0. *Corolla* white, 1 in. long. Kurz For. Fl. II. 242; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 481; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900). *Dilivaria volubilis*, Nees in Wall. Pl. As. Rar. III. 98. *D. scandens*, Nees in DC. Prodr. XI. 269.

PENANG: *Curtis* 510. SINGAPORE: fide *Ridley*.—DISTRIB. Coast of India, Siam, Malaya, Australia.

The dried tips of the branches are difficult to separate from those of *A. ebracteatus*; the leaves are usually entire or slightly prickly; the flowers larger.

15. GYMNSTACHYUM, Nees.

Herbs or undershrubs, sparingly pubescent. *Leaves* lanceolate to obovate, entire or crenulate, petioled. *Panicle* (in the Malay Peninsula

species) terminal, sometimes of several elongate branches; branches linear, with very small lateral cymes, or reduced to spikes; bracts linear, very small; prophylla hardly any. *Calyx* small, less than .2 in. long, divided deeply into 5 linear segments, pubescent or puberulous. *Corolla* .5 to 1 in. long; tube narrow; limb 2-lipped. *Stamens* 2; anther-cells 2, oblong, parallel, at equal height, muticous; pollen small, short-ellipsoid, longitudinally (often obscurely) ribbed. *Ovary* conic, many-ovulate, nearly glabrous; style at tip shortly 2-fid. *Capsule* .5 to 1 in. long, linear, glabrate, with parallel sides, 8- to 20-seeded from the base. *Seeds* ovoid, flattened, obscurely hairy. Species 25 to 30, in South-east Asia, North Australia, Polynesia.

This genus, varying in size, is distinguished by the linear (not clavate) many-seeded capsule. The small-sized group, *Gymnostachyum* proper, has (A) the flowers clustered or opposite (B) the flowers, solitary, alternate; but of the group (A) there is no example from the Malay Peninsula.

Stems 1 to 4 in. long. Flowers solitary in long spikes:—

Spikes linear, simple. Corolla blue, toward the base whitish:—

Leaves suddenly narrowed on the winged petiole .. 1. *G. decurrens*.

Leaves spatulate on the petiole:—

Corolla .75 in. long or more 2. *G. diversifolium*.

Spikes linear, somewhat branched; corolla white .. 3. *G. pallens*.

Stem elongate; panicle with many long, linear branches .. 4. *G. polyneuron*.

Stems 1 to 3 ft. long; inflorescence terminal; bracts minute; stamens, pollen, and style as of *Gymnostachyum*; but the capsule is not known in any of the following species:—

Panicle 2 to 3 in. long, short-peduncled; flowers 8 to 20:—

Spike slender, linear; style hairy 5. *G. simplicicaule*.

Spike denser; style glabrous:—

Leaves with 5 to 6 pairs of nerves 6. *G. hirtistylum*.

Leaves with 9 to 11 pairs of nerves 7. *G. magis-nervatum*.

Panicle 8 in. long, usually branched:—

Leaves not exceeding 2.5 in. in breadth:—

Leaves thick, attenuate at either end 8. *G. knoxiiifolium*.

Leaves elliptic, shortly acuminate:—

Panicle with long branches 9. *G. ? Scortechinii*.

Panicle linear, with short lateral cymes .. 10. *G. Ridleyi*.

Leaves 6 in. wide 11. *G. ? magnum*.

1. *GYMNOSTACHYUM DECURRENS*, Stapf in Kew Bull. 357 (1894).

Stem 1 to 4 in. high. *Leaves* up to 5 by 3 in., pubescent beneath, ovate; tip triangular; margin undulate; nerves 6 pairs, the lowest patent; base suddenly narrowed, often decurrent on the petiole. *Spikes*

linear, 4 to 7 in. long (5 on one stem); flowers all solitary; bracts minute, linear. *Sepals* hardly .15 in. long, linear, pubescent. *Corolla* .5 to .6 in. long, pubescent, blue. *Stamens* 2; filaments glabrous upwards; anther-cells 2, oblong, parallel at equal height, minutely or obscurely mucronate at base; pollen ellipsoid, 20 μ long, obscurely ribbed longitudinally. *Ovary* minutely pubescent; style thinly hairy, with one branch suppressed. *Capsule* .7 in. long, linear, glabrate, 20-seeded.

PAHANG: *Ridley*.

2. GYMNSTACHYUM DIVERSIFOLIUM, C. B. Clarke, n. sp. Creeping. *Stems* 1 to 4 in. *Leaves* up to 5 by 2.25 in., slightly pubescent beneath, ovate; tip triangular; margin entire; nerves 8 pairs; base suddenly narrowed, shortly decurrent on the petiole, or (on every plant) one leaf truncate or cordate at base. *Spikes* linear, 2 to 5 in. long, 1 to 3 on one stem; flowers all solitary; bracts minute or none. *Calyx* scarcely .15 to .2 in. long. *Corolla* .75 in. long or rather more. Otherwise as *G. decurrens*, Stapf.

KEDAH: *Curtis* 2530. PERAK: alt. 400 to 600 ft., *King's Collector* 8284, 936; *Scortechini* 1589.

In every plant the leaves are decurrent on the petiole; but there are one or two upper leaves truncate or even cordate at base; the same may be observed in several of these small *Gymnostachyums*. This plant is nearly allied to *G. decurrens*, Stapf; the leaves are of thinner texture, with thinner nerves.

3. GYMNSTACHYUM PALLENS, C. B. Clarke, n. sp. Rhizome 1.5 in. long, woody, nodose. *Stem* .5 to 1 in. long. *Leaves*: blade 4 by 2.5 in., broad-ovate; tip subobtusate, nearly glabrous, shortly decurrent on the petiole; margin wavy-crenate; upper surface densely punctate; lower surface pale green. *Spike* 3 to 4 in. long, on a 3 to 4 in. peduncle, slightly branched, minutely pubescent; flowers solitary. *Calyx* .125 in. long. *Corolla* .5 in. long, white. *Capsule* rather more than .5 in. long.

PERAK: alt. 300 to 500 ft., *King's Collector* 8133.

4. GYMNSTACHYUM POLYNEURON, C. B. Clarke, n. sp. Top of stem leafy, 3 in. long (seen). *Leaves* spatulate; blade ovate, 5 by 2.25 in.; tip triangular-obtusate, nearly glabrous; primary nerves 10 pairs; petioles 1.5 in. long. *Panicle* terminal, compound; ultimate spikes 2 to 5 in. long, linear; flowers distant, solitary, subsessile. *Sepals* .125 in. long, linear, nearly glabrous. *Corolla* .5 in. long; "lower lip deep violet, upper white splashed with violet." *Stamens* 2; anther-cells 2, narrow oblong, at equal height, not tailed; pollen ellipsoid, 30 μ long, with 2 stopples and 2 longitudinal rows on either side of each stopple. *Ovary*

nearly glabrous; style shortly 2-fid, thinly hairy in the lower half. *Capsule* .5 in. long, linear-oblong, glabrate, with 10 seeds.

SIAMESE STATES: Songkah, *Curtis*.

5. *GYMNOSTACHYUM SIMPLICICAULE*, C. B. Clarke, n. sp. Slightly pubescent. *Stem* 1 to 2 ft. long, undivided (in any example seen). *Leaves*: blade 3 by 1 in., elliptic, obtusely triangular at either end, entire; nerves 5 to 6 pairs, obscure; petioles .25 to .5 in. long. *Panicle* terminal, few-flowered, reduced almost to an oblong spike; peduncle hardly 1 in. long; bracts minute. *Sepals* hardly .125 in. long, linear. *Corolla* hardly .5 in. long, grey-yellow, 2-lipped. *Stamens* 2; filaments glabrous; anther-cells 2, narrowly oblong, parallel, nearly at equal height, mucous; pollen 30 by 15 μ , narrowly ellipsoid; stopples 2, longitudinally obscurely ribbed. *Style* upwards glabrous, very shortly bifid at tip.

PERAK: alt. 3000 to 3500 ft., *King's Collector* 893, 935, 2394; *Scortechini* 688.

6. *GYMNOSTACHYUM HIRTISTYLUM*, C. B. Clarke, n. sp. Glabrate, the inflorescence pubescent. *Stems* nearly a foot high, simple, decumbent, rooting at the base. *Leaves* opposite, equal; blade elliptic-acute, 4 by 2 in., without raphides; base broadly cuneate; nerves 6 to 7 pairs; petioles .2 in. long. *Inflorescence* of 2 terminal, simple, linear, slender, interrupted, ebracteate spikes; peduncles .5 to 1 in. long; flower-clusters of 1 to 2 flowers, opposite, the lower pairs distant. *Sepals* hardly .125 in., linear. *Corolla* white, very small, with a short tube. *Stamens* 2; anther-cells 2, at equal height, not tailed; pollen very shortly ellipsoid. *Style* hairy; tip shortly bifid.

PERAK: alt. 400 to 600 ft., *King's Collector* 10814.

7. *GYMNOSTACHYUM MAGIS-NERVATUM*, C. B. Clarke, n. sp. Almost glabrous. *Stem* 12 to 18 in., decumbent, rooting near the base, branched. *Leaves* opposite, equal; blade 3.5 by 1.3 in., elliptic-lanceolate, acuminate at either end; nerves 9 to 11 pairs, oblique; both surfaces with raphides, the lower also densely, minutely dotted; petioles .2 in. long. *Peduncles* terminal, hardly .5 in. long. *Spikes* 2.5 in. long, simple; flowers 12 to 20, opposite; bracts minute. *Sepals* hardly .1 in. long, lanceolate, nearly glabrous. *Corolla* .5 in. long, very narrow, cream-coloured, 2-lipped nearly half-way down. *Stamens* 2; filaments glabrous; anther-cells 2, rather large, oblong, at equal height, mucous; pollen 40 by 25 μ , with 10 strong longitudinal ribs. *Pistil* glabrous; ovules 8 or more.

PERAK: alt. 100 ft., *King's Collector* 6542.

8. *GYMNOSTACHYUM KNOXIFOLIUM*, C. B. Clarke, n. sp. Nearly glabrous, except the minutely pubescent inflorescence. *Stem* erect, with long

internodes. *Leaves*: blade 6·5 by 2 in., broadly lanceolate, tapering at either end, texture thick, without raphides; nerves 7 pairs, springing very obliquely and curving inwards; petioles ·25 in. long. *Panicle* of two branches; branch 8 in. long, linear, with small, opposite, distant cymes; bracts hardly ·2 in. long, linear. *Sepals* ·075 in. long, oblong-linear. *Stamens* 2; filaments glabrous, each with a minute tooth at base; anther-cells narrow-oblong, parallel at equal height, muticous. *Ovary* nearly glabrous, many-ovuled; style thinly hairy; tip minutely 2-fid. Buds very young; corolla noted white by collector.

NEGRI-SEMBILAN: *King's Collector* 10085.

9. GYMNSTACHYUM ? SCORTECHINII, C. B. Clarke, n. sp. *Stem* erect, at least 12 to 18 in. high. *Leaves*: blade 7·5 by 2·5 in., elliptic, acuminate at either end, entire; upper surface with raphides; lower minutely pubescent; petioles ·5 to 1·5 in. long. *Panicle* very young, 8 in. long, with long branches, many-flowered, rusty-pubescent; bracts inconspicuous; flowers mostly in approximate opposite pairs. *Calyx* ·125 in. long. *Stamens* 2; filaments glabrous at top; anther-cells 2, oblong, parallel, at equal height, acute-muticous at base; pollen 35 by 20 μ , with 2 stopples; a longitudinal row of patches (hardly tubercles) on each side of each stopple.

PERAK: *Scortechini*.

The habit of this plant might do for a *Gymnostachyum* near *G. venustum*, T. Anders., but the genus is doubtful.

10. GYMNSTACHYUM RIDLEYI, C. B. Clarke, n. sp. A tall shrub. *Leaves*: blade 6 to 7 by 2·25 in., elliptic, shortly cuneate-acuminate at either end, pubescent beneath; petiole ·75 in. long, pubescent. *Panicles* (reduced almost to spikes) 2, terminal, 11 by ·75 in.; bracts ·125 to ·2 in. long, linear; flowers distant, solitary, or in 2- to 4-flowered lateral cymes on peduncles hardly ·15 in. long. *Sepals* ·15 to ·2 in. long, pubescent. *Corolla* white.

PERAK: *Ridley* 9772.

The example shows no corolla, no capsule.

11. GYMNSTACHYUM ? MAGNUM, C. B. Clarke, n. sp. A shrub. *Stem* glabrate; upper internodes 7 in. long. *Leaves*: blade up to 12 by 6 in., obovate, nearly glabrate, entire; nerves 12 (or more) pairs; upper petioles 3 in. long. *Panicle* terminal, 8 by ·75 in.; bracts ·15 to ·2 in., linear; peduncle 1·5 in. long; small cymes 2- to 3-flowered in opposite approximate pairs. *Sepals* linear, ·2 in. long, pubescent. *Corolla* in very young bud. *Stamens* 2; filaments glabrous upwards; anther-cells 2, parallel, oblong, at equal height, muticous.

MALACCA: Waterfall, *Goodenough* 1893.

From the size, habit, and stamens of this plant it is almost certainly either a *Gymnostachyum* or a *Phlogacanthus*.

16. PHLOGACANTHUS, Nees.

Corolla-tube cylindric. *Capsule* narrowly ellipsoid, contracted close to the base; otherwise as *Gymnostachyum*.—DISTRIB. Species 12, in India; 1 or 2 extending a short way east.

1. PHLOGACANTHUS BREVIS, C. B. Clarke, n. sp. A branched under-shrub, 12 to 18 in. long. *Leaves*: blade 6 by 3·5 in., broadly ovate; tip subobtusely; base shortly attenuate; nerves 6 to 7 pairs; petiole 1 to 1·5 in. long. *Panicles* terminal, 2 to 4 in. long, oblong; bracts minute. *Sepals* ·15 to ·2 in. long, linear, minutely pubescent. *Corolla* small (only seen in bud), grey pubescent without. *Stamens* 2; anther-cells 2, oblong, parallel, at equal height, mucicous; pollen 20 by 15 μ , longitudinally banded. *Pistil* glabrous. *Capsule* 1 in. long, nearly ·2 in. wide upwards, subcylindric, obtuse, 8-seeded; base narrowed. *Seeds* flat, nearly ·125 in. in diam.

PERAK: alt. 300 ft., *King's Collector* 2884.

The capsule is here typically that of *Phlogacanthus*, and not the parallel-sided capsule of *Gymnostachyum*; but the two genera may be united.

17. ANDROGRAPHIS, Wallich.

Herbs or very small shrubs. *Leaves* entire. *Racemes* (or spikes) 1-sided, axillary and terminal, often compounded into loose panicles with spreading branches; bract very small, narrow; prophylla hardly any; flowers solitary or in few-flowered, distant clusters. *Sepals* 5, rarely more than ·2 in. long, linear. *Corolla* small (about ·5 in. long), 2-lipped; base tubular; limb white, spotted pink-purple in the palate. *Stamens* 2; filaments hairy; anther-cells 2, ovate, parallel, at nearly equal height; base acute (not spurred), with often a tuft of hairs; pollen 25 μ long, short-ellipsoid, with few very slender longitudinal ribs. *Style* thinly hairy; tip minutely bifid. *Capsule* narrowly oblong, with parallel sides, seed-bearing nearly from the base, flattened from the back of the valves. *Seeds* 6 to 12, stony, cuboid-ellipsoid, smooth, glabrate, with rows of minute pits.—DISTRIB. Species 18, very closely allied, in India; 1 or 2 extending to China and Malaya.

| | |
|---------------------------|---------------------------|
| Leaves lanceolate | 1. <i>A. paniculata</i> . |
| Leaves ovate | 2. <i>A. tenuiflora</i> . |

1. ANDROGRAPHIS PANICULATA, Nees in Wall. Pl. As. Rar. III. 116 (1832). An erect annual, 1 to 3 ft. high. *Stem* quadrangular.

Leaves 2·5 by ·5 to ·75 in., lanceolate, glabrous, paler beneath; petioles ·25 in. long. *Panicle* copious, of lax divaricate racemes; lower flowers in each raceme pedicelled, solitary. *Capsule* ·75 by ·125 in., nearly glabrous when mature. Nees in DC. Prodr. XI. 515; Wight Ic. t. 518; Miq. Fl. Ind. Bat. II. 855; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 501; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 323; Prain Beng. Plants 809. *Justicia paniculata*, Burm. Fl. Ind. 9; Blume Bijdr. 788.

PENANG: Curtis 1877.—DISTRIB. Throughout India.

2. *ANDROGRAPHIS TENUIFLORA*, T. Anders. in Journ. Linn. Soc. IX. 502 (1867). *Leaves*: blade ovate, shortly acuminate, 2·5 by 1·5 in., obscurely puberulous; base shortly spathulate. *Racemes* (often nearly spikes) very slender, straggling. *Corolla* ·4 in. long. Otherwise as *A. paniculata*, Nees. Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 323; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 502. *Haplanthus tener*, Nees in Wall. Pl. As. Rar. III. 115, and in DC. Prodr. XI. 512.

KEDAH: Ridley 8331; Curtis 2136, 2578.—DISTRIB. Eastern India, Malaya.

18. CYSTACANTHUS, T. Anders.

Shrubs or erect herbs. *Leaves* opposite, equal, entire. *Inflorescence* terminal (or axillary in some non-Malay species); panicles narrow; bracts small; prophylla 0. *Calyx* deeply 5-fid; segments narrow. *Corolla* rather large, tubular, curved and inflated, somewhat 2-lipped; segments ovate or oblong, one completely outside in the bud. *Stamens* 2; rarely 2 rudiments added; anthers of 2 oblong, parallel, mucous cells; connective often hispid on the back; pollen subglobose, with few longitudinal bands. *Ovary* with 4 or more ovules in each cell. *Capsule* linear, with parallel sides, many-seeded nearly from the base.—DISTRIB. Species 5, in India; 1 extending to Cochin-China.

1. *CYSTACANTHUS TURGIDA*, Nicholson Dict. Gard. I. 428 (1884). A glabrous shrub, 1 to 2 ft. high. *Leaves*: blade 4 to 7 in. long, oblong or narrow-elliptic, narrowed at either end; petioles ·5 to 1 in. long. *Inflorescence* terminal; panicles 1 to 5 in. long, dense; flowers clustered on branches hardly ·17 in. long; bracts inconspicuous, ·15 to ·2 in. long. *Calyx*-segments ·125 to ·2 in. long, linear. *Corolla* 1 in. long, white, pink-spotted; tube strongly bent close above the calyx and greatly inflated. *Capsule* 1 by ·125 in., many-seeded, dorsally compressed. *Seeds* ovoid, flattened, densely hairy. Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 325. *Cystacanthus* sp., Benth. in Benth. & Hook. f. Gen. Pl. II. 1098. *Meninia turgida*, Hook. Bot. Mag. t. 6043.

PENANG: Deschamps.—DISTRIB. Burma, Cochin-China.

19. ASYSTASIA, Blume.

Herbs or undershrubs. *Leaves* opposite, equal or nearly so. *Racemes* subterminal, unilateral, lax at base, sometimes compound; pedicels short (0 to .2 in. long), alternate or opposite, in bud and flower suberect; bract and 2 prophylla at base of the pedicel small bristles (hardly .125 in. long). *Calyx* .2 to .25 in. long, divided very nearly to the base into 5 linear or narrow-oblong segments. *Corolla* short or long; tube inflated upwards or linear; lobes 5, imbricated in the bud. *Stamens* 4, didynamous, all perfect; filaments united in pairs at the base, glabrous or slightly hairy near the base; anther-cells 2, oblong, parallel, at equal height, at base mucous or minutely auricled; pollen ellipsoid, longitudinally ribbed in the type species. *Ovary* hairy; style long, glabrous except near the base; stigmatic lobes 2 equal, hemiglobose; ovules in each cell 2. *Capsule* oblong, 4-seeded in the upper part; base contracted, sterile. *Seeds* compressed, round, often tubercled or rough, without hairs. Species 30, in South-east Asia, and in Tropical and South Africa.

Flowers alternate; inflated part of corolla-tube longer than the base 1. *A. coromandeliana*.
 Flowers mostly opposite; corolla-tube linear, widened near the top 2. *A. intrusa*.

1. ASYSTASIA COROMANDELIANA, Nees in Wall. Pl. As. Rar. III. 89 (1832). A more or less dull-pubescent herb, 1 to 4 ft. high. *Leaves* from 1 to 3.5 in. long, ovate, triangular-acute at tip, entire, the margin undulate or sometimes obscurely toothed; petiole .25 to 1.75 in. long. *Racemes* 1 to 4 in. long, rarely divided (paniculate), on a peduncle 1 to 4 in. long. *Sepals* .2 in. long, linear, pubescent. *Corolla* varying from lurid pale-purple to nearly white, 1 to 1.25 in. long (see however, remark on form β below); the contracted cylindrical base of the tube much shorter than its inflated upper half. *Pollen* 75 by 45 μ , with 2 stopples, and longitudinal ribs beside each stopple. *Capsule* 1 in. long; solid cylindrical base .35 in.; seeds .2 in. in diam., compressed, ovoid, wrinkled or subtubercular. Nees in DC. Prodr. XI. 165 (*with syn. and var.*); Miq. Fl. Ind. Bat. II. 792; Hook. f. Fl. Br. Ind. IV. 493 (*with syn.*); Dyer Fl. Trop. Afr. V. 131, Fl. Cap. V. 42. *A. gangetica*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 326, fig. 131; Prain Beng. Plants 813.

PENANG: *Deschamps*; Waterfall, *King*; *John Scott*. SINGAPORE: *Deschamps*; *T. Anderson*; *Hullett* 67.—DISTRIB. Indian Peninsula; Tropical and South Africa; elsewhere perhaps only a weed of cultivation.

There is no definite line between the examples of this species with small corolla (as John Scott's Penang example, with corolla only .75 in. long and small leaves) and the *A. chelonoides*, Nees. T. Anderson called our present plant *A. gangetica*; while he has twice marked the Java *A. chelonoides* (with subcompound inflorescence) as *A. coromandeliana*.

2. *ASYSTASIA INTRUSA*, Blume Bijdr. 796 (1825) (*excl. syn.*). A slender undershrub, 2 to 5 ft. high, sparingly pubescent. *Leaves* 2 to 3 in. long, elliptic-lanceolate; base obtriangular. *Racemes* 1 to 2 in. long; flowers often opposite. *Corolla* .7 to .75 in. long, dull pink; tube linear, widened only near the top. *Capsule* .75 in. long; seeds 4, tubercular. *Stamens, pollen, pistil*, nearly as of *A. coromandeliana*. Moritsi Verz. Zoll. Pfl. 47; Hassk. Cat. Hort. Bogor. p. 149 (*excl. syn.*); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 493; Ridley in Journ. As. Soc. Straits 121 (Singapore 1900). *A. Blumei*, Nees in DC. Prodr. XI. 167; Miq. Fl. Ind. Bat. II. 793; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 326. *Isochoriste javanica*, Miq. Fl. Ind. Bat. II. 822; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 326.

PENANG: *J. Scott*; *Deschamps*; *Curtis* 2741; Waterfall, *Curtis* 1853, 3732. SINGAPORE: *Schomburgk* 72; *Hullett*; *Ridley* 3862.—
DISTRIB. Frequent throughout the Malay Archipelago.

Nees altered the name of this plant, because he says that there existed an earlier *Asystasia intrusa* of Forskahl; Forskahl's name, however, was *Ruellia intrusa*.

20. PHIALACANTHUS, Benth.

Calyx-segments united into a tube at the base (very shortly so in *P. minor*). *Inflorescence* glabrous or very nearly so; pedicels spreading, with nodding flowers. *Capsule*, where known (*i.e.* in *P. Wrayi*), supported by the hardened elongate calyx-tube; otherwise as *Filetia*.—
DISTRIB. Species 4, *viz.* the 3 below, and *P. Griffithii*, Benth., from East Assam.

| | | | | | | |
|--|--|----|----|----|----|----------------------|
| Calyx-tube about as long as the teeth. | Pollen with 12 raised strong longitudinal ribs | .. | .. | .. | .. | 1. <i>P. Wrayi</i> . |
| Calyx-tube shorter than the teeth. | Pollen with very obscure longitudinal ribs:— | | | | | |
| Corolla 1.25 in. long | .. | .. | .. | .. | .. | 2. <i>P. major</i> . |
| Corolla .6 in. long | .. | .. | .. | .. | .. | 3. <i>P. minor</i> . |

1. *PHIALACANTHUS WRAYI*, C. B. Clarke, n. sp. A branched nearly glabrous shrub, 2 to 3 ft. high. *Leaves* opposite, equal; lamina 5 by 2 in., narrowed at either end, subentire; tip acuminate; rhaphides obscure; petiole .75 to 1 in. long. *Panicles* 2 to 4 in. long, terminal,

sometimes reduced to a simple raceme; bracts scarcely .1 in. long; pedicels 0 to .2 in. long, in opposite pairs. *Calyx* in flower .25 to .35 in. long; teeth triangular-lanceolate, acute; calyx in fruit hardening, lengthening (up to .5 in. and upwards). *Corolla* 1 in. long and upwards, pale primrose (Wray). *Stamens* 4; filaments glabrous, united in pairs; anthers sub-equal, the two cells ellipsoid-oblong, at equal height, hardly auricled at the base; pollen 80 by 15 μ , with 2 stopples, and 12 strong raised ribs. *Capsule* more than 1 in. long, oblong-ellipsoid, smooth, 4-seeded in the upper half; retinacula large.

PERAK: Gunong Summit, alt. 6700 ft., Wray 378.

P. Griffithii, Benth., has pollen exactly as of *P. Wrayi*, and is closely allied to it, but has a much more open and compound inflorescence.

2. PHIALACANTHUS MAJOR, C. B. Clarke, n. sp. A nearly glabrous shrub, 6 to 8 ft. high. *Leaves* opposite, equal; the blade up to 8 by 3 in., narrowed at each end; petiole more than 1 in. long. *Panicles* 2 to 5 in. long, terminal, sometimes reduced to a simple raceme; flowers opposite; pedicels .175 in. long, spreading; buds drooping. *Calyx* nearly .35 in. long, divided more than half-way down; teeth lanceolate. *Corolla* 1.25 in. long, waxy yellowish-white. *Stamens* nearly as of *P. Wrayi*, but the pollen only obscurely ribbed longitudinally. *Pistil* as of *P. Wrayi*.

PERAK: Scortechini 249; alt. 2500 to 4000 ft., King's Collector 8146, 10929.

3. PHIALACANTHUS MINOR, C. B. Clarke, n. sp. Very like *P. major*, but smaller in every part. *Leaves* smaller, sometimes only 3 by .7 in. *Calyx* divided nearly to the base, .2 in. long; segments linear. *Corolla* .8 in. long.

PERAK: Scortechini.

21. FILETIA, Miq.

Herbs or small shrubs. *Leaves* opposite, subequal, petioled, entire, with few or no raphides. *Panicle* symmetrically terminal, frequently reduced nearly to a raceme or spike; pedicels largely opposite; bracts small, inconspicuous, except in *F. bracteosa*. *Calyx* .175 to .25 in. long, divided nearly to the base into 5 narrow segments. *Corolla-tube* linear or cylindric, conspicuously 2-lipped; posticous lip erect, subentire; anticous of 3 oblong lobes. *Stamens* 4, perfect, subsimilar; anthers 2-celled, the cells oblong, muticous, one placed half-way below the other, or nearly at equal height; pollen short-ellipsoid, with 2 stopples, and longitudinally striate. *Pistil* glabrous, or hairy in the lower half of the style; ovules 2 in each cell; style shortly 2-fid, or with one

branch obsolete. *Capsule* stalked, with 4 smooth, flat seeds in the clavate upper part (where known).—DISTRIB. Species about 10, being those here described, the type *F. costulata* from Sumatra, *F. africana*, Lindau, and several from Borneo.

We have 3 divisions of *Filetia*:—

Div. 1. EU-FILETIA.—Corolla-tube linear, .6 in. long; palate glabrous. Cells of the anthers quadrate, glabrous. Pollen with longitudinal lines.—*Filetia costulata*, Miq.

Div. 2. PERAKIA.—Corolla-tube .4 in. long, cylindrical; palate (usually densely) furred. Cells of the anthers oblong or narrow-oblong, the upper one fringed with hair. Pollen with longitudinal latticed bands.—Here belong the 4 species below described, and some of Malaya.

Div. 2. AFRO-FILETIA.—Corolla-tube .125 to .175 of an inch long; palate glabrous. Anther-cells roundish, the lower divaricate.—Here belongs *Filetia africana*, Lindau.

Panicle spreading. Sepals small, acute, pubescent .. 1. *F. paniculata*.

Panicle reduced to a raceme or spike. Sepals glabrous, hardly acute:—

Bracts ovate, larger than the calyx 2. *F. bracteosa*.

Bracts inconspicuous:—

Flowers subsessile. Leaves elliptic or subovate .. 3. *F. Scortechinii*.

Flowers pedicelled. Leaves oblong .. 4. *F. Ridleyi*.

1. FILETIA PANICULATA, C. B. Clarke, n. sp. *Branches* (seen) 8 to 12 in. long, glabrate, woody below. *Leaves*: blade 4.5 by 2 in., elliptic, narrowed at either end, nearly glabrous; nerves 8 to 10 pairs; petioles .25 to .35 in. long. *Inflorescence* of 3, nearly simple, racemes 2 to 4 in. long; floral leaves at base of inflorescence .5 in. long, linear; flowers mostly in opposite separate pairs, on pedicels .125 in. long; bract at base of pedicel linear, .125 to .175 in. long. *Sepals* .175 in. long, linear, pubescent, acute. *Corolla* .7 in. long, yellowish, densely hairy down the throat (Scortechini). *Pollen* 70 by 40 μ , the longitudinal bands latticed. *Style* hairy at base; ovary nearly glabrous.

PERAK: *Scortechini* 604.

Scortechini marked correctly his *Filetias* as nov. genus next *Lepidagathis*.

2. FILETIA BRACTEOSA, C. B. Clarke, n. sp. Nearly glabrous. *Leaves*: blade up to 9 by 3 to 3.5 in., elliptic, narrowed at either end; nerves 12 pairs; petioles up to .7 in. long. *Inflorescence* a dense nearly simple spike 3 by .7 in.; flowers mostly in opposite pairs, nearly sessile; the bract ovate or nearly round, .2 in. long. *Sepals* .2 in. long, linear-ligulate, glabrous, hardly acute. *Corolla* and stamens nearly as of *F. paniculata*. *Style* hairy in the lower half. *Capsule* 1 in. long, with 4 seeds in the upper half (resembling the capsule of *Eranthemum*).

PERAK: *Scortechini* (none of the 4 sheets numbered).

3. *FILETIA SCORTECHINII*, C. B. Clarke, n. sp. A much-branching nearly glabrous undershrub. *Leaves*: blade in the typical collections of Scortechini 2·5 by 1 in., elliptic, rather oblique; nerves 5 to 6 pairs; petioles 0 to ·2 in. long; in Wray 1505 the leaves are 4·5 by 1·75 in., obovate with cuneate base (see also var. β below). *Inflorescence* a simple spike 2 to 3 in. long; flowers subsessile, in opposite pairs; bract ·125 to ·175 in. long, oblong. *Sepals* ·25 in. long, linear-ligulate, glabrous, hardly acute. *Corolla* ·7 in. long, white or pale yellow, furred in the throat but much less so than in *F. paniculata*. *Stamens* and pollen as of *F. paniculata*. *Style* slightly hairy at the base.

PERAK: *Scortechini*; alt. 4500 to 4900 ft., Wray 258, 1505.

VAR. β *evolutior*. *Branches* elongate, with long internodes. *Leaves*: blade up to 5·5 by 2·25 in.; nerves 8 pairs; petiole up to ·5 in. long. *Spike* elongate, loose; the lower pairs of flowers are far apart.

PERAK: *Scortechini* 306.

This may differ specifically; the flowers are exactly as of *F. Scortechinii* type.

4. *FILETIA RIDLEYI*, C. B. Clarke, n. sp. A much-branched nearly glabrous undershrub. *Leaves* 3 by ·75 in., oblong, narrowed at each end; margins undulate; petioles ·25 to ·35 in. long. *Raceme* 2 to 3 in. long, rather loose, with opposite pairs of pedicelled flowers; pedicels ·125 to ·175 in. long; bract oblong, shorter than the calyx. *Sepals* ·2 in. long, linear-ligulate, subobtuse, glabrous. *Corolla* ·7 to ·8 in. long, white, shaped as of *F. paniculata*. *Stamens* as of *F. paniculata*; the anther-cells rather narrower. *Style* thinly clothed with long white hairs. *Capsule* 1 in. long, clavate; the 4 seeds in the broadly obovate top.

PERAK: *Ridley* 9771.

22. LEPIDAGATHIS, Willd.

Herbs or shrubs. *Leaves* entire, undulate or crenate. *Inflorescence* of spikes, or of panicles narrowed almost to spikes, many-flowered; bracts secund, usually longer than the sepals, elliptic or narrow-lanceolate, acute; prophylla smaller than the bracts. *Calyx* divided nearly to the base into narrow-lanceolate segments, whereof 2 are often larger, 2 are sometimes connate at the base. *Corolla-tube* cylindrical; limb 2-lipped; the 5 segments not very unequal. *Stamens* 4, subsimilar; anther-cells 2, parallel, oblong, often minutely mucronate at the base, at equal height or one slightly below the other; pollen small, ellipsoid, with longitudinal rows of large patches. *Stigma* nearly entire. *Capsule* small, 2- or 4-seeded, conic, hairy at top. *Seeds* flattened, orbicular, hygroscopically hairy on the margin or nearly glabrate.—Species 60, in the hotter regions of the Old World; 2 in America.

Lindau, in order to get *Lepidagathis* into a Tribe characterized by honeycombed pollen, advances the explanation that in *Lepidagathis* honeycomb bands are indicated by rows of points. I reckon honeycomb-pollen to be globose without longitudinal bands, and I do not esteem the pollen of *Lepidagathis* as honeycomb-pollen.

Flowers .5 in. long. Spikes rarely up to 3 in. long:—

Leaves 3 to 5 in. long. Spikes .5 to 1.5 in. long .. 1. *L. incurva*.

Leaves 6 to 7 in. long. Spikes 2 to 3 in. long .. 2. *L. chlorostachya*.

Flowers 1 to 1.3 in. long. Spikes 4 to 8 in. long:—

Upper bracts elliptic-lanceolate. Corolla pink-purple, 1 in.

long 3. *L. longifolia*.

Upper bracts linear. Corolla white, 1.3 in. long .. 4. *L. macrantha*.

1. LEPIDAGATHIS INCURVA, D. Don Prodr. Fl. Nepal. 119 (1825). *Stem* suberect, 1 to 2 ft. high, decumbent, rooting at base. *Leaves* 3 to 5 in. long, oblong, narrowed at each end, pubescent or nearly glabrate; margin often undulate; petiole .5 in. long. *Spikes* .5 to 1.5 in. long, oblong, axillary and terminal, erect, sessile, often clustered, ciliate, often softly hairy; bracts secund, nearly .5 in. long, lanceolate, mucronate; prophylla nearly .35 in. long, lanceolate, mucronate. *Sepals* 5, narrow-lanceolate, nearly .35 in. long, unequal. *Corolla* .25 in. long, white with brown spots on the palate. *Anther-cells* one slightly below the other, often minutely tailed. *Capsule* .2 in. long, conic, hairy at top. *Seeds* 4, flat, slightly hairy on the margin. Kurz in Flora LIII. 363 (1870). *L. hyalina*, Nees in Wall. Pl. As. Rar. III. 95 (1832), and in DC. Prodr. XI. 252; Miq. Fl. Ind. Bat. II. 815; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 521; Hemsl. in Journ. Linn. Soc. XXVI. 244 (1890); Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 313; Prain Beng. Plants 815. *L. cephalotes*, O. Kuntze Revisio I. 492. *Ruellia dependens*, Roxb. Fl. Ind. III. 49. *Hypoestes cephalotes*, Link Jahrb. III. 48.

PENANG: Curtis 2760, 3733; Ridley 2760, 7170, alt. 100 to 200 ft.; King's Collector 1292. KEDAH: Ridley 8319.—DISTRIB. Common throughout India; extending to China and Malaya.

2. LEPIDAGATHIS CHLOROSTACHYA, Nees in DC. Prodr. XI. 256 (1847). *Leaves* 7 by 2.25 in., elliptic-lanceolate, acuminate, attenuate at the base. *Spikes* often 2 to 3 in. long, broader than in *L. incurva*; otherwise as in *L. incurva*. T. Anders. in Journ. Linn. Soc. IX. 496 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 519.

PENANG: Pulo Poongah, Curtis 2941.—DISTRIB. Mergui, Griffith (K.D.) 6141.

This is a much larger plant than *L. incurva*; the bracts are longer and the spikes manifestly broader, but the corolla is hardly longer.

3. LEPIDAGATHIS LONGIFOLIA, Wight Ic. Pl. Ind. Or. t. 1564 (1850).

Shrubby, 3 to 6 ft. high. *Leaves* up to 9 by 2 in., lanceolate, acuminate at either end, glabrous; *petioles* .7 in. long. *Panicles* narrowed nearly to spikes, 6 to 8 in. long, pubescent; *bracts* lax, .75 by .35 in., elliptic, apiculate. *Sepals* nearly .5 in. long, lanceolate, unequal. *Corolla* "pink-purple" or "dull crimson," 1 in. long; tube at top subcampanulate. *Anther-cells* at equal height, minutely mucronate at the base; pollen of the genus. *Capsule* seen only young, promises to be conic, small. T. Anders. in Journ. Linn. Soc. IX. 499 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 523; Ridley in Trans. Linn. Soc. ser. 2, III. 332 (1893).

MALACCA: *Griffith* (K.D.) 6138; *Maingay* (K.D.) 1751; *Goodenough* 1690. NEGRI SEMBILAN: *Muar*, *Fox* 11283. PAHANG: *Ridley* 2174. JOHORE: *Ridley* 11127; *Curtis*. PERAK: *Scortechini* 2038; *Wray* 1297; *Goenong Panli*, *King's Collector* 229; alt. 300 to 500 ft., *King's Collector* 3025, 10040. KOTA GLANGGI and PULAU TAWAR: fide *Ridley*. SELANGOR: *Curtis* 2362. SINGGA: *Hullett* 5718.

4. LEPIDAGATHIS MACRANTHA, C. B. Clarke, n. sp. *Bracts* lanceolate at top, the upper nearly linear, .75 by .125 in. *Corolla* white, very pubescent without, 1.3 in. long; otherwise as *L. longifolia*.

PERAK: alt. 300 ft., *Wray* 3385.

This may prove a variety only of *L. longifolia*, Wight; among the abundant collections of *L. longifolia* there is no specimen that matches *L. macrantha*.

23. BARLERIA, Linn.

Herbs or undershrubs, sometimes prickly. *Leaves* opposite or whorled, two of a whorl often reduced to spines. *Inflorescence* a terminal spike (in the Malay Peninsula plants); *bract* large; *prophylla* 2 or 0. *Calyx* large, of 4 distinct segments, 2 inner segments much the smaller. *Corolla* with a cylindric tube an inch or more long. *Stamens* 2, perfect; *anther-cells* 2, at equal height, muticous; pollen globose, honeycombed. *Ovary* with 2 to 1 ovules in each cell; *stigmas* 2, short. *Capsule* ovoid; seeds 2 to 4, large, shaggy with hygroscopic hairs or nearly glabrate.—Species 120, mostly in Africa and Tropical Asia, a few in America.

| | | | | |
|-----------------------------------|----------------|----|----|--------------------------|
| Leaves with interpetiolar spines. | Corolla yellow | .. | .. | 1. <i>B. Prionitis</i> . |
| Spineless. | Corolla blue | .. | .. | 2. <i>B. conspicua</i> . |

1. BARLERIA PRIONITIS, Linn. Sp. Pl. 636 (1753). Glabrous or nearly so. *Stems* 1 to 3 ft. high. *Leaves* 2 to 5 by .3 to 1 in., elliptic, narrowed at both ends, mucronate; *interpetiolar spines* .25 to .75 in. long. *Inflorescence* terminal; lower flowers of the spike often a little distant; *flower-bract* lanceolate, widened at the base;

posticous sepal nearly $\cdot 5$ in. long, elliptic mucronate; anticous calyx-segment similar to the posticous sepal. *Corolla* yellow; tube hardly $\cdot 5$ in. long; posticous lip of 4 connate segments $\cdot 7$ in. long; anticous lip clawed, shorter. *Capsule* $\cdot 5$ to $\cdot 7$ in. long, 2-seeded. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 482 (*with syn.*); Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 314, tt. 105c, 106B, 125E; Dyer Fl. Cap. V. 46 (*with syn.*); Prain Beng. Plants 811, 812.

MALACCA: *Griffith*; *Ridley* 2696; *Harvey*; *Derry* 271.—DISTRIB. Africa, India.

This plant (with closely allied species) is abundant in Africa, and probably wild in Western India. In Eastern India it is cultivated, and found near villages. It may not be wild at Malacca.

2. *BARLERIA CONSPICUA*, Nees in Wall. Pl. As. Rar. III. 92 (1832). Large, sparingly pubescent, without spines. *Leaves* 8 by 2 in., oblong, acuminate at either end; petioles $\cdot 5$ in. *Spikes* 5 by nearly 1 in., loose, nearly continuous; bracteoles present, $\cdot 7$ in. long, linear-oblong, minutely strigose; outer sepals $\cdot 7$ in. long, lanceolate, one bifid at the top, with some yellow hairs. *Corolla* 1 in. long, blue. *Capsule* $\cdot 75$ in. long, narrowly oblong, glabrate, 4-seeded. *Seeds* ultimately nearly glabrate. Nees in DC. Prodr. XI. 226; T. Anders. in Journ. Linn. Soc. IX. 493 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 489. *Justicia conspicua*, Wall. Cat. 2460.

PENANG: *Wallich*.

24. *ERANTHEMUM*, R. Brown [Linn. *partim*].

Undershrubs, some very small. *Leaves* opposite, equal or nearly so, petioled, entire, often undulate or obscurely crenulate, nearly glabrous, usually pubescent at least on the midrib beneath. *Panicles* narrow, or reduced to apparent spikes, terminal in the species of the Malay Peninsula; bracts linear, inconspicuous, only in *E. caudifolium* so much as $\cdot 25$ in. long. *Calyx* $\cdot 125$ to $\cdot 2$ in. long ($\cdot 25$ in. long or more in *E. caudifolium*), divided to the base into linear segments, pubescent, ultimately often glabrate. *Corolla* showy, white or colorate; tube linear (except in *E. breviflos*); segments 5, quadrate-elliptic, subequal, spreading, more or less one-sided. *Stamens* 2; filaments very short; anthers in the mouth of the tube or just exsert, of 2 parallel oblong mucous cells placed at equal height; pollen shortly ellipsoid or subglobose, with 2 stopples and 6 to 10 longitudinal bands, often obscure. *Ovary* with 2 ovules in each cell; style with 2 subequal minute lobes. *Capsule* with a linear-cylindric base, and 2 to 4 seeds in the much-widened upper half. *Seeds* ovoid, flattened, glabrate, corrugate.—DISTRIB.

Species 90 (after Mackaya has been taken out), mainly in South-east Asia and Oceania; a dozen species in Tropical Africa with Madagascar, and a few in Tropical America.

- Pistil clothed with brown hairs. Flowers $\cdot 75$ in. long .. 1. *E. hirtipistillum*.
 Pistil with a few patent thin hairs or glabrate:—
 Corolla-tube $\cdot 5$ to $\cdot 6$ in. long:—
 Spikes 3 to 6 in. long; lower flowers solitary, distant .. 2. *E. porphyranthos*.
 Panicles $1\cdot 5$ in. long, of 6 to 12 small flowers .. 3. *E. breviflos*.
 Panicles long, dense; flowers clustered or cymulose:—
 Sepals $\cdot 125$ to $\cdot 25$ in. long; leaf-base attenuate .. 4. *E. caudifolium*.
 Sepals scarcely $\cdot 125$ in. long; leaf-base obtuse .. 5. *E. selangorensis*.
 Corolla-tube 1 to $1\cdot 3$ in. long:—
 Panicle often reduced to an apparent spike:—
 Flowers white:—
 Panicle of elongate, interrupted spikes .. 6. *E. album*.
 Spikes dense. Flowers clustered .. 8. *E. Kingii*.
 Flowers coloured:—
 Flowers solitary, all close in a continuous spike .. 7. *E. malaccense*.
 Flowers in whorls, the lower standing apart .. 9. *E. acuminatissimum*.
 Panicle with lower branches $\cdot 175$ in. long, carrying small cymes .. 10. *E. Teijsmannii*.

1. ERANTHEMUM HIRTIPISTILLUM, C. B. Clarke, n. sp. Erect, 2 ft. high, pubescent. *Leaves* up to 8 by 3 in., elliptic-acuminate, base sub-obtuse, fuscous beneath, pubescent on both surfaces; primary nerves 10 pairs; petiole $1\cdot 5$ in. *Inflorescence* of 3 to 1 panicles reduced to spikes, 4 to 9 in. long; flowers in clusters of 1 to 5, opposite, mostly $\cdot 25$ to 1 in. apart; bracts linear, $\cdot 175$ in. long. *Sepals* $\cdot 2$ in., linear, very pubescent. *Corolla* pale pink; tube $\cdot 5$ in. long; lobes hardly $\cdot 3$ in. long. *Stamens* and pollen of the genus; the filaments and anthers slightly hairy. *Ovary* and style-base clothed with erect brown hairs. *Capsule* nearly 1 in. long, with 4 seeds in the hairy top, constricted between the pairs of seeds. *Seeds* of the genus.

PERAK: Wray 1399.

2. ERANTHEMUM PORPHYRANTHOS, C. B. Clarke, n. sp. A sparingly hairy, suberect, simple-stemmed undershrub, 1 to 2 ft. high. *Leaves* very variable in size; blade sometimes 7 by $2\cdot 5$ in., sometimes 2 by $\cdot 7$ in., elliptic-lanceolate-acute; base cuneate; margin often undulate, sub-crenulate; lower surface nearly glabrous or pubescent on the midrib, often when dry whitened; primary nerves 6 pairs; petioles $\cdot 25$ to $\cdot 3$ in. long. *Inflorescence* a linear spike, 3 to 6 in. long (but see var. β); flowers sessile, in opposite pairs, the lower pairs $\cdot 25$ to $\cdot 35$ in. (and upwards), distant; bracts linear, hardly $\cdot 175$ in. long. *Sepals* $\cdot 15$ in. long, linear, minutely pubescent. *Corolla* purple, or light purple, or "white

tinged carnation" (Scortechini); tube .5 in. long, linear, very slender, the upper .175 in. widened, oblong; lobes elliptic, .35 in. long. *Stamens* of the genus. *Style* slightly hairy near the base. *Capsule* .7 in. long, with 4 seeds in the top, minutely pubescent, constricted between the pairs of seeds; seeds corrugated, subscabrous. *E. crenulatum*, Nees in DC. Prodr. XI. 453 (a partly). *E. malaccense*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 498 (partly).

PENANG: *Ridley*; *Deschamps*; *Curtis* 499. MALACCA: *Cuming* 2357. PERAK: *Scortechini* 114, 543, 564; Larut Perak, alt. 1000 to 1500 ft., *King's Collector* 3907.

The very slender short tube of the corolla, having an oblong dilatation in the upper third of it, marks this species off from most *Eranthemums*.

VAR. β *evolutior*, C. B. Clarke. *Panicle* of numerous elongate spikes, with additional spikes from the leaf-axils; *corolla-tube* up to .7 in. long.

PENANG: Waterfall, *Curtis* 348.

3. ERANTHEMUM BREVIFLOS, C. B. Clarke, n. sp. A small, woody, crooked-stemmed, branched, nearly glabrous undershrub, 4 to 8 in. high. *Leaves* 4 by 1.75 in., elliptic, shortly narrowed at each end; nerves 6 pairs; midrib beneath glabrate in the mature leaf; petioles .25 to .75 in. long. *Inflorescence* a panicle 1.5 in. long, of 6 to 12 flowers, nearly glabrate, on a peduncle .5 in. long; pedicels 0 to .175 in. long; bracts minute, setaceous. *Sepals* .125 in. long, linear, when young minutely pubescent. *Corolla* "grey"; tube .25 in. long, cylindric. *Stamens* and pollen of *Eranthemum*, glabrous. *Capsule* .8 to .9 in. long, linear-oblong; seeds 4, in the upper part, nearly smooth.

PERAK: Goping, *King's Collector* 518.

This plant appears closely allied in habit to *E. album*; the short cylindric corolla-tube and linear-conic capsule (not suddenly narrowed into a cylindric stalk) with smooth seeds, suggest that it may belong to a different genus.

4. ERANTHEMUM CAUDIFOLIUM, C. B. Clarke, n. sp. A shrub, 4 to 5 ft. high, branched upwards, sparingly pubescent. *Leaves*: blade 7.5 by 2.5 in., elliptic, acuminate at either end, with a linear caudate tip (in *Scortechini* n. 447), but in other examples leaves are seen narrower with a shorter tip; nerves 7 to 8 pairs; petioles of the lower leaves often 2 to 2.5 in. long, of the upper only .25 in. *Inflorescence* a narrow dense panicle 6 by 2 in., with brown pubescence; lateral branches hardly .2 in. long, carrying small dense cymes; bracts .35 in. long, linear, setaceous. *Sepals* .175 to .25 in. long, linear, caudate. *Corolla* white (*Curtis*); tube .5 to .6 in. long, often curved towards the top; segments .2 in. long. *Stamens* of the genus. *Pistil* and style

very thinly hairy. *Capsule* 1 in. long, with 4 seeds in the upper part.

PERAK: *Scortechini* 447, 1531; *Curtis* 3150, 3341. DINDINGS: *Ridley* 3066 bis.

There are abundant collections and a detailed MS. description of this plant by *Scortechini*. It is easily recognized by the small flowers with a large capsule, sometimes more than an inch long.

5. *ERANTHEMUM SELANGORENSE*, C. B. Clarke, n. sp. A branched shrub, minutely pubescent. *Leaves*: blade 5 to 6 by 2·5 in., elliptic-acuminate; base obtuse or rounded. *Panicle* 3 by 1 to 2 in.; lower branches sometimes much developed, 1 in. long, carrying 3 to 6 flowers. *Sepals* scarcely ·175 in. long. *Corolla-tube* ·6 in. long. Otherwise as *E. caudifolium*.

SELANGOR: *Sungu Bulu*, *Goodenough* 10547; *Kwala Lumpor*, *Curtis* 2367.

6. *ERANTHEMUM ALBUM*, Nees in DC. Prodr. XI. 455 (1847). A nearly glabrate undershrub, 1 to 3 ft. high. *Stem* usually lignescent, with white bark, to the very base of the inflorescence. *Leaves* opposite, subequal; blade 5·5 by 2·5 in., shortly acuminate at either end, often whitened underneath; margins often obscurely undulate, crenulate; nerves 7 pairs; petioles ·5 to 1 in. long. *Inflorescence* a panicle of many thin spikes, 4 to 8 in. long (poor examples with one spike occur); flowers mostly solitary, in distant pairs, the lower ·25 in. apart or more; bracts linear, ·175 in.; pedicels 0 to ·175 in. (*i.e.*, the spike is itself a contracted panicle). *Sepals* ·175 in. long, linear, minutely pubescent. *Corolla* white; tube 1 to 1·3 in. long, linear, exactly the same width to the top. *Stamens* and pistil glabrous; pollen subglobose, 30 μ in diam., lightly banded longitudinally. *Capsule* 1 in. long, glabrous or scarcely microscopically puberulous, 4-seeded near the top, slightly contracted between the pairs of seeds. *Seeds* corrugated. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 498; *Ridley* in Journ. As. Soc. Straits 121 (Singapore 1900); *Prain Beng. Plants* 814. *E. diversifolium*, Miq. Fl. Ind. Bat. II. 837. *E. crenulatum*, Nees in DC. Prodr. XI. 453. Var. *a* (*partim*), 454; Var. γ *angustifolia* (*partim*). *Justicia alba*, Roxb. Fl. Ind. ed. Carey & Wall. I. 117 (1820); Ic. Ined. 1105 in hb. Kew. *J. orbiculata*, Wall. Cat. 2489b.

MALACCA: *Griffith*. MALAY PENINSULA: *Griffith* (K.D.) 6175 (*partly*).—DISTRIB. Chittagong; Pegu; abundant in the Andamans and Nicobars; Malaya.

Nees' type example of his *E. Zollingerianum*, viz. Zollinger 162 in *Javâlectus*, is in Kew, but is not this. In the large examples the panicle has many long curved spikes,

the second flowers all turned to the convex side of the spike. The smaller forms (?), i.e. *J. orbiculata*, Wall., have a single straight spike.

7. *ERANTHEMUM MALACCENSE*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 498 (1884) (*tab. et syn. excl.*). *Innovations* pubescent. *Stem* up to 4 to 5 ft. high, often branching. *Leaves*: blade 5·5 by 1·25 in., lanceolate or narrow, elliptic-lanceolate, acute at either end; nerves 7 pairs, oblique; petioles ·175 to ·35 in. long. *Flowers* sessile, numerous, close together in a spike nearly continuous to its base, mostly solitary, opposite; spikes 2 to 3 in. long, one or several at the end of each branch; pedicels rarely up to ·075 in. long; bracts hardly longer than the pedicels. *Sepals* about ·075 in. long, narrow, pubescent. *Corolla* of one colour, variously noted as violet, purple, pink, pink-yellow, yellow-green; tube 1·125 in. long, linear to the top. *Stamens* of the genus. *Pistil* with few patent thin hairs or subglabrate. *Capsule* (in a Yunnan plant referred here) ·7 in. long, clavate, 4-seeded, very nearly glabrous. Ridley in Trans. Linn. Soc., ser. 2, III. 333 (1893). *E. erectum*, T. Anders. in Journ. Agri.-Hort. Soc. Ind. new ser. I. 286 (1868). *E. crenulatum* var. *grandiflora*, T. Anders. l.c. *E. Blumei*, T. Anders. l.c. (*non* Nees). *E. crenulatum*, Nees in Wall. Pl. As. Rar. III. 107 (*in large part*), and in DC. Prodr. XI. 523 (*in part, not of* Lindley). *Pseuderanthemum malaccense*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 330.

PROVINCE WELLESLEY: *Curtis* 203; *Ridley* 2231. KEDAH: Langkawi Island, *Curtis*; *Ridley* 8335. MALACCA: common, fide *Ridley*; *Griffith* (K.D.) 6175; *Cuming* 2389; *Harvey*; *Goodenough* 1713; *Holmbury* 732; Mt. Ophir, *Lobb*. PERAK: alt. 500 ft., *King's Collector* 8567, 8626, 8665; *Curtis* 3327. PEKAN: fide *Ridley*. JOHORE: *Curtis*.—DISTRIB. Siam.

This species, abundant in its area, is characterized by the uniform inflorescence, and is always collected in flower. *E. palatiferum*, Bot. Mag. t. 5957, of which (in Fl. Br. Ind. IV. 498) I referred one piece to *E. malaccense*, is undoubtedly all true *E. palatiferum*, of which it has the characteristic inflorescence; the colour of the flowers varies from pale pink to bluish purple in both species. The name *E. erectum*, T. Anders., is older than *E. malaccense*, but was published without one word of description.

8. *ERANTHEMUM KINGII*, C. B. Clarke, n. sp. *Branches* elongate, with long internodes. *Leaves* elliptic, shortly acuminate at the tip, hardly acuminate at the base, paler beneath when dry. *Spikes* solitary, 2 to 4 in. long, dense; the lower axils with 1 to 3 flowers in each axil. *Corolla* white; tube 1·125 in. long. Otherwise as *E. malaccense*, C. B. Clarke.

JOHORE: *Jaffaria*, *King*. SINGAPORE: *Hullett* 810.

The leaves of this species resemble those of *E. album*, Nees, while the spikes resemble those of *E. malaccense*, but are slightly more pubescent, and the corolla is white.

9. *ERANTHEMUM ACUMINATISSIMUM*, Miq. Fl. Ind. Bat. II. 835 (1856). Erect, nearly glabrous. *Leaves*: blade 8·5 by 2 in., acuminate-attenuate at either end; nerves 8 pair, oblique; raphides on the upper surface numerous, very short; petioles 1 in. *Spikes* 1 to 3, 7 to 10 in. long, many-flowered, the lower clusters half-whorled, ½ to 1 in. apart, with 5 to 10 flowers to the whorl; the upper whorls fewer-flowered, coalescent; bracts ½ in. long, lanceolate-linear. *Sepals* ½ in. long, nearly linear, ultimately nearly glabrous. *Corolla* white, with one segment purple-spotted; tube 1·25 in. long. *Stamens* of the genus. *Capsule* 1·125 in. long, with 4 seeds in the upper part, slightly constricted between the seeds. *E. Andersoni*, Masters in Gard. Chron. 134, 136 (1869); Bot. Mag. t. 5771; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 499; Ridley in Trans. Linn. Soc., ser. 2, III. 333 (1893), and in Journ. As. Soc. Straits 121 (Singapore 1900). *E. elegans*, Masters in Gard. Chron. 1234 (1868) (not of R. Brown). *E. Blumei*, Hassk. Cat. Hort. Bogor. 151; T. Anders. in Journ. Agri.-Hort. Soc. Ind. new ser. I. 285 (1868), and in Journ. Linn. Soc. IX. 523 (1867); Kurz in Flora LIII. 363 (1870) (not of Miquel). *E. diantherum*, Blume Bijdr. 793 (not of Roxb.). *E. aspersum*, Hook. Bot. Mag. 5711. *Pseuderanthemum Andersoni*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 330.

SINGAPORE: *T. Anderson* 112. JAVA: cult. in Hort. Bogor. (*Kurz* 379). *Ridley, l. c.*, thinks the Singapore collection was probably a garden escape.

The "type" of *E. acuminatissimum*, Miquel, from Utrecht, proves identical with the *E. Andersoni*, Masters. It was, perhaps, *E. viscidum* β *acuminatissimum*, Hassk. Hort. Bogor. p. 151, but not *E. viscidum* β Blume. The *E. Blumei*, Miq. (Fl. Ind. Bat. II. 836) is before me, and very closely allied to *E. acuminatissimum*, but has (as Miquel says) smaller leaves, smaller bracts, and smaller calyx.

10. *ERANTHEMUM TELJSMANNI*, T. Anders. in Journ. Agri.-Hort. Soc. Ind. new ser. I. 285 (1868). "A shrubby creeper, 8 to 12 ft. long" (King's Collector). *Branches* ¼ in. in diam., with numerous secondary branches springing at a right angle. *Leaves*: blade 6 by 2 in., broad-oblong, acuminate; nerves 6 pair; base often rounded or truncate, but on the same branch sometimes cuneate-oblique; petioles ¼ to 1·25 in. long. *Inflorescence* a narrow, many-flowered panicle rarely so much as 6 in. long; the lower branches hardly ¼ in. long, carrying small cymes (almost clusters) of flowers. *Calyx* and *corolla* (white tinged blue) as of *E. acuminatissimum*, Miq. *E. Blumei*, Hort. Buitenzorg *via* Miquel. *E. crenulatum* ? var., T. Anders. MS.

PERAK: *Scortechini* 1356; Tapa, alt. 2000 to 3000 ft., *Wray* 837; *King's Collector* 2176; Larút, alt. 5000 to 800 ft., *King's Collector* 5489. MALACCA: H.D. 364.

T. Anderson's whole diagnosis of his *E. Teijsmanni* is "a fine species with a straggling habit"; and I have no authentic specimen; the name is disposable. Whether this was the imperfectly known *E. graciliflorum*, Nees (Wall. Pl. As. Rar. V. 3, 107), from Penang I cannot say; it is not the *E. graciliflorum* of Madura (Java) distributed from the Buitenzorg Garden. This species resembles much *E. hirtipistillum* (collected at the same locality), but the corolla-tube is here 1.3 to 1.5 in. long.

25. CLINACANTHUS, Nees.

A rambling shrub. *Flowers* conspicuous, in small drooping cymes at the ends of the branches; bracts and prophylla small, linear. *Sepals* 5, equal, linear. *Corolla-tube* narrow, funnel-shaped; limb 2-lipped. *Stamens* 2; anthers of 1 cell, oblong, mucous; pollen ellipsoid, with 2 longitudinal bands. *Style* very shortly 2-fid. *Capsule* stalked, 4-seeded. Only 1 species.

1. CLINACANTHUS BURMANNI, Nees in DC. Prodr. X. 511 (1847). *Stems* round. *Leaves* glabrate; blade 3 by .5 to .8 in., elliptic-lanceolate or lanceolate, entire or crenate; base obtuse or attenuate; petiole .25 in. long. *Cymes* pubescent, 5- to many-flowered; bracts .125 in. long. *Sepals* .25 in. long, minutely hairy. *Corolla* orange-red or dull scarlet, 1.25 in. long, lobed one-third to half-way down. *Stamens* glabrous, no rudiments. *Style* glabrous. *Miq.* Fl. Ind. Bat. II. 854; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 524; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 340; Hemsl. in Journ. Linn. Soc. XXVI. 244 (1890). *C. nutans*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 340. *Justicia nutans*, Burm. Fl. Ind. 10, t. 5, fig. 1. *J. fulgida*, Blume Bijdr. 784. *Belero pone ? fulgida*, Hassk. Cat. Hort. Bogor. 151.

MALACCA: *Maingay* 1977 (K.D. 1180); Songkah, *Curtis* 2904.—
DISTRIB. Siam, Borneo, Hainan.

26. JUSTICIA, Linn.

Herbs or shrubs. *Leaves* opposite, subequal or sometimes pseud-alternate, entire or undulate. *Inflorescence* various in the different sections, from strobilate spikes to panicles with the flowers all pedicelled; bracts and prophylla small, linear, sometimes lanceolate, or in the strobilate spikes round, large, imbricate (these large round bracts in many cases cover more than one flower, and are then floral leaves). *Calyx* small, deeply 5-fid (4-fid in Sect. ROSTELLARIA). *Corolla-tube*

shorter (or scarcely longer) than the 2-lipped limb; segments imbricated (not twisted) in the bud. *Stamens* 2; anther-cells 2, one below the other, tailed; pollen ellipsoid, small, longitudinally ribbed beside the stopples. *Ovary* 4-celled; style shortly bifid. *Capsule* regularly dehiscent; 4-seeded (the placentæ not springing elastically from the base of the capsule), stalked with the seeds in the top, or seed-bearing nearly from the base. *Seeds* ovoid, flattened, verrucose, subtubercular, glabrous (except in Sect. RHAPHIDOSPORA).—DISTRIB. Species 150, widely spread throughout the hot regions of the world.

This genus is only artificially separated from several others (as from *Leda Adhatoda*, *Ptyssiglottis*) by the white tail to the lower anther-cell. If this character be not regarded as of generic importance, the number of species may be 300, as in the arrangement by Lindau in Engl. & Prantl Pflanzenfam.

Sect. 1. BRACTEATÆ. Bracts (floral leaves) round, large, strobilate at least in the young spikes :—

Flowers mostly solitary under each bract (floral leaf) :—

Corolla glabrous without, except a few hairs at the tip .. 1. *J. ptychostoma*.

Corolla hairy without :—

Nerves of the leaves 6 to 7 pairs :—

Leaves mostly cuneate at the base 2. *J. pubiflora*.

Leaves rounded at the base 4. *J. Scortechinii*.

Nerves of the leaves 10 to 11 pairs 3. *J. patulinervis*.

Flowers 2 to 3 or more clustered under each bract :—

Bracts .5 in. long, including the petiole 5. *J. subcymosa*.

Bracts .6 in. long, subsessile 6. *J. selangorensis*.

Sect. 2. CALOPHANOIDES. Flowers axillary, cymose, solitary or clustered; without a terminal cyme or panicle. Corolla small :—

Leaves opposite, subequal :—

Leaves elliptic 7. *J. quadrifaria*.

Leaves linear-oblong 8. *J. Neesiana*.

Leaves apparently alternate, *i.e.* one of each pair 0 or minute, deciduous :—

Leaves on the nerves beneath and stem nearly glabrous :—

Herb, with long internodes 9. *J. henicophylla*.

Much-branched shrub 10. *J. subalternans*.

Leaves on the nerves beneath and stem hairy 11. *J. alternifolia*.

Leaves one of each pair reduced to a persistent ear 12. *J. otophora*.

Sect. 3. GENDARUSSA. Spikes terminal, and terminal on short axillary branches; bracts mostly narrow, the lowest rarely imbricate :—

Leaves narrow-oblong or lanceolate :—

Spikes dense; flowers clustered 13. *J. Gendarussa*.

Spikes lax; flowers mostly solitary 14. *J. Maingayi*.

Leaves elliptic, large (5 to 8 in. long) :—

Peduncles short :—

Spikes linear, interrupted 15. *J. vasculosa*.

- Spikes dense 16. *J. uber*.
 Peduncles long; carrying panicles of linear spikes .. 17. *J. sumatrana*.
 Sect. 4. ROSTELLULARIA. Spikes cylindric; bracts narrow, about as
 long as the calyx. *Calyx* of 4 linear segments, the 5th suppressed:—
 Corolla .25 to .35 in. long 18. *J. procumbens*.

Justicia *conspicua*, Dayd.-Jack. Ind. Kew., is a bare name, founded on Wall. Cat. n. 2475. The "type" of this came from Penang; but Wallich sorted with it, doubtfully, one plant from hb. Wight, another from Silhet. I have not found n. 2475.

1. *JUSTICIA* *PTYCHOSTOMA*, Nees in Wall. Pl. As. Rar. III. 108 (1832). A herb, very sparingly pubescent. *Stem* 1 to 4 ft. high, branching; internodes 3 to 6 in. long. *Leaves* 6.5 by 2.25 in., elliptic-lanceolate, acuminate at tip, cuneate at base (but see the Varieties below), often undulate or obscurely crenate on the margin, with very small raphides on both surfaces; primary nerves 7 to 9 pairs, oblique; petioles .5 to 1.5 in. long; opposite pairs of leaves equal or rarely somewhat unequal. *Peduncles* terminal, penultimate, or axillary, 1 to 2 in. long, frequently 2 from one axil; spike 1 in. long, or lengthening to 1 to 4 in. long; bracts round, ovate, green, .3 to .35 in. long, shortly stalked, very caducous, nearly glabrous, but often with white bristles on the margin; with 1 (rarely 1 to 2) flower under each bract. *Calyx* .125 in. long, nearly glabrous; segments linear. *Corolla* lurid white-yellow marked with purple grey lines; corolla before expansion nearly .5 in. long, glabrous without, or with a few hairs at the very tip. *Filaments* glabrous; anther-cells round, one lower than the other with a short conic white tail; pollen small, ellipsoid, 30 μ long, with two stopples and two rows of tubercles (or round patches) on each side of the stopple. *Pistil* glabrous; style very shortly 2-fid. *Capsule* .5 in. long, glabrate, 4-seeded. *Seeds* flattened, verrucose, subtubercled. T. Anders. in Journ. Linn. Soc. IX. 517 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. 4 534 (*emend.*). *Rhytiglossa ptychostoma*, Nees in DC. Prodr. II. 337. *R. ptychosperma*, Miq. Fl. Ind. Bat. II. 825.

PERAK: *Scortechini* 689; *Wray* 2046; alt. 100 ft., *King's Collector* 2077. PENANG: *Porter* (Wall. Cat. 2478). KEDAH: *Curtis* 2117.

VAR. β *angustifolia*, C. B. Clarke. *Leaves* lanceolate or linear-lanceolate.

PERAK: alt. 5000 ft., Gunong Inas, *Wray* 4130.

VAR. γ *rotundifolia*, C. B. Clarke. *Leaves* 6 by 3.5 in., rounded at the base.

PERAK: *Ridley* 7163.

VAR. δ *auriculata*, C. B. Clarke. *Leaves* narrowly, unequally cordate at base, with two ears.

PERAK: alt. 500 ft.; *King's Collector* 2062; *Scortechini*.

This is a striking var.; some of Scortechini's examples show on the same stem leaves acute at base and leaves auricled at base.

VAR. ε *parvibracteata*, C. B. Clarke. *Spikes* interrupted at base; bracts very small, round, long-petioled, spreading, hardly (or not) imbricated.

PERAK: *Ridley* 7166; *Goping, King's Collector* 555.

Wallich's (one) type sheet of this is very imperfect, as can be inferred from Nees' description, and my account in Hook. f. Fl. Br. Ind. is erroneous both as to the bracts and the synonymy.

2. *JUSTICIA PUBIFLORA*, C. B. Clarke, n. sp. *Leaves* 4 to 6 in. long, elliptic-lanceolate, cuneate or rounded at the base; nerves 6 pairs; raphides none (or most obscure) on either surface. *Peduncles* terminal, and a few axillary; bracts (floral leaves) round-ovate, green, .35 in. long, shortly stalked, pubescent, without white bristles on the margin. *Calyx* pubescent. *Corolla* very hairy without. *Style* at base slightly hairy. *Anther-cells* short-ellipsoid, the lower with a medium ovoid tail; pollen ellipsoid; pores 2; one longitudinal row of tubercles on either side of each pore. Otherwise resembling *J. ptychostoma*, Wall.

PERAK: alt. 4000 ft., *King's Collector* 3671; *Scortechini*.

3. *JUSTICIA PATULINERVIS*, C. B. Clarke, n. sp. Sparingly pubescent. *Leaves* 6 by 4 in., crenate, truncate at base, very shortly cuneate on the petiole; nerves 10 to 11 pairs, spreading at right angles from the midrib. *Spike* dense; bracts nearly glabrate, with some white bristles on the margin. *Corolla* hairy without. Otherwise as *J. pubiflora*.

PERAK: *Scortechini*.

4. *JUSTICIA SCORTECHINII*, C. B. Clarke, n. sp. *Leaves* 3 to 4 in. long, ovate or elliptic-acuminate, most of them rounded at the base, crenulate; nerves 6 to 7 pairs, without raphides. *Spikes* dense; bracts round-ovate, imbricate, somewhat pubescent, not bristle-ciliate. *Corolla* hairy without. *Capsule* hairy, nearly to the base. Otherwise as *J. pubiflora*.

PERAK: *Scortechini* 41, 387.

The leaves have dried a rich brown in all the nine sheets of *Scortechini*. so that they look very unlike the preceding three species.

5. *JUSTICIA SUBCYMOSA*, C. B. Clarke, n. sp. *Stem* 2 to 5 ft. high. *Leaves* ovate-acuminate, up to 9 by $5\frac{1}{2}$ in., mostly obtuse at the base; nerves 11 pairs; petioles 1 to 2 in. long. *Inflorescence* up to 9 by 1 in.; bracts .5 in. long (petiole included), ovate, at first imbricated, in fruit often distant patent; a condensed cyme of 3 to 7 flowers under each floral leaf. *Sepals* hardly .125 in. long, pubescent. *Corolla* pale

yellow, .5 in. long, hairy without. *Capsule* nearly .7 in. long, hairy to the base. *Stamens* and pistil nearly as of *J. ptychostoma*.

PENANG: *Curtis* 1765. PERAK: *Scortechini*; alt. 500 to 1000 ft., *King's Collector* 5766, 10244. SELANGOR; *Ridley* 7593.

A larger plant than the four preceding. It has been supposed allied to *J. decusata*, Roxb., but the pseudo-spikes do not branch.

6. *JUSTICIA SELANGORENSIS*, C. B. Clarke, n. sp. *Leaves* 9 by $4\frac{1}{2}$ in elliptic, shortly acuminate, rounded or cuneate at the base, dark purple (*Ridley*); nerves 9 to 10 pairs, oblique; petioles 2 to 4 in. long. *Peduncles* .75 in. long; spikes 4 by 1.25 in., slightly pubescent; bracts ovate or obovate, up to .6 in. long, subsessile, glabrate, imbricate, purple (*Ridley*), with 2 or 3 flowers under each. *Calyx* small, glabrate. *Corolla* white (*Ridley*). *Capsule* hardly .35 in. long, glabrate.

SELANGOR: *Ridley* 7587.

I have seen no flowers. This may be near the group of *J. burmanica* and *J. Atkinsoni*.

7. *JUSTICIA QUADRIFARIA*, Wall. Cat. 2479 (1828-49). *Branches* 2 to 3 ft. long, little divided, pubescent. *Leaves* opposite, subequal, somewhat pubescent, at least on the midrib; blade elliptic, 2 to 4 in. long, acuminate at either end, entire; petiole 0 to .35 in. long. *Flowers* densely clustered in the axils, sometimes in small heads on short axillary peduncles; bracts (rather floral leaves) spatulate, rusty-pubescent, occasionally present. *Sepals* .25 in. long, linear, pubescent. *Corolla* .25 to .35 in. long, white with rose spots. *Stamens* 2; anther-cells 2, one below the other, tailed; style glabrous. *Capsule* .25 in. long, glabrate or minutely pubescent; solid pedicel very short; seeds 4, verrucose-tubercular. T. Anders. in Journ. Linn. Soc. IX. 514 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 530; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 349; Hemsl. in Journ. Linn. Soc. XXVI. 246 (1890). *J. Zollingeriana*, C. B. Clarke, l.c. *Gendarussa quadrifaria*, Nees in Wall. Pl. As. Rar. III. 105. *Adhatoda quadrifaria* and *Neesiana*, Nees in DC. Prodr. XI. 396.

SINGAPORE: *Hullett* 156. SELANGOR: *Curtis*.—DISTRIB. Khasia, Tenasserim, Sumatra, China.

8. *JUSTICIA NEESIANA*, T. Anders. in Journ. Linn. Soc. IX. 513 (1867). *Leaves* oblong or linear-lanceolate, 1.5 by .25 in. in the type examples, but (in Wray 3538) attaining 4 by .75 in. *Sepals* hardly .175 in. *Corolla* .25 in. long. Otherwise as *J. quadrifaria*, Wall. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 531. *Gendarussa Neesiana*, Wall. Cat. 7175; Nees in Wall. Pl. As. Rar. III. 105. *Adhatoda Neesiana*, Nees in DC. Prodr. XI. 397.

PERAK: *Scortechini* 38, 1304; alt. 300 ft., *Wray* 3538. BUNGAL R.: *Lobb*.—DISTRIB. Amherst.

Scortechini, n. 38, and *Lobb*'s example agree with the Wallichian Amherst plant. *Wray*'s example is much larger, and from description is not separable from *J. salicifolia*, T. Anders. (see Fl. Br. Ind. IV. 531), a Khasia plant, which, however, it does not match. As stated in the Fl. Br. Ind. IV. 530, *J. Neesiana* should be esteemed only a var. of *J. quadrijaria*.

9. *JUSTICIA HENICOPHYLLA*, C. B. Clarke, n. sp. A herb, 1.5 to 4 ft. high, nearly glabrous. *Leaves* apparently alternate, attaining 9 by 3.5 in., often only half these dimensions, elliptic or ovate, acuminate, acute; base cuneate, not rarely unequal, with one side rounded or almost cordate; primary nerves 7 pairs; petioles 0 to .25 in. long. *Inflorescence* of axillary peduncled cymes, sometimes small few-flowered, sometimes compound 40-flowered (but less than half the length of the leaf); bracts and prophylla minute. *Sepals* 5, linear, .175 in. long, pubescent. *Corolla* a greenish cream-colour, the palate marked with rose-purple, .35 in. in length, pubescent without; altogether as of a *Justicia*. *Stamens* 2; filaments glabrous; cells of anthers 2, ellipsoid, one (half its length) below the other with a white tail; pollen ellipsoid, 30 μ long, with 2 stopples, and a longitudinal row of patches on either side of each stopple. *Style* hairy, shortly 2-fid at top. *Capsule* .7 in. long, glabrate; base cylindrical, with 4 seeds in the upper (widened) part; seeds glabrous, granular-scabrid.

The numerous examples here collected may include more species than one; some (*King's Collector* 2189, *Curtis* 1342) have dried green; others (*Wray* and *Scortechini*) have dried red tinged black. The leaves in some are shortly acuminate, in others long acuminate. The base of the leaf varies greatly on one branch.

PERAK: *Curtis* 1342; *Wray* 1402, 2751; *Scortechini*; alt. 500 ft., *King's Collector* 2189, 10297.

VAR. β *caudata*, C. B. Clarke. *Leaves* very unequal at the base; the tip caudate, curved on one side.

PERAK: *Goping*, alt. 500 to 800 ft., *King's Collector* 4349.

VAR. γ *scandens*, C. B. Clarke. "A slender creeper, 20 to 25 ft. high." *Leaves* at the base nearly equal-sided, cuneate.

PERAK: *Goping*, alt. 300 to 500 ft., *King's Collector* 6058.

10. *JUSTICIA SUBALTERNANS*, C. B. Clarke, n. sp. A much-branched shrub, 2 to 4 ft. high, nearly glabrous. *Leaves* opposite, rarely subequal, one of each pair often wanting or less than .125 in. long; nearly sessile, 1-sided, curved, shining, 4 by 1.25 in. long, acuminate, acute, minutely scabrous on the midrib beneath. *Inflorescence* of peduncled, axillary, short cymes. *Sepals* .125 in. long, lanceolate, pube-

scent. *Stamens* 2; one anther-cell below the other, white-tailed. The flowers and inflorescence much as of *J. hevicophylla*.

PERAK: Kinta, alt. 300 to 800 ft., *King's Collector* 7061.

11. *JUSTICIA ALTERNIFOLIA*, C. B. Clarke, n. sp. Shrub, 2 to 3 ft. high, with hairy stem. *Leaves* all alternate (*i. e.* one of each pair $\cdot 1$ in. long, early deciduous); lamina ovate, oblique, acute, 7 by $3\cdot 5$ in., very unequal at the base; primary nerves 8 to 9 pairs, hairy on the under side of the leaf; petioles $\cdot 1$ to $\cdot 25$ in. long. *Inflorescence* of small, short-peduncled, pubescent, axillary, few-flowered cymes; bracts and prophylla inconspicuous. *Capsule* $\cdot 7$ in. long, hairy, cylindrical at base, with 4 seeds at the top.

PERAK: alt. 500 to 700 ft., *King's Collector* 10680.

The corolla has not been seen. This can hardly be a species of *Hallieracantha*, as the cyme is too open and the calyx too small for that genus.

12. *JUSTICIA OTOPHORA*, C. B. Clarke, n. sp. Nearly glabrous. *Branches* slender, round, zigzag. *Leaves* sessile, one of each pair reduced to an ovate persistent ear $\cdot 25$ to $\cdot 35$ in. long; the other 4.5 by $1\cdot 35$ in., elliptic; base unequal, rounded on one side; tip caudate-ligulate. *Peduncles* $\cdot 5$ to 1 in. long, axillary, carrying small few-flowered cymes. *Sepals* $\cdot 175$ in. long, linear-lanceolate, nearly glabrous. *Capsule* $\cdot 7$ in. long, glabrate, cylindrical at the base, with 4 seeds in the top.

PERAK: *Scortechini*.

The anther-tails have not been seen; it is inferred from the small calyx and the peduncled cymes that the genus is *Justicia* (alternate-leaved section), and not *Hallieracantha*.

13. *JUSTICIA GENDARUSSA*, Linn. f. *Suppl.* 85 (1781). Erect, 2 to 4 ft. high. *Leaves* 4 by $\cdot 75$ in., lanceolate, glabrous, entire or undulate; petioles $\cdot 25$ in. long. *Spikes* (condensed panicles) 2 to 5 by $\cdot 75$ in., terminal, sometimes paniced; flowers clustered; floral leaves 0; bracts $\cdot 125$ to $\cdot 175$ in., linear. *Sepals* 5, linear, viscous-pubescent, $\cdot 175$ in. long. *Corolla* $\cdot 5$ in. long, white or rose-purple, pubescent without or nearly glabrous. *Stamens* 2; one anther-cell a little below the other, tailed; pollen 30μ long, ellipsoid, with 2 longitudinal rows of patches beside each stopple. *Capsule* $\cdot 5$ in. long, clavate, glabrous, 4-seeded. Blume *Bijdr.* 785; C. B. Clarke in *Hook. f. Fl. Br. Ind.* IV. 532; Lindau in *Engl. & Prantl Pflanzenfam.* IV. 3B, 347, t. 139, fig. D; Hemsl. in *Journ. Linn. Soc.* XXVI. 245 (1890); Ridley in *Trans. Linn. Soc. ser. 2, Bot.* III. 333 (1893), and in *Journ. As. Soc. Straits*, 122 (Singapore 1900); Prain *Beng. Plants*, 817, 818. *Gendarussa vulgaris*,

Nees in Wall. Pl. As. Rar. III. 104; Wight Ic. t. 468; Moritsi Verz. Zoll. Pl. 47; Hassk. Cat. Hort. Bogor. 151; Miq. Fl. Ind. Bat. II. 831.

PENANG: *King's Collector* 1461; *Deschamps*; *Curtis* 791. MALACCA: *Griffith*. PERAK: alt. 500 ft., *King's Collector* 8682. DINDINGS: Pangkore, *Scortechini* 208, 950.—DISTRIB. South-east Asia; largely cultivated.

The Malay Peninsula material may be all from cultivated plants; none shows a capsule. Ridley, *l. c.*, observes that it seems never to fruit, and that he knows it only from gardens or remains of cultivation.

14. JUSTICIA MAINGAYI, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 534 (1885). A small shrub, with weak branched stems 2 ft. long. Leaves 4 by .35 to 1.25 in., nearly glabrous, entire or undulate-crenate; tip acuminate; base cuneate; upper surface with raphides; petiole .2 in. Spikes terminal and axillary, 2 to 3 in. long, linear, peduncled, often 2 to 3 paniced on one peduncle; flowers mostly solitary, distant; bracts and prophylla minute. Sepals .175 in. long, lanceolate-linear, pubescent. Corolla .5 in. long, pubescent without, nearly as of *J. vasculosa*. Stamens 2; filaments glabrous; anther-cells 2, ellipsoid, one below the other with a white tail. Pollen oblong-ellipsoid. Capsule .35 in. long, 4-seeded at the top.

PENANG: *Maingay* (K.D.) 1181.

15. JUSTICIA VASCULOSA, Wall. Cat. 2469 (1826). Branches 8 to 20 in. long, dividing, rather weak. Leaves ovate to narrow-elliptic, attenuate at either end, up to 5 by 2 in., nearly glabrous; petiole .5 in. long. Spikes 2 to 4 in. long, linear or oblong, terminal and axillary, often clustered or subpaniculate; flowers distant, opposite, sessile, solitary or sometimes clustered; floral leaves often 0, sometimes several, narrow-lanceolate, .5 in. long, green, scattered about the lower portion of the spike; bracts and prophylla very small, pubescent. Sepals .175 in. long, linear-lanceolate, pubescent. Corolla .5 in. long, yellow; the mouth pink-spotted; upper lip oblong entire, lower pendent. Stamens 2; filaments glabrous; anther-cells 2, round-ellipsoid, one below the other, with a white knob at the base; pollen 40 μ long, ellipsoid, with 2 stopples and longitudinal rows of tubercles beside them. Pistil glabrous, except a few hairs near the base of the style. Capsule .6 in. long, with 4 seeds in the upper part, glabrate. T. Anders. in Journ. Linn. Soc. IX. 515 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 533. *Ruellia rivinaefolia*, Wall. Cat. 2413. *Gendarussa vasculosa*, Nees in Wall. Pl. As. Rar. III. 104. *Adhatoda vasculosa*, Nees in DC. Prodr. XI. 407.

PENANG: *Curtis*. PAHANG: *Ridley* 2183. SINGAPORE: *Ridley* 3165.—DISTRIB. Eastern India, plentiful, from Assam to Tenasserim; Sumatra.

16. *JUSTICIA UBER*, C. B. Clarke, n. sp. *Stem* 3 to 4 ft. high. *Leaves* opposite, subequal; blade up to 10 by 3 to 4 in., elliptic or subovate, lanceolate acuminate at tip, cuneate at base; margin undulate; upper surface glabrate, lower paler, obscurely pubescent; raphides none or obscure; nerves 8 pairs, oblique; upper petioles .5 in. long. *Spikes* terminal and on axillary peduncles, sometimes paniced, dense, nearly always 1-sided, 1 to 3 by .5 in.; bract and prophylla .175 in. long, narrow-lanceolate, nearly glabrate. *Sepals* .175 in. long, narrow-lanceolate, nearly glabrous. *Corolla* greenish-yellow, .6 in. long, somewhat hairy without. *Stamens* 2; one anther-cell much below the other, with a white tail. *Capsule* .6 in. long, stalked, 4-seeded, glabrate. *Seeds* flattened, verrucose, tubercled.

PERAK: *Scortechini* 96, 319; alt. 400 to 700 ft., *Wray* 386; *King's Collector* 10245; *Ridley* 9773. SELANGOR: *Ridley* 8216.

This plant flowers and fruits freely; and there is more of it in the collections than of any other *Acanth* of the Malay Peninsula.

17. *JUSTICIA SUMATRANA*, C. B. Clarke. Nearly glabrous; the *inflorescence* minutely pubescent. *Leaves* opposite, subequal; blade 6 by 3 in., broadly elliptic, entire; tip very shortly acuminate; base cuneate; nerves 7 to 8 pairs; petiole .35 in. long. *Peduncles* near the ends of the branches, 4 to 6 in. long, each carrying a very lax panicle of thin linear spikes 2 to 4 in. long; floral leaves 0; flowers solitary, minutely pedicelled, opposite; bract and prophylla minute. *Sepals* .175 in. long, lanceolate linear, viscous-scabrous. *Corolla* greenish-white with purple spots, .4 in. long, minutely pubescent without. *Stamens* 2; filaments glabrous; anther-cells ellipsoid, one below the other, with a short conic white tail; pollen 25 by 15 μ , with longitudinal series of spots. *Pistil* glabrate, except the base of the style. *Capsule* .6 in. long, nearly glabrous, 4-seeded in the upper part; seeds cerebrose-tubercular. *Gendarussa* ? *sumatrana*, Miq. Fl. Ind. Bat. II. 832.

PERAK: *Scortechini* 340; *Wray* 1596.—DISTRIB. Sumatra (*Teijsmann*).

This species is allied to *J. flaccida*, Kurz, but the petioles are not eared at base; the flowers are much smaller.

18. *JUSTICIA PROCUMBENS*, Linn. Sp. Pl. 15 (1753). Annual, much branched, decumbent or procumbent. *Branches* slender, quadrangular. *Leaves* elliptic or oblong, 1 to 2 in. long, glabrous or hairy, short-

petioled. *Spikes* cylindric, continuous, hirsute; bracts linear-lanceolate, .175 in. long. *Sepals* 4, linear, .175 in. long, hirsute. *Corolla* .25 to .35 in. long, white pink-spotted. *Stamens* 2; anthers 2-celled; one cell below the other, tailed. *Capsule* .25 in. long, 4-seeded nearly from the base. Benth. Fl. Austral. IV. 549; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 532; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 349; Hemsl. in Journ. Linn. Soc. XXVI. 246 (1890). *J. diffusa*, Prain Beng. Plants 818. *Rostellaria procumbens*, Nees in Wall. Pl. As. Rar. III. 101. *Rostellularia procumbens*, Nees in DC. Prodr. XI. 371; Moritsi Verz. Zoll. Pfl. 47; Miq. Fl. Ind. Bat. II. 826.

PENANG: *Curtis* 3099.—DISTRIB. South India; Australia.

The group to which *J. procumbens* belongs may be esteemed to form but one species; in which case its area would include all South and East Asia.

27. ADHATODA, Nees.

Spikes strobilate; the large bracts imbricated, green: *Stamens* 2; anther-cells 2, oblong, at nearly equal height, at the base subacute or with a minute knob, not tailed. Otherwise as *Justicia*.—DISTRIB. Species, the present common one; with which 6 or 8 other plants from Tropical Africa have been generically associated.

This plant resembles altogether the bracteate section of *Justicia* with strobilate spikes, except that the anther-cells have not at their base the characteristic white anther-tail.

1. ADHATODA VASICA, Nees in Wall. Pl. As. Rar. III. 103 (1832). A dense shrub, 3 to 8 ft. high. *Leaves* 8 by 3 in., elliptic, acute at either end, entire, minutely pubescent; petioles 1 in. long. *Peduncles* 1 to 6 in. long, from the upper axils of the branches. *Spikes* strobilate, 2 to 6 in. long; bracts ovate, green, entire, .75 by .25 in.; prophylla up to .5 by .125 in. *Sepals* .3 to .35 in. long, lanceolate. *Corolla* white, purple-spotted, 1.25 in. in total length; tube short, widened above the base. *Capsule* .75 in. long, stout, clavate, pubescent, with 4 rough seeds at the top. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 540 (*with syn.*); Prain Beng. Plants 819. *Justicia Adhatoda*, Linn. Sp. Pl. ed. i. 15, ed. ii. 20; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 349; Hemsl. in Journ. Linn. Soc. XXVI. 244 (1890); Ridley in Journ. As. Soc. Straits 122 (Singapore 1900). *Gendarussa Adhatoda*, Hassk. Cat. Hort. Bog. 151.

PENANG: *Curtis* 1017. SINGAPORE: *vide* Hook. f. Fl. Br. Ind. IV. 540.—DISTRIB. Throughout India, extending to Malaya; commonly cultivated.

28. RHINACANTHUS, Nees.

Erect or rambling herbs. *Leaves* entire; margins often undulate. *Flowers* in subsessile distant clusters on the branches of the panicle; bract and prophylla very small, linear. *Sepals* 5, linear, very small, hairy. *Corolla* 2-lipped; tube linear, longer than the lips; anticus lip patent, deeply 3-lobed; posticus lip narrowly oblong-linear, emarginate, curved and curled. *Stamens* 2; shortly exerted; anther-cells 2, one somewhat below the other, not tailed; pollen ellipsoid, longitudinally banded. *Ovary* hairy; ovules 2 in each cell; stigma shortly subequally 2-lobed. *Capsule* with cylindric stalk, and 4 seeds in the top; placenta not rising elastically. *Seeds* orbicular, flattened, black, pubescent.—
DISTRIB. Species 3 or 4, in the warm parts of Africa and India.

1. RHINACANTHUS COMMUNIS, Nees in Wall. Pl. As. Rar. III. 109 (1832). Hairy or nearly glabrous, 2 to 4 ft. high. *Leaves* opposite, subequal, ovate to lanceolate, subobtuse, entire, 2 to 5 in. long, narrowed to a petiole 0 to .35 in. long. *Panicle* large, much-branched, with small clusters of flowers on peduncles, sometimes very leafy, sometimes with few small floral leaves; bracts .125 to .25 in. long. *Calyx* .125 to .25 in. long. *Corolla* white; tube .75 in. long, linear to the top. *Capsule* .7 in. long, hairy. Usually recognized by the curled linear-oblong lip of the corolla. Hassk. Cat. Hort. Bogor. 151; Moritsi Verz. Zoll. Pfl. 48; Miq. Fl. Ind. Bat. II. 833; C. B. Clarke in Dyer Fl. Trop. Afr. V. 224 (*with syn.*); Prain Beng. Plants 819. *R. Nasuta*, Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 339, t. 135, fig. E.

PENANG: *Deschamps*; *Curtis* 2918. TONGKAR: *Curtis* 2964. MALACCA: *Griffith*.—DISTRIB. Common in the warm parts of Africa and South-east Asia.

29. LEDA, C. B. Clarke [LEPTOSTACHYA, Nees, *partim*].

Herbs. *Panicle* loose; branches long, linear, with distant flowers solitary or in clusters in the typical form; bracts inconspicuous. *Stamens* 2; anther-cells 2, the lower without a tail, at equal height parallel, or one lower somewhat divaricate; pollen ellipsoid, with 2 stopples, the longitudinal rows of patches on either side of each stopple prominent or obsolete. Otherwise as *Justicia*, Sect. *Gendarussa*.—
DISTRIB. Species 12, in South-east Asia.

The seventy American species, among which stands *Dianthera*, Linn., differ greatly in habit among themselves and from the Indian. The genus *Dianthera* is sunk in *Justicia* by Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 346, which then has three hundred species and is inconveniently large. But the Indian *Dianthera* only differs from *Justicia vasculosa*, Wallich, and its neighbours by the absence of a white tail to the lower anther-cell.

Panicle very open, with long linear branches :—

| | | |
|--|----|---------------------------------|
| Leaves rounded or sometimes cordate at base.. | .. | 1. <i>L. subcordata</i> . |
| Leaves obovate, attenuate at base.. | .. | 2. <i>L. obovata</i> . |
| Panicle almost dense, oblong, hardly 1 in. broad | .. | 3. <i>L. densiflora</i> . |
| Panicle reduced to two or three flowers | .. | 4. <i>L. radicans</i> . |
| Terminal spikes simple; flowers solitary | .. | 5. <i>L. andrographioides</i> . |

1. LEDA SUBCORDATA, C. B. Clarke, n. sp. Nearly glabrous; the innovations and inflorescence minutely pubescent. *Stem* 1 to 2 ft. long, divided, rambling, sometimes decumbent and rooting at the lower nodes (then with smaller leaves). *Leaves* opposite, subequal; blade 3·5 by 1·5 in., elliptic, acuminate, entire; base rounded or slightly cordate; petioles 1 in. long. *Panicles* terminal on the slender branches, and with few distant subsolitary flowers; bracts and prophylla minute. *Sepals* 1·25 in. long, linear. *Corolla* white, 5 in. long; tube straight, narrowly funnel-shaped. *Stamens* 2; anther-cells 2, parallel, at equal height, rounded at base; pollen 45 by 30 μ , with 2 stopples and 2 longitudinal bands on either side each stopple. *Style* glabrate.

PERAK: *King's Collector* 970; *Scortechini* 95; *Curtis* 3153.

This species is close to the Khasia *L. debilis*, C. B. Clarke sub *Dianthera*, in which the flowers are in approximate, sessile, opposite pairs, forming long linear spikes.

2. LEDA OBOVATA, C. B. Clarke, n. sp. Nearly glabrous; the inflorescence minutely pubescent. *Stem* 1 foot or more. *Leaves* opposite, subequal; blade 5·5 by 2·25 in. obovate, with a very short acumination, entire, with many raphides, long decurrent at base; petiole hardly 5 in. long. *Panicle* terminal, long-peduncled, with few long linear branches; bracts and prophylla minute; the branches very narrow thinly flowered racemes; pedicels 0·6 in. long, or occasionally 2 to 3 flowers clustered. *Sepals* 1·25 in. long, linear, acute. *Corolla* ("yellow" in Ridley's example) 5 in. long; tube straight, narrowly funnel-shaped. *Stamens* 2; anther-cells 2, parallel, one placed at one-third of its length below the other, rounded at base; pollen ellipsoid with longitudinal bands. *Capsule* (young) 7 in. long, with a linear stalk, pubescent.

PERAK: *Scortechini* (type of species). SELANGOR: *Ridley* 7592 (an imperfect specimen; appears to match).

This species is near *Dianthera leptostachya*, Benth.

3. LEDA (?) DENSIFLORA, C. B. Clarke, n. sp. Glabrous. *Stems* 8 in. long, decumbent at base. *Leaves* opposite, equal, some 5 by 1 in., lanceolate, some 5 by 1·5 in, elliptic-lanceolate; nerves 7 to 8 pair, patent; raphides many, small on both surfaces; margin undulate; base cuneate to a petiole 25 in. long. *Inflorescence* terminal; peduncle 5 in. long;

panicle 2 by 1 in., many-flowered; pedicels 0 to .1 in. long; bracts and prophylla minute or 0. *Sepals* .06 in. long, lanceolate, glabrous. *Corolla* .5 in. long, yellow, straight, funnel-shaped, deeply 2-lipped. *Stamens* 2; filaments long, glabrous; anther-cells 2, oblong, parallel at equal height, obtuse at base, microscopically hairy; pollen ellipsoid, with 2 pores and 2 longitudinal lines of patches beside each stopple. *Capsule* .75 in. long, slender, glabrous, with 4 seeds in the upper half.

PERAK: *Ridley* 7165.

This plant satisfies the technical characters of *Leda*, but the habit and inflorescence are those of *Eranthemum*.

4. LEDA RADICANS, C. B. Clarke, n. sp. Creeping, rooting. *Stems* 10 in. long, divided, minutely pubescent. *Leaves* opposite, equal; blade ovate, 1.5 in. long, subentire, with many small raphides, rhomboid or nearly rounded at the base; petioles .25 to .5 in. long. *Inflorescence* terminal, depauperated, of 2 to 3 distant flowers. *Sepals* .125 to .175 in. long, linear, somewhat pubescent. *Corolla* nearly .5 in. long, as of *Dianthera*. *Stamens* 2; filaments glabrous; anther-cells 2, nearly at equal height, muticous; pollen short-ellipsoid, 25 μ long, with 2 stopples, obscurely marked longitudinally. *Pistil* glabrous.

PERAK: Ulu Salami, *Scortechini* 129.

The material for this plant is scanty, and the genus doubtful.

5. LEDA ANDROGRAPHIOIDES, C. B. Clarke. Nearly glabrous. *Stems* about 1 ft. high, weak. *Leaves* 3 in. long, elliptic, acuminate; petioles .25 to .5 in. long. *Spikes* 2 to 3 in. long, terminal, solitary; flowers solitary, opposite, in distant pairs; bracts inconspicuous. *Sepals* .125 in. long, linear-lanceolate, nearly glabrous. *Corolla* .5 in. long or rather more; tube cylindric, straight; lips short. One anther-cell below the other, with a minute callus at the base; hardly tailed. *Justicia andrographioides*, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 534; *Ridley* in Journ. As. Soc. Straits 121 (Singapore 1900).

SINGAPORE; fide *Ridley*.—DISTRIB. Tenasserim.

30. POLYTREMA, C. B. Clarke, n. gen.

Slender undershrubs. Opposite pairs of *leaves* equal or unequal. *Inflorescence* in small, few-flowered, axillary cymes; bracts inconspicuous. *Calyx*-lobes 5, linear. *Corolla* small, 2-lipped. *Stamens* 2; anther-cells 2, oblong, standing a little apart, one slightly below the other, having its base muticous or sometimes acute, not tailed. *Pollen* globose or obscurely trigonous-globose, without (or with very obscure) longitudinal bands, surface smooth or most minutely uniformly granu-

lar; stopples 4 in the typical species, possibly 4 to 3 in other species. Capsule stalked, with 4 seeds.—DISTRIB. Species: the 3 here described and 1 in the Philippines.

A group of species resembling in habit some of the Malay plants referred to *Ptysiglottis* by Hallier f. in Nova Acta Leop. Carol. Akad. 70 (1897) (as *P. lanceolata*, Hallier f. l.c. 221, t. 15, fig. 1, or *P. frutescens*, Hallier f. l.c. 222, t. 16, fig. 2), which have ellipsoid pollen longitudinally banded and anther-cells approximated. The type *Ptysiglottis* from Ceylon is remote in habit and has approximated anther-cells.

Leaves of opposite pairs (many of them) very unequal:—

| | |
|--|---------------------------|
| Leaves entire; sepals .35 in. long | 1. <i>P. vulgare</i> . |
| Leaves finely crenulate; sepals .2 in. long | 2. <i>P. crenulatum</i> . |
| Leaves of opposite pairs equal or very nearly so | 3. <i>P. isophyllum</i> . |

1. *POLYTREMA VULGARE*, C. B. Clarke, n. sp. Nearly glabrous; branches round, somewhat zigzag. Leaves opposite, one reduced to an ovate auricle .25 to .5 in. long, the other elliptic or broadly elliptic, 4 to 6 in. long, entire, covered with small raphides; tip acuminate; base rhomboid not rounded; primary nerves 10 to 11 pair; petiole 0 to .175 in. long. Cymes few-flowered, small, sessile or very nearly so in the axils; bracts and prophylla hardly any. Sepals .35 in. long, setaceous, minutely pubescent or nearly glabrous. Corolla .7 in. long; tube inflated in the upper half. Stamens 2; anther-cells 2, mucicous, distant, one rather the lower. Style glabrous. Capsule .7 in. long, glabrate, with 4 seeds in the upper part.

PERAK: Ridley 7164, 9445, 9768; Wray 3591 (partly); Goping, King's Collector 486. SELANGOR: Ridley 8545.

2. *POLYTREMA CRENULATUM*, C. B. Clarke, n. sp. Branches 6 to 8 in. long, decumbent, much divided. Leaves up to 2.5 by 1 in., subsessile, elliptic-acuminate; margin finely crenulate. Cymes closely axillary, 1- to 3-flowered. Sepals .2 in. long, linear-setaceous, nearly glabrous. Corolla .35 in. long. Otherwise as *P. vulgare*.

PERAK: *Scortechini* (two collections without number).

This is possibly only a starved form of *P. vulgare*, but it is considerably smaller in every part.

3. *POLYTREMA ISOPHYLLUM*, C. B. Clarke, n. sp. Herb, 1 to 2 ft. high, nearly glabrous. Leaves opposite, equal, yellow when dry; blade 4.5 by 1.75 in., elliptic-acuminate; base cuneate, entire, covered with raphides; primary nerves 7 to 8 pair; petioles .5 to 1 in. long. Cymes small, few-flowered, closely axillary. Sepals .35 in. long, setaceous, minutely pubescent. Corolla white, more than .5 in. long. Stamens 2; filaments glabrous; anther-cells rather long, not tailed,

distant but nearly parallel, one (for one-third its length) below the other. *Pistil* glabrous.

PERAK: *Scortechini* 224.

31. ECBOLIUM, Kurz.

Spikes strobilate; bracts imbricate, enclosing the calyx. *Corolla*-tube linear. *Stamens* 2, without rudiments; anther-cells 2, narrowly oblong, at equal height, muticous; pollen globose, with meridional bands. *Capsule* stalked, with 4 large flat seeds in the round head. Otherwise as *Justicia*.—DISTRIB. Species 12 in the warm parts of Africa, Madagascar, Arabia, and India.

This genus resembles the section *Bracteata* of *Justicia*, which has similar strobilate spikes; it differs in having the anther-cells at equal height and without tails. It is difficult to say by what character it differs from some of the American species of *Dianthera*; but the Malay *Dianthera* (*Leda*) have all very small bracts.

1. ECBOLIUM LINNEANUM, Kurz in Journ. As. Soc. Beng. XL. ii. 75 (1871). A small shrub, glabrate; the inflorescence somewhat pubescent. *Leaves* opposite, equal, elliptic or obovate, acute, 3 to 6 in. long; base cuneate; petiole .5 to 1.5 in. *Spikes* strobilate, 2 to 6 in. long, terminal and on axillary peduncles; bracts ovate, .5 in. long, green, varying in their margin, which is sometimes serrate, sometimes quite entire, rounded at the tip; prophylla 2, minute. *Sepals* .2 in. long, narrow. *Corolla* green-blue; tube .75 to 1 in. long, linear to the top; lips .35 to .5 in. long. *Capsule* .75 in. long; stalk narrowly cylindric; head round, flat, .3 in. in diam., containing 2 large, round, thin, rough seeds. Boiss. Fl. Orient. IV. 526; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 338; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 544, and in Dyer Fl. Trop. Afr. V. 236 (*with syn.*); Prain Beng. Plants 816.

PENANG: *King's Collector* 1671. MALACCA: *Maingay* (K.D.) 1172. SINGAPORE: *Deschamps*.—DISTRIB. Common in warm Africa and India; not yet known from the Malay Archipelago.

Recognized by its green-blue corolla, or by the broad head to the capsule.

32. GRAPTOPHYLLUM, Nees.

Glabrous shrubs. *Leaves* equal, opposite, entire. *Panicles* terminal, dense, oblong; bracts and prophylla very small. *Corolla* large, red; tube narrowly funnel-shaped, curved; otherwise nearly as *Ecbolium*.—DISTRIB. Species 3, whereof 1 is widely spread in the warm regions of the Old World, and 2 in Australia.

The red corolla has a much broader tube than that of *Ecbolium*. The much-cultivated species here described is not confounded with *Ecbolium*, but is marked

sometimes *Justicia*, from which it differs by the anther-cells at equal height, not tailed.

1. *GRAPTOPHYLLUM HORTENSE*, Nees in Wall. Pl. As. Rar. III. 102 (1832). Attains 6 to 8 ft. in height. *Leaves* broadly elliptic, 5 to 9 in. long, cuneate at either end; petiole hardly .25 in. *Panicle* narrowed nearly to a raceme, terminal, subsessile, 10- to 40-flowered; bracts and prophylla inconspicuous. *Sepals* .175 in. long. *Corolla* red; tube .75 in. long; lips .5 in. long. Hassk. Cat. Hort. Bogor. 150; Moritzi Verz. Zoll. Pf. 47; Miq. Fl. Ind. Bat. II. 824; C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 545, and in Dyer Fl. Trop. Afr. V. 241 (*with syn.*). *G. pictum*, Griff. Notul. IV. 139; Lindau in Engl. & Prantl Pflanzenfam. IV. 3 B, 327.

PERAK: *Scortechini* 1545. KEDAH: *King's Collector* 1765. Wild probably in the Malay Archipelago, where it is plentiful. Frequent in India, also in Guinea, where it is almost certainly introduced.

33. PERISTROPHE, Nees.

Erect branched herbs. *Leaves* opposite, subequal, petioled. *Flowers* 1 to 4 together, and of these one or more often imperfect, clustered between 2 floral leaves; the flower-clusters often peduncled, axillary or terminal; bract and prophylla to each flower small or 0. *Calyx* small, deeply lobed into 5 subequal lanceolate teeth. *Corolla* rose or purple; tube slender; limb 2-lipped; upper lip subentire, lower subequally 3-lobed. *Stamens* 2; filaments pubescent below; anther-cells 2, muticous, narrow, curved, one half its length above the other; pollen short-ellipsoid, longitudinally banded. *Ovary* 4-ovulate; style filiform, minutely bifid. *Capsule* ellipsoid, stalked, minutely pubescent; placenta not rising elastically from the base; seeds granular, subtubercular.—
DISTRIB. Species 25, but several very close together, extending from Africa to Japan and New Caledonia.

| | |
|--|----------------------------|
| Floral leaves ovate triangular, .5 in. broad; corolla 1.25 in. long | 1. <i>P. tinctoria</i> . |
| Floral leaves broadly lanceolate, .175 in. broad; corolla .75 in. long | 3. <i>P. salicifolia</i> . |
| Floral leaves linear-ligulate, .06 to .09 in. broad; corolla .75 to 1 in. long | 2. <i>P. acuminata</i> . |

These three species are very closely allied, as are all species admitted of this group by Nees and Miquel. *P. montana*, Nees, *P. angustifolia*, Nees, *P. salicifolia*, Blume, *P. commutata*, Nees, are not improbably natives of the Malay Peninsula, but are included between *P. tinctoria* and *P. acuminata*.

1. *PERISTROPHE TINCTORIA*, Nees in Wall. Pl. As. Rar. III. 113 (1832). Often 3 to 4 ft. high. *Leaves* 3.5 by 1.75 in., cuneate at either end, entire, sparingly pubescent; petioles .25 to 1 in. long. *Peduncles*

·25 to 1 in. long, several often approximated, subpanicked, often glabrate. *Floral leaves* ovate-triangular, large, up to 1 by ·5 in.; margins not ciliate, but (more or less) minutely scabrid. *Calyx* ·175 to ·2 in. long, grey, hairy; teeth lanceolate. *Corolla* 1·25 in. long. *Anthers* ·175 in. long. *Capsule* ·6 in. long. C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 556; Hemsl. in Journ. Linn. Soc. XXVI. 248 (1890); Prain Beng. Plants 820. *P. pallida*, Nees in DC. Prodr. XI. 494; Miq. Fl. Ind. Bat. II. 846; Ridley in Trans. Linn. Soc. ser. 2, III. 334 (1893).

JOHORE: *Ridley*. KRIAN: *Scortechini* 1373. SINGAPORE: *Scortechini* 370, 816.—DISTRIB. Cultivated much in South-east Asia.

P. fera, C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 556, is possibly the wild form of *P. tinctoria*, and hardly differs from it but by having the floral leaves ciliate on the margins. This plant is (partly) described as *P. tinctoria* by Nees and Miquel; I have seen no example of it from the Malay Peninsula.

2. PERISTROPHE ACUMINATA, Nees in Wall. Pl. As. Rar. III. 113 (1832). Smaller than *P. tinctoria*, Nees, in all its parts. *Floral leaves* ·5 by ·06 to ·09 in. broad, glabrous. *Corolla* ·75 to 1 in. long. *Capsule* ·5 in. long. Nees in DC. Prodr. XI. 496; T. Anders. in Journ. Linn. Soc. IX. 521 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 555; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 331; Ridley in Trans. Linn. Soc. ser. 2, III. 334 (1893), and in Journ. As. Soc. Straits 122 (Singapore 1900). *P. Blumeana*, Hassk. Cat. Hort. Bogor. 152; Nees in DC. Prodr. XI. 495; Miq. Fl. Ind. Bat. II. 848. *Justicia Roxburghiana*, Blume Bijdr. 786, *fide* Miquel.

PENANG: *Deschamps*, *Curtis* 681. PAHANG: *Ridley* 1165. PERAK: *Scortechini* 14, 146; *King's Collector* 285. MALACCA: *Griffith*; *Harvey*; *Curtis* 254; *Goodenough*. SINGAPORE: *Hullett* 93. PEKAN: *fide* *Ridley*.—DISTRIB. Eastern India, Burma, Java.

3. PERISTROPHE SALICIFOLIA, Miq. Fl. Ind. Bat. II. 847 (1856). *Leaves* oblong-lanceolate, often 3 by ·5 in., rarely elliptic-lanceolate, often long acuminate. *Floral leaves* ·6 by ·175 in. (or broader). *Corolla* ·75 in. long. *Capsule* ·5 in. long. *Justicia salicifolia*, Blume Bijdr. 787. *Hypoestes salicifolia*, O. Kuntze Revisio I. 491 (1891).

PENANG: *Deschamps*; *King's Collector*; *Ridley* 9375. PERAK: *Scortechini*; *Wray* 847.—DISTRIB. Java.

This species is separated here from *P. acuminata* by the sole character of broader bracts, and I doubt its specific distinctness. It is a curious coincidence that O. Kuntze should have named his plant (which is at Kew) *salicifolia*, as he did not intend it to be = Blume's *Justicia salicifolia*.

34. HYPOESTES, R. BROWN.

Erect branched herbs or shrubs. *Leaves* opposite, subequal, petioled. *Flowers* paired, one of these often imperfect or wanting the two bracts connate (in the Malay species) into an obconic or cylindrical involucre; prophylla to the lower bract inside the involucre usually longer than the calyx; prophylla to the upper bract often 0; involucres often numerous, in heads, dense panicles or racemes. *Calyx* shorter than the involucre, deeply lobed; teeth 5, lanceolate. *Corolla* rose-purple; tube linear; lips 2, narrow. *Stamens* 2; anthers of 1 cell, mucous; pollen ellipsoid, longitudinally striate. *Ovary* 4-ovulate; style glabrate upwards, shortly bifid. *Capsule* oblong or ellipsoid, stalked, 4-seeded; placenta not rising elastically from the base of the capsule; seeds glabrous, tuberculate-granular.—**DISTRIB.** Species 40, mostly in Africa and Mascarenia; 8 species are described by Miquel from Malaya, but these 8 are so closely allied that they might be described as 2.

The genus *Hypoestes* abounds in the Malay Archipelago, and the quantity of material from thence is very large. In India, again, *Hypoestes* is frequent. But from the Malay Peninsula I have only seen one collection, viz. Maingay 1176, here described.

1. **HYPOESTES MALACCENSIS**, Wight Ic. 1555 (before 1850). Pubescent, branched, 1 to 2 ft. high. *Leaves* up to 3 by .8 in., elliptic-lanceolate, narrowed at either end, entire, petiole .5 in. long. *Involucres* in axillary and terminal ovoid clusters 1 in. long; involucres .8 in. long, shortly conic at base, with 2 linear teeth. *Calyx* .25 in. long, minutely thinly hairy. *Corolla* .75 in. long. *Pollen* with 3 stopples. T. Anders. in Journ. Linn. Soc. IX. 522 (1867); C. B. Clarke in Hook. f. Fl. Br. Ind. IV. 558; Lindau in Engl. & Prantl Pflanzenfam. IV. 3B, 333. *H. rosea*, Dene. in Nouv. Ann. Mus. III. 381 (Paris 1834) (*non* Beauv.).

MALACCA: Griffith; Capt. A. C. Wight; Maingay (K.D.) 1176.—**DISTRIB.** Malay Islands.

With this is united (in Fl. Br. Ind. IV. 558) the Malay Archipelago species *H. Decaisneana*, Nees, and *H. laxiflora*, Nees, which differ very little.

35. RUNGIA, NEES.

Small undershrubs or herbs. *Leaves* opposite, equal. *Flowers* in peduncled spikes; floral leaves sometimes strobilate, including two bracts; lower bract longer than the calyx, upper smaller, sterile, nearly always empty. *Sepals* 5, nearly separate, linear. *Corolla* small, 2-lipped; tube oblong, short; lobes imbricated in the bud. *Stamens* 2;

1 anther-cell below the other usually appendaged; pollen ellipsoid, longitudinally banded. *Ovary* 4-ovulate; style at tip emarginate. *Capsule* small, with 4 or 2 seeds; placentæ rising elastically with the seeds, from the base of the capsule; seeds glabrous, minutely tuberculate.—**DISTRIB.** Species 35, mainly in India, extending to China, Australia, and Africa.

This genus can be separated from the small species of *Justicia* by the fruit.

1. *RUNGIA LAXIFLORA*, C. B. Clarke. Suberect, 3 ft. high, nearly glabrous. *Leaves*: lamina 3·5 by 1·25 in., elliptic, narrowed at either end; petioles ·25 to 1 in. long. *Spikes* 2 to 4 in. long, linear, flexuose, very lax; the outer bracts often scarcely imbricated. *Bract* (floral leaf) 9 mm. long, narrow-lanceolate, with scarious margins; the two prophylla lanceolate with scarious margins, the lower ·3 in. long, the upper sterile, smaller. *Sepals* ·275 in. long, linear, glabrous. *Corolla* ·6 in. long, "pale yellow, striped with light grey" (Collector's note). *Stamens* 2; lower anther-cell smaller than the upper, with a white spur; pollen 50 μ long, with 3 stopples. *Style* glabrous, minutely hairy near the base. *Capsule* ·35 in. long; minutely hairy; placentæ rising elastically; seeds minutely tubercled. ? *Justicia laxiflora*, Blume Bijdr. 789.

PERAK: *Scortechini*; Larút, alt. 3000 ft., *King's Collector* 3676; alt. 100 ft., *King's Collector* 1815.—**DISTRIB.** Java (?).

Justicia laxiflora, Blume, has the filament "antice barbata," and could hardly be this. It was Zollinger, n. 1539 *vide* Moritzi Verz. Zoll. Pfl. 47, which I have not got. But I believe I got the name *Rungia laxiflora* from a Java plant marked *Justicia laxiflora*, which passed through my hands.

2. *RUNGIA MINUTIFLORA*, C. B. Clarke, n. sp. Suberect, a branched herb, 9 in. high. *Leaves*: blade 2 by ·75 in., ovate-lanceolate; tip obtuse, nearly glabrous, attenuated at base; petiole up to ·5 in. long. *Spikes* linear, 1 to 1·25 in. long, very lax, interrupted at base; flower-bract ·125 in. long, elliptic-obtuse, green, microscopically brown-hairy. *Corolla* ·2 in. long. *Stamens* 2; one anther-cell a little below the other distinctly tailed. *Capsule* ·15 to ·175 in. long; placentæ rising elastically from the valves; seeds brown, minutely tuberculated.

KEDAH: Lankawi Island, *Curtis* 3689.

Family XCI.—LABIATÆ.

[By D. PRAIN.]

Herbs, less often shrubs, usually beset with oil-glands. *Stem* usually 4-angled. *Leaves* opposite or whorled; exstipellate. *Flowers* irregular, solitary, 2-nate or fascicled, axillary or in centrifugal spicate cymes which by union in pairs form false whorls. *Calyx* persistent, nearly regular, or variously 4- to 5-cleft, or 2-lipped. *Corolla* gamopetalous, hypogynous; limb 4- to 5-lobed, or 2-lipped and personate, the lobes imbricate in bud. *Stamens* attached to the corolla-tube, usually 4 didynamous, sometimes the upper pair imperfect; anther-cells divaricate or parallel, sometimes disjoined, sometimes confluent. *Disk* usually prominent, regular or irregular. *Ovary* free, composed of two 2-celled carpels, the cells of which are also free; style simple, inserted between the lobes of the ovary; the stigma usually 2-lobed, its arms often unequal; ovules in each cell solitary, erect, anatropous. *Fruit* of 4 dry or rarely fleshy 1-seeded nutlets, rarely one or more of these abortive, situated at the base of the calyx; scar of attachment usually basal, small, occasionally lateral or sublateral and larger. *Seeds* small, erect, without albumen, or albumen very scanty; radicle inferior.—DISTRIB. Species about 2800, mainly in North Temperate regions.

Stamens 4, declinate :—

Lowest corolla-lobe patent, flat or slightly concave, wide-based; calyx-limb 2-lipped; upper tooth much wider than the others; filaments free :—

Corolla-tube very short, not or slightly exerted; stigma

2-fid 1. OCIMUM.

Corolla-tube long, usually far exerted; stigma entire or

subentire 2. ORTHOSIPHON.

Lowest corolla-lobe deflexed, saccate or cymbiform, narrow-based :—

Calyx-limb uniform; teeth 5, subequal; lowest corolla-lobe thick-edged, deeply saccate, not much longer than the others; filaments free 3. HYPTIS.

Calyx-limb 2-lipped; upper tooth often (not always) wider than the others; lowest corolla-lobe cymbiform, much longer than the others, its margin not thickened :—

Filaments free beyond point of insertion on corolla-tube 4. PLECTRANTHUS.

Filaments connate in a sheath round the style .. 5. COLEUS.

Stamens not declinate; filaments free :—

Stamens 4, erect or spreading, equal or subequal; calyx-limb uniform; teeth 5, subequal; corolla-lobes 4, flat, subequal :—

- Anthers 1-celled; filaments bearded:—
- Whorls glomerulate in stout, lax, usually interrupted spikes 6. POGOSTEMON.
- Whorls aggregated in slender, dense, continuous spikes 7. DYSOPHYLLA.
- Anthers 2-celled, cells parallel; filaments not bearded; whorls sometimes terminal, usually axillary 8. MENTHA.
- Stamens ascending under upper lip of corolla; usually 4 didynamous, the anterior pair the longer; sometimes 2, one pair being imperfect; corolla 2-lipped:—
- Calyx-limb distinctly 2-lipped:—
- Calyx-throat remaining open after flowering; tube without dorsal appendage, undivided in fruit and persistent:—
- Stamens two pairs; upper calyx-lip 3-toothed .. 9. CALAMINTHA.
- Stamens one pair, with remote anther-cells; upper calyx-lip 3-toothed or entire 10. SALVIA.
- Calyx-throat occluded after flowering; tube with a dorsal plate or pouch, 2-partite; the upper segment deciduous in fruit 11. SCUTELLARIA.
- Calyx-limb uniform, or, if oblique, not 2-lipped; the teeth subequal:—
- Anthers dimorphic; cells of anterior longer pair dimidiate, 1-locular, of posterior shorter pair 2-locular; upper corolla-lip short, flattish, pubescent externally but not woolly; flowers medium, purplish; calyx-teeth 5, subequal .. 12. ANISOMELES.
- Anthers uniform; upper corolla-lip arched or hooded over stamens:—
- Calyx-teeth 6 to 10; limb often oblique; upper corolla-lip densely woolly externally:—
- Lower corolla-lip shorter than upper; flowers large, yellow 13. LEONOTIS.
- Lower corolla-lip longer than upper; flowers medium or small, white 14. LEUCAS.
- Calyx-teeth 5, subequal; limb uniform; upper corolla-lip pubescent externally but not woolly:—
- Nutlets with a small basal or subbasal scar:—
- Nutlets dry; flowers medium:—
- Calyx-teeth spinescent; flowers purplish; leaves deeply incised 15. LEONURUS.
- Calyx-teeth herbaceous; flowers white or yellow; leaves not incised 16. PARAPHLOMIS.
- Nutlets fleshy; flowers large, yellow or white .. 17. GOMPHOSTEMMA.
- Nutlets with a large lateral scar; flowers very small, yellow 18. CYMARIA.

1. OCIMUM, Linn.

Strongly scented herbs or undershrubs. *Flowers* small, in 6- to 10-flowered whorls, spicate or racemose; pedicels recurved under the calyx; bracts small, caducous. *Calyx* ovoid or campanulate, in fruit

deflexed, 2-lipped; upper lip broad, flat, decurrent; lower usually with 4 slender teeth, the central pair exceeding the lateral. *Corolla-tube* short, not annulate within; limb 2-lipped; lower lip declinate, entire, flat or nearly so; upper rather shorter than lower, subequally 4-fid. *Stamens* 4, declinate, didynamous, exerted; filaments free or the lower pair connate below, naked or the upper toothed or hairy below; anther-cells confluent. *Disk* entire or 3- to 4-lobed. *Style* 2-fid; lobes subulate or flattened. *Nutlets* smooth or subrugose, mucilaginous when moistened. —DISTRIB. Species about 60, throughout the Tropics.

| | |
|--|----------------------------|
| Pedicels equalling or exceeding the calyx; two lower calyx-teeth longer than the upper lip | 1. <i>O. sanctum</i> . |
| Pedicels much shorter than the calyx:— | |
| Lower calyx-teeth longer than the upper lip | 2. <i>O. Basilicum</i> . |
| Lower calyx-teeth shorter than the upper lip | 3. <i>O. gratissimum</i> . |

1. OCIMUM SANCTUM, Linn. Mant. 85 (1767). An erect, softly hairy, much-branched herb, 1 to 2 ft. high. *Stems* and branches usually purplish, often woody at the base. *Leaves* opposite, membranous, pubescent on both surfaces, especially on the nerves and principally beneath, elliptic-oblong, obtuse or acute; base cuneate or truncate, entire; the margin elsewhere entire or serrate; 1 to 2 in. long, .6 to 1.2 in. wide; petiole .5 to 1 in. long, slender, pubescent. *Flowers* in slender racemes or panicles, 6 to 8 in. long, of rather close whorls; bracts ovate-acuminate, .12 in. long, ciliate. *Calyx* .12 in. (in fruit .2 in.) long; pedicels longer than the calyx, slender, .25 in. long, pubescent; lower lip of calyx longer than upper, its 4 teeth lanceolate, similar below; the central pair with long, slender, awn-like, upcurved tips, which project beyond the upper lip; the lateral pair with short straight tips; upper lip wide-obovate or suborbicular, reflexed, shortly apiculate. *Corolla* .15 in. long, purplish-pink; upper lip pubescent on the back. *Filaments* exerted, slender; the upper ones with a small bearded basal appendage. *Nutlets* .05 in. long, wide-ellipsoid, smooth, yellow with black markings. Roxb. Fl. Ind. III. 14; Wall. Cat. 2716; Benth. in DC. Prodr. XII. 38; Miq. Fl. Ind. Bat. II. 939; Hook. f. Fl. Br. Ind. IV. 609; Prain Beng. Plants 843. *O. monachorum*, Linn. Mant. 85. *O. tenuiflorum*, Linn. Sp. Pl. I. 597; Benth. in DC. Prodr. XII. 39. *O. inodorum*, Burm. Thes. Zeylan. 175, t. 80, f. 2.

In most of the provinces; in waste places. —DISTRIB. South-east Asia from Arabia eastwards; Australia; Pacific Islands.

This, the Sacred Tulsi of India, is no doubt an introduced plant in our area; where it is indigenous is uncertain.

2. *OCIMUM BASILICUM*, Linn. Sp. Pl. 597 (1753). An erect branching herb, 2 to 3 ft. high. *Stems* and branches usually green, sometimes purplish, glabrous or more or less hispidly hairy. *Leaves* opposite, membranous, green or purplish, variously pubescent, in extreme forms quite glabrous, in others strongly hispidly hairy, ovate-acute; base cuneate, entire; margin elsewhere entire or toothed or occasionally (in cultivated forms) deeply lobed; 1 to 2 in. long, .6 to 1.2 in. wide, occasionally, in cultivated varieties, larger; petiole .5 to 1 in. long. *Flowers* in rather dense racemes of whorls, the terminal raceme ultimately 6 to 8 in. long, much exceeding the lateral, rarely (var. *thyrsoides*) with all the racemes subequal, forming a terminal thyrse; bracts ovate-acute, petiolate. *Calyx* .2 in. (in fruit .35 in.) long; pedicels very short; lower lip with central pair of teeth longer than the upper lip, which is orbicular, longer than the campanulate tube. *Corolla* .35 to .5 in. long, variously white or pink or purplish, nearly or quite glabrous to pubescent or (var. *ciliata*) hispidulous. *Filaments* shortly exerted; the upper ones with a tooth above the base. *Nutlets* .07 in. long, ellipsoid, pitted. Wall. Cat. 2713; Hook. f. Fl. Br. Ind. IV. 608.

PERAK: *Wray*! PENANG: *Wallich*! MALACCA. Perhaps only cultivated in our area.—DISTRIB. Throughout Tropics of Eastern Hemisphere and Polynesia.

The presence of this species in Malacca is recorded by Sir J. D. Hooker (Fl. Br. Ind. l. c.), but there are not now any Malacca specimens at Kew. In Penang it has only been collected by Wallich; his plant is a glabrous form never met with in India save in gardens. No complete specimens have been sent from Perak, but Wray records the species, under the name "Ruku," as an adulterant of Patchouli. "Ruku" is, however, the Malay name for *Hyptis graveolens*, which is one of the usual adulterants of Patchouli leaves, though the writer finds that samples of "Ruku" do contain, mixed with the leaves and calyces of *Hyptis graveolens*, calyces of *O. Basilicum*. The particular variety met with in these samples being var. *pilosum*, there is just a possibility that in Perak this may sometimes occur as an escape from cultivation.

3. *OCIMUM GRATISSIMUM*, Linn. Sp. Pl. 1197 (1753). A shrubby, much-branched perennial, 4 to 6 ft. high, woody at the base. *Stems* glabrous; young branches pubescent. *Leaves* opposite, chartaceous, pubescent, elliptic-lanceolate, acute; base cuneate, entire; margin elsewhere coarsely crenate-serrate; 2.5 to 5 in. long, 1.5 to 2.25 in. wide; petiole 1 to 2.5 in. long, slender, pubescent. *Flowers* in simple or branched, strict, slender racemes; whorls rather close; rachis softly pubescent; bracts sessile, acuminate from a wide ovate base, exceeding the calyx, decussate and squarrose in young racemes. *Calyx* .12 in. (in fruit .25 in.) long, pubescent, glandular; pedicels very short, softly

pubescent; lower lip with central pair of teeth minute and much shorter than the upper lip, which is rounded and recurved. *Corolla* .17 in. long, yellowish- or greenish-white, externally pubescent. *Filaments* distinctly exerted; upper pair with a bearded tooth at the base. *Nutlets* .06 in. long, subglobose, rugose, brown. Roxb. Fl. Ind. III. 17; Wall. Cat. 2720; Hook. f. Fl. Br. Ind. IV. 608.

PENANG: *Wallich*. Almost certainly only cultivated in our area.—
DISTRIB. Tropics generally, but doubtfully indigenous in America.

The only record of this species from our area is that of *Wallich*, who collected specimens in Penang in 1822. Seeing that no one has sent it since from any of the provinces, it may almost certainly be concluded that *Wallich's* specimens came from cultivated plants or from casual escapes that have not become permanently established.

2. ORTHOSIPHON, Benth.

Herbs, undershrubs, or shrubs. *Flowers* in 6- or fewer-flowered racemously arranged whorls; bracts small. *Calyx* 2-lipped, ovoid or campanulate-tubular, deflexed in fruit; lower lip 4-toothed, the central and lateral teeth distinct or shortly connate, usually subulate; upper lip broad, membranous; the margins decurrent. *Corolla* 2-lipped; tube often slender, straight or incurved; lower lip entire, concave; upper lip 3- to 4-fid. *Stamens* 4, declinate, didynamous, included or exerted; filaments free, not appendaged at base; anther-cells confluent. *Disk* usually gibbous. *Style* with a small capitate or clavate, entire or notched stigma. *Nutlets* dry, ovoid or globose, smooth or nearly so.—DISTRIB. Species about 60, in Tropics of the Old World.

ORTHOSIPHON STAMINEUS, Benth. in Wall. Pl. As. Rar. II. 15 (1831). A slender glabrous or pubescent herb, 1 to 2 ft. high; stems distinctly quadrangular. *Leaves* opposite, membranous, usually puberulous to pubescent on the nerves on both surfaces, otherwise glabrous, rather dark-green above, ovate-acuminate, with long entire cuneate base; margin elsewhere coarsely wide-serrate; 2 to 4 in. long, .75 to 1.5 in. wide; petiole .25 to .4 in. long, puberulous or pubescent. *Flowers* in rather distant whorls, .6 in. apart below, these arranged in lax terminal racemes 4 to 8 in. long, 1.5 in. across, not including the far-exserted filaments. *Calyx* .15 in. (in fruit .25 in.) long, campanulate, puberulous on the nerves, gland-dotted between; the two central teeth of lower lip subulate. *Corolla* uniformly finely puberulous, 1 in. long, purplish or white; tube slender, straight, thrice as long as calyx; lower lip straight, .2 in. long; upper lip refracted, .2 in. long. *Filaments* glabrous, capillary, projecting 1.2 in. beyond corolla-limb. *Nutlets* wide-oblong, compressed, rugulose. Benth. Lab. Gen. & Sp. 29, and in DC. Prodr. XII.

52; Wall. Cat. 2727; Bot. Mag. t. 5833; Miq. Fl. Ind. Bat. II. 944; Hook. f. Fl. Br. Ind. IV. 615. *Ocimum grandiflorum*, Blume Bijdr. 835. *O. longiflorum*, Ham. in Wall. Cat. l. c.

PERAK: *Kunstler*! SINGAPORE: *Deschamps*! NICOBARS: *Kurz*!—
DISTRIB. South-eastern Asia and Australia.

3. HYPTIS, Jacq.

Herbs or shrubs. *Flowers* small or medium, very variously arranged; in our species arranged in dense capitate or lax secund heads; bracts subulate or setaceous. *Calyx* 10-nerved, ovate or campanulate or tubular; teeth 5; subequal, erect. *Corolla* 5-lobed; lowest lobe abruptly deflexed, with thickened margin, saccate and contracted at the base; the other lobes erect or spreading, flat. *Stamens* 4, declinate; filaments free, without basal appendages; anther-cells confluent. *Disk* entire, regular or somewhat gibbous in front. *Style* with subentire or 2-fid stigma. *Nutlets* oblong or ovoid, smooth or rugulose.—DISTRIB. Species about 250, all American; a few introduced and established in the Tropics of the Old World.

Flowers in dense, globose, axillary, many-flowered heads

.. 1. *H. brevipes*.

Flowers in lax, secund, racemose, few-flowered heads

.. 2. *H. suaveolens*.

1. HYPTIS BREVIPES, Poit. Ann. Mus. Par. VII. 465 (1806). An erect annual herb, 2 to 3 ft. high. *Stems* glabrate or pilose. *Leaves* opposite, membranous, medium-green and sparsely hispid throughout above, paler and pubescent on the nerves beneath, ovate-oblong or lanceolate; apex acute; base long-cuneate, entire; margin elsewhere serrate; 2 to 3 in. long, .75 to 1 in. wide; petiole .25 to .5 in. long. *Flowers* in dense heads, .4 in. in diam., on axillary, hispid, slender peduncles .4 to .5 in. long; bracts ciliate, lanceolate or subulate, rigid, .2 in. long. *Calyx* subtubular, .1 in. (in fruit .15 in.) long, ciliate; teeth erect, subequal, subulate, as long as the tube. *Corolla* .2 in. long; tube slender. *Nutlets* ovoid, brown, minutely rugulose. Benth. in DC. Prodr. XII. 107; Miq. Fl. Ind. Bat. II. 959; Hook. f. Fl. Br. Ind. IV. 630.

MALACCA: *Griffith* 3961! PENANG: *King*! SINGAPORE: *Kunstler*! PERAK: *Scortechini*! ANDAMANS: at Port Blair, *King*!—DISTRIB. America, from Brazil to Mexico; Tropical Africa and the Malay Archipelago, introduced.

Hyptis capitata, Jacq., a species in habit resembling *H. brevipes*, is frequently met with in gardens in S.E. Asia. It sometimes occurs spontaneously in waste places in India, and appears to have become established in the Philippines and in Formosa. The

possibility of its occurrence in our area should therefore be kept in mind. It is readily distinguished from *H. brevipes* by its much larger capitula, which reach .75 in. across, and by its calyx-teeth being shorter than the tube. There is nothing in the description of the mysterious *Leucas globulifera* (Hassk. Cat. Hort. Bogor. alt. 133), which finds a place in various works of reference and which is obviously not a *Leucas*, to prevent it from having been *Hyptis capitata* in cultivation, as Hasskarl says, at Buitenzorg. Hasskarl's small 2-fid upper lip may stand for the two upper corolla-lobes, the lateral lobes of the lower lip being the two lateral corolla-lobes; the concave mid-lobe, largest of the three in what Hasskarl terms the lower lip, explains itself. Every other character agrees with *Hyptis capitata*, and the combination of characters will fit no other Labiate known to the writer as likely to be in cultivation in Java when Hasskarl wrote.

2. *HYPTIS SUAVEOLENS*, Poit. Ann. Mus. Par. VII. 472, t. 29, f. 2 (1806). A rigid, branching, annual herb, 2 to 4 ft. high. *Stems* hirsute. *Leaves* opposite, firmly herbaceous, dark-green, pilose above, paler, densely grey-pubescent beneath, rather wide-ovate, subacute; base rounded, truncate or slightly cuneate, rarely subcordate; margin sinuate and serrulate; .75 to 3 in. long, .6 to 2 in. wide; petiole slender, .35 to .75 in. long, sparingly pubescent. *Flowers* in lax few-flowered, secund heads, .5 in. long, arranged racemosely towards ends of branches in the axils of smaller leaves, on pubescent peduncles .5 in. long; bracts minute, setaceous. *Calyx* campanulate, .2 in. (in fruit .35 in.) long, strongly ribbed; mouth villous; teeth erect, subulate, shorter than tube. *Corolla* blue, .3 in. long; tube slender. *Nutlets* narrowly oblong, brown, faintly rugose. Benth. in DC. Prodr. XII. 126; Miq. Fl. Ind. Bat. II. 959; Hook. f. Fl. Br. Ind. IV. 630. *Ballota suaveolens*, Linn. Sp. Pl. 815. *Bysteropogon suaveolens*, L'Hérit. Sert. Angl. 19. *B. graveolens*, Blume Bijdr. 824. *Schauera graveolens*, Hassk. in Flora, 1842, II. Beibl. 25.—Malay name "Ruku."

PERAK: Wray! MALACCA: Maingay 2280! PENANG: Deschamps! NICOBARS: Kurz 26063!—DISTRIB. Tropical America; introduced and widely spread in South-east Asia.

Leaves largely used, along with those of *Urena lobata*, Linn., in adulterating commercial samples of leaves of *Pogostemon Cablin*, the Patchouli plant principally cultivated in our area.

4. PLECTRANTHUS, L'Hérit.

Herbs or undershrubs. *Flowers* usually small, generally in lax, paniculate, 6- to 8-flowered cymes. *Calyx* 5-toothed, 2-lipped, enlarging in fruit. *Corolla-tube* exerted, long or short, decurved or straight; limb gibbous or sometimes spurred, less often straight, 2-lipped; lower

lip entire, long boat-shaped; upper short, 3- to 4-fid, recurved. *Stamens* 4, declinate; filaments free, simple; anther-cells usually confluent. *Disk* usually produced anteriorly, there nearly to fully as long as the ovary. *Style* usually 2-fid. *Nutlets* orbicular or occasionally oblong or ovoid, smooth, granulate or punctate.—*DISTRIB.* Species about 100, in the Tropics of the Old World, Australia and Polynesia.

PLECTRANTHUS KUNSTLERI, Prain Journ. As. Soc. Beng. LXVI. ii. 521 (1897). A stoutish shrubby plant, 2 to 5 ft. high, everywhere finely puberulous. *Leaves* opposite, membranous, pale-green especially beneath and there sparsely glandular-puberulous, darker and similarly faintly puberulous above, sometimes with a whitish line down the centre, ovate-acute with entire, cuneate base and short, entire, subacuminate apex; margin elsewhere regularly crenate; 3 to 4.75 in. long, 1.5 to 2 in. wide; petiole 1.5 to 2 in. long. *Flowers* in racemed cymes disposed in stout panicles with ascending branches, 6 in. long, 4 in. across. *Calyx* in fruit .2 in. long, gland-dotted; pedicels .15 in. long, finely puberulous; the two lower teeth subulate, the two lateral ovate-acute, longer than the upper orbicular-ovate. *Corolla* greenish-white, or waxy white, faintly dotted, .4 in. long; the tube decurved with a gibbous base, one and a half times as long as the boat-shaped lower lip; upper lip rather short. *Filaments* discrete from the point at which they are free from the corolla-tube. *Nutlets* oblong, brown, hardly shining. Ann. Rôy. Bot. Gard. Calc. IX. i. 55, t. 70.

PERAK: Kwala Dipong, 400 to 600 ft. elev., *King's Collector (Kunstler)* 8240! Kinta, 800 to 1000 ft., *King's Collector (Kunstler)* 7143! On limestone ridges.

5. *COLEUS*, Lour.

Herbs. *Flowers* usually small, generally in lax, paniculate, 6- to 8-flowered cymes. *Calyx* 5-toothed, 2-lipped, enlarging in fruit. *Corolla-tube* exserted, long or short, decurved or straight; limb gibbous or less often straight, 2-lipped; lower lip entire, long boat-shaped; upper short, 3- to 4-fid, recurved. *Stamens* 4, declinate; filaments combined below into a sheath around the style; anther-cells usually confluent. *Disk* usually produced anteriorly. *Style* usually 2-fid. *Nutlets* orbicular, oblong or ovoid, smooth, granulate or punctate.—*DISTRIB.* Species about 80, in the Tropics of the Old World and in Australia.

COLEUS ATROPURPUREUS, Benth. in Wall. Pl. As. Rar. II. 16 (1831). A herb 2 to 3 ft. high, everywhere finely pubescent. *Leaves* opposite, membranous, dark-green above, rather closely puberulous on the nerves, elsewhere sparingly so, paler beneath and pubescent on the main and

secondary nerves, ovate-acute, with entire rounded rarely cuneate base, and short, entire, blunt apex; margins elsewhere rather widely crenate; 2 to 4 in. long, 1.25 to 1.75 in. wide; petiole 1 to 2 in. long. *Flowers* in irregularly branched cymes disposed in stoutish thyrses 3 to 6 in. long, 1.5 in. across; bracts ovate-acute, pubescent, .15 in. long, deciduous. *Calyx* in fruit .2 in. long, sparingly gland-dotted; pedicels .2 in. long, pubescent; the two lower teeth subulate, the two lateral oblong-obtuse, shorter than the upper ovate-subacute. *Corolla* blue and white, .35 in. long; the tube abruptly decurved, shorter than the lower lip; upper lip very short. *Filaments* connate far beyond point of attachment to corolla-tube. *Nutlets* orbicular, brown, almost shining. Benth. Lab. Gen. & Spec. 54 and in DC. Prodr. XII. 74; Wall. Cat. 2733; Nunes Fl. Filip. t. 208; Miq. Fl. Ind. Bat. II. 951; Hook. f. Fl. Br. Ind. IV. 626.

In most of the Provinces.—DISTRIB. Malay Archipelago; Philippines; Polynesia.

6. POGOSTEMON, Desf.

Herbs or undershrubs, often strongly scented. *Leaves* usually opposite. *Flowers* small, in simple or paniculate spikes or contracted racemes formed of many dense-flowered subcapitate whorls. *Calyx* almost equally 5-toothed. *Corolla* 2-lipped; upper lip 3-lobed, the lobes subequal or the central one rather longer and narrower than the lateral ones; the lower lip flat, patent, entire. *Stamens* 4, exserted, straight or declinate, the lower pair rather shorter than the upper; filaments bearded; anther-cells confluent. *Disk* subentire, uniform. *Style* shortly 2-fid, the arms subulate, subequal. *Nutlets* smooth, ovoid or ellipsoid.—DISTRIB. Species about 30, throughout South-eastern Asia.

Leaves membranous, sparingly puberulous or almost glabrous; whorls separated by distinct interspaces throughout the spikes; corolla glabrous externally, except for a few hairs on margin of lower lip 1. *P. Heyneanus*.

Leaves herbaceous, densely pubescent, especially beneath; whorls contiguous throughout the spikes or only the lowest separated by an interspace; corolla uniformly pubescent externally 2. *P. Cablin*.

1. POGOSTEMON HEYNEANUS, Benth. in Wall. Pl. As. Rar. I. 31 (1830). An erect branching herb, 2 to 4 ft. high. *Stems* and branches slender, sparsely pubescent. *Leaves* opposite, thinly membranous, very sparingly puberulous or sometimes almost glabrous on both surfaces,

medium-green above, pale-green beneath, ovate-acute; base wide-cuneate, entire; margin elsewhere crenate, each lobule again crenulate; 2.5 to 4 in. long, 1.5 to 2.75 in. wide; petiole 1 to 1.5 in. long, very sparingly puberulous. *Flowers* in slender, simple or paniculately branching terminal spikes 3 to 6 in. long; whorls at the base .5 to .75 in. apart, gradually more approximate upwards, but those near the apex still .2 to .15 in. apart; whorls .4 in. across; bracts elliptic, acute, sparingly puberulous, .15 in. long or less. *Calyx* .15 in. (in fruit .2 in.) long, sparingly pubescent externally; teeth triangular, one-third the length of the tube, equal and similar. *Corolla* .2 in. long, glabrous externally save for a few hairs on margin of lower lip. *Filaments* exerted, almost straight, all bearded. *Style-arms* short, only one-tenth to one-eighth the length of the style. *Nutlets* wide-ovate, .02 in. long, dark-brown with a paler base, smooth. Benth. Lab. Gen. & Sp. 154, and in DC. Prodr. XII. 153; Wight Ic. t. 1440; Cooke Fl. Bomb. II. 455. *P. Patchowli*, Dalz. & Gibs. Bomb. Fl. Addend. 66 (not *P. Patchouly*, Pellet.). *P. Patchouli*, Hook. f. Fl. Br. Ind. IV. 633 (not *P. Patchouly*, Pellet.).

SINGAPORE: *G. Thomson*. MALACCA: *Griffith*, 3966! SELANGOR: Rawang, *Ridley* 7603! Cultivated or as an escape from cultivation.—DISTRIB. India and Ceylon; where, however, it is only known as a cultivated plant or as an escape from cultivation.

This, the Indian "Patchouli," if one may judge from the specimens communicated, is the plant first introduced to our area on account of its peculiar scent. There is nothing to indicate whether it was formerly at all extensively cultivated; it does not appear to be so now.

2. *POGOSTEMON CABLIN*, Benth. in DC. Prodr. XII. 156 (1848). An erect, rather stout, branching undershrub, 2 to 5 ft. high. *Stems* and branches stout, distinctly swollen under the nodes, densely hoary-pubescent. *Leaves* opposite, herbaceous, closely densely pubescent on both surfaces, especially beneath, dark-green above, medium-green below, ovate-acute; base shortly cuneate or subtruncate, entire; margin elsewhere usually deeply lobate, the lobes crenate; rarely margin simply crenate or in upper leaves almost entire; 3 to 4 in. long, 2 to 3 in. wide; petiole 1.5 to 2.5 in. long, densely hoary-pubescent. *Flowers* in stout simple spikes terminating the stem and the branches, 1.5 to 4 in. long, the lowest whorl sometimes .5 to .6 in. remote from the next, the rest or all the whorls closely aggregate; whorls .75 in. across or more; bracts elliptic, acute, densely pubescent, .2 to .35 in. long. *Calyx* .2 in. (in fruit .25 in.) long, densely pubescent, especially along the nerves; teeth triangular, one-third the length of the tube,

equal and similar. *Corolla* .3 in. long, the throat and lips uniformly pubescent externally. *Filaments* exserted, almost straight, all bearded. *Style-arms* rather long, one-fifth to one-fourth the length of the style. *Nutlets* not seen ripe. *P. Patchouly*, Pellet. in Mem. Soc. Sc. Orleans V. 277, t. 7. *P. suavis*, Ten. in Giorn. Bot. Ital. II. 56. *P. Patchouli*, Hook. Kew Journ. Bot. I. 328, t. 11. *P. Patchouli* var. *suavis*, Hook. f. Fl. Br. Ind. IV. 634. *Mentha Cablin*, Blanco, Fl. Filip. 473. *M. auricularia*, Blanco Fl. Filip. ed. 2, 329 (not of Linn.).

PERAK: *Wray!* PENANG: *Wallich!* *Curtis!* Cultivated only, in our area.—DISTRIB. Philippines; where, according to Loher, it occurs only in gardens.

This plant seems to flower not infrequently in the Philippines; there are specimens from thence at Kew collected both by Vidal and by Loher. So far as is known, it has flowered only three times in Europe: once in France, recorded by Pelletier (1844); once in Italy, recorded by Tenore (1847); once in England, recorded by Sir W. J. Hooker (1849): Hooker's plant was obtained from Tenore. No flowering specimen has ever been communicated from our area where, according to Wray and Curtis, it is extensively cultivated by Chinese settlers. In the Royal Botanic Garden at Calcutta the plant has been in continuous cultivation since 1834, when Wallich first obtained it from Penang; at Saharanpur, whence it was distributed from the Calcutta Garden, it has also been long in cultivation. At Calcutta and at Saharanpur all attempts to induce the plant to flower have consistently failed.

This, which may be termed the Malayan, as opposed to the original or Indian Patchouli, is not known to be cultivated anywhere in India except in botanical gardens.

There are indications that a third kind of Patchouli plant, the Chinese Patchouli (*Microtoena cymosa*, Prain), had at one time been introduced, not impossibly by Chinese settlers, to Java. But its cultivation has not persisted in the Malayan Archipelago, and there is no indication that it was ever introduced to the Peninsula. The Chinese Patchouli seems at one time to have been cultivated to a considerable extent in North-eastern India, and to have competed in the Calcutta market with the Indian Patchouli (*Pogostemon Heyneanus*). Now, however, the Malayan Patchouli, the product of *Pogostemon Cablin*, appears to have so completely supplanted both the others that neither are offered for sale, and the cultivation of *Pogostemon Heyneanus* is restricted to native gardens in the Indian Peninsula, while that of *Microtoena cymosa* only lingers in a few native gardens in the Khasia Hills.

In commercial samples of the leaves of *Pogostemon Cablin*, various extraneous leaves are to be met with. The chief of these are leaves of *Hyptis suaveolens*, Poit., in our area known as "Ruku," also leaves of *Urena lobata*, Linn., known in our area as "Perpulut." With *Hyptis suaveolens*, and under the same name "Ruku," are associated the leaves of *Ocimum Basilicum*, Linn., var. *pilosum*. These, however, are in much smaller quantity than those of the *Hyptis*.

7. DYSOPHYLLA, Bl.

Herbs. *Leaves* opposite or whorled. *Flowers* minute, in dense long spikes composed of numerous close-set many-flowered cymes. *Calyx* minute, ovoid, 5-toothed; teeth subequal; throat naked within. *Corolla* minute; tube exserted or included, limb equally 4-fid; upper lobe entire or notched, lower spreading. *Stamens* 4, exserted, straight or nearly so; filaments bearded, very long; anther-cells confluent. *Disk* equal, subentire. *Style* 2-fid. *Nutlets* ovoid or oblong, smooth or granulate.—DISTRIB. Species about 15, in Tropics of Old World and Australia.

DYSOPHYLLA AURICULARIA, Blume Bijdr. 826 (1826). A coarse annual herb. *Stems* laxly branched, rarely simple, 1 to 2 ft. high, pubescent with spreading hairs. *Leaves* opposite, membranous, rather pale-green, especially beneath, with numerous scattered hairs above and with similar hairs on the nerves beneath, ovate or oblong-ovate, acute or rarely obtuse, with entire cuneate or rounded base; margins elsewhere coarsely serrate; 1 to 2.75 in. long, .5 to 1 in. wide; petiole .1 to .4 in. long. *Flowers* in villous cylindric terminal spikes 1.5 to 3 in. long, .2 to .35 in. in diam.; whorls of cymes close-set throughout. *Calyx* in fruit .1 in. long, subcampanulate, gland-dotted; teeth subequal, triangular, incurved over the nutlets. *Corolla* .1 in. long, pinkish; tube slender, much exserted; lobes short, pubescent. *Filaments* exserted, densely villous. *Nutlets* ellipsoid, almost smooth. Benth. Lab. Gen. & Sp. 158, in DC. Prodr. XII. 156, and in Wall. Pl. As. Rar. I. 30; Wall. Cat. 1548; Wight Ic. t. 1445; Hook. f. Fl. Br. Ind. IV. 638. *Mentha auricularia*, Linn. Mant. 81; Roxb. Fl. Ind. III. 4; Griff. Notul. IV. 200. *M. fatida*, Burm. Fl. Ind. 126.

In all the provinces.—DISTRIB. Throughout South-east Asia.

8. MENTHA, Linn.

Strongly scented perennial herbs with creeping rootstocks. *Flowers* small, in usually many-flowered terminal spikes or axillary whorls; bracts small or large. *Calyx* tubular or campanulate, 10-ribbed, 5-toothed; teeth subequal. *Corolla-tube* infundibuliform, short; lobes 4, the uppermost rather wider than the other three, emarginate. *Stamens* 4, usually dimorphic, subequal; filaments free, erect, distant; anthers 2-celled; cells parallel. *Disk* entire, uniform. *Style-arms* short, subequal. *Nutlets* ovoid, smooth or reticulate.—DISTRIB. Species variously estimated—perhaps not more than 30 in reality—mainly in North Temperate regions, but some now widely dispersed in all parts of the world.

MENTHA JAVANICA, Blume Bijdr. 826 (1826). A prostrate herb, rooting

below. *Stems* 1 to 2 ft. long, pubescent with reflexed adpressed hairs. *Leaves* opposite, membranous, harshly hairy above, glabrous beneath, rather wide-lanceolate, acute; base long-cuneate, entire; margin elsewhere serrate; 1 to 2 in. long, .25 to .35 in. wide; petiole .25 in. long or shorter; floral leaves like those on the stem below the whorls. *Flowers* in axillary capitate distant whorls; bracts acute, shorter than the flowers. *Calyx* .1 in. long, tubular-campanulate, adpressed-pubescent; teeth lanceolate, acute, longer than the tube. *Corolla* .15 in. long, pubescent. Benth. in DC. Prodr. XII. 173. *M. sativa*, Roxb. Fl. Ind. III. 6 (*hardly of Linn.*). *M. arvensis*, Thw. Enum. Pl. Zeyl. 239; Trim. Fl. Ceyl. III. 381 (*hardly of Linn.*). *M. arvensis* var. *javanica*, Hook. f. Fl. Br. Ind. IV. 648.

MALACCA: *Griffith!*—DISTRIB. Ceylon; Java; Philippines.

Apparently rare, and possibly an introduced plant in our area, seeing that it has never been reported since Griffith met with it. As Sir J. D. Hooker remarks, this, which is Roxburgh's *M. sativa*, may really be a form of *M. sativa*, Linn., and, if so, may only be a state of *M. arvensis*, Linn., to which Boissier refers *M. sativa*, and to which Thwaites refers the present plant. For the purposes of a local flora, however, it seems better to keep this form, which is easily recognized, apart as a distinct species.

9. CALAMINTHA, Mönch.

Herbs or shrubs. *Flowers* small or medium, in dense axillary or loose spicate or racemose or paniced whorls. *Calyx* 13-nerved, 2-lipped; lower lip 2-toothed, teeth narrow; upper lip 3-toothed, teeth wider and more highly connate; throat naked or villous. *Corolla-tube* straight, throat villous; lower lip spreading, 3-lobed; upper lip erect, flattish. *Stamens* 4, didynamous, ascending under upper lip, the upper pair sometimes imperfect; anther-cells parallel or divaricate. *Disk* uniform, entire. *Style-lobes* equal or the upper smaller. *Nutlets* minute, subglobose, smooth.—DISTRIB. Species about 40, in North Temperate regions.

CALAMINTHA GRACILIS, Benth. in DC. Prodr. XII. 232 (1848). A slender prostrate herb. *Stems* 8 to 12 in., faintly puberulous, rooting below. *Leaves* opposite, membranous, glabrous on both sides, dark-green above, paler beneath, ovate-subacute; base rounded or shortly cuneate, entire; margin elsewhere serrate; .4 to .6 in. long, .3 to .5 in. wide; petiole .25 in. long, puberulous. *Flowers* in lax many-flowered whorls in axils of uppermost leaves, and there remote or aggregated in racemose or subcapitate terminal racemes, with rachis sparsely pubescent; bracteoles subulate, finely puberulous, half as long as slender pedicels. *Calyx* .12 in. (in fruit .17 in.) long; tube slightly inflated below; lower teeth subulate, ciliate, incurved; upper lip shortly 3-toothed, recurved; teeth

ovate; pedicels .12 in. long, puberulous. *Corolla* .2 in. long. *Nutlets* .02 in., pale-brown, smooth.

PERAK: Thaiping, *Ridley* 11912!—DISTRIB. Java; Assam.

This species is not included in the 'Flora of British India.' It was obtained by the late Mr. C. B. Clarke, at Dibrugarh in Upper Assam, subsequent to the appearance of the account of the Indian species of this family by Sir Joseph Hooker.

10. SALVIA, Linn.

Herbs, undershrubs or shrubs. *Flowers* small, medium, or large and showy; whorls usually in racemes or spikes; bracts small or large, sometimes coloured. *Calyx* campanulate or tubular, 2-lipped; mouth naked; upper lip entire or 3-toothed; lower lip 2-fid. *Corolla* 2-lipped; tube naked or annulate within; lower lip 3-lobed, the central lobe usually wider than the lateral, entire or emarginate; upper lip erect. *Stamens* 2, the upper pair imperfect, represented by small staminodes or obsolete; filaments short, articulating with a slender connective, and sometimes produced beyond the joint; connective linear, transverse, with an upper ascending arm which bears a linear fertile anther-cell, and a lower straight or deflexed arm bearing a cell which may be empty or fertile or bearing no cell. *Disk* usually enlarged anteriorly. *Style* shortly 2-fid; the lobes usually subulate, equal or the lower larger, sometimes flattened. *Nutlets* ovoid, somewhat triquetrous, smooth.—DISTRIB. Species about 450, cosmopolitan.

Flowers rather large, showy; corolla-tube long, far exerted .. 1. *S. coccinea*.
Flowers minute, inconspicuous; corolla-tube short, not exerted .. 2. *S. plebeia*.

1. SALVIA COCCINEA, Juss. ex Murr. in Comm. Gott. I. 86, t. 1 (1778). A slender herb, 1 to 3 ft. high. *Stems* numerous, 4-angled, ascending, often branched, finely pubescent. *Leaves* opposite, membranous, glabrous above, finely white-pubescent beneath, dark-green, ovate- or cordate-acute, crenate except the base; 1 to 1.5 in. long, .75 to 1 in. wide; petiole slender, finely puberulous, .6 to .8 in. long. *Flowers* in 6- to 10-flowered remote whorls disposed in terminal racemes; bracts ovate-acuminate, deciduous; pedicels .12 in. long, slender, puberulous. *Calyx* .25 in. (in fruit .35 in.) long, pubescent, striate, narrowly campanulate; upper lip entire, obtuse; lower 2-fid; the lobes acute. *Corolla* .75 in. long, red; tube straight, much exerted, widened upwards; lower lip spreading, 3-fid; upper lip short, erect. *Nutlets* .08 in. long, very narrowly oblong, smooth, brown, shining. Linn. f. Suppl. 88; Benth. in DC. Prodr. XII. 343; Hook. f. Fl. Br. Ind. IV. 656. *S. Gerardiana*, Benth. in Wall. Cat. 2150.

SINGAPORE: *Kurz!* MALACCA: *Maingay* 1167! 1778! ANDAMANS: Port Blair, *Kurz!*—DISTRIB. America, where indigenous; Africa and South-east Asia, where generally cultivated and often as an escape from gardens.

2. *SALVIA PLEBEIA*, R. Br. Prodr. 501 (1810). An erect herb, 6 to 18 in. high. *Stems* obtusely 4-angled, grooved, hoary-pubescent. *Leaves* opposite, membranous, sparsely hirsute or nearly glabrous, oblong-ob lanceolate, obtuse or subacute; base usually cuneate, entire; margin elsewhere irregularly crenate; 2 to 4 in. long, .75 to 1.75 in. wide; petiole 1 to 2 in. long. *Flowers* in paniculate or subthyrsoid, interrupted, pubescent, spicate racemes; bracts small, linear-spathulate; pedicels short. *Calyx* .1 to .12 in. (in fruit .18 to .2 in.) long, campanulate, 2-lipped; upper lip obtuse, entire, lower 2-fid; the lobes acute or subacute. *Corolla* small, .15 in. long, whitish; lower lip 3-lobed, the mid-lobe exceeding the lateral ones; upper lip oblong, obtuse. *Nutlets* .04 in. long, ovoid, smooth, brown. Benth. Lab. Gen. & Sp. 309, and in DC. Prodr. XII. 355; Miq. Fl. Ind. Bat. II. 970; Hook. f. Fl. Br. Ind. IV. 655. *S. brachiata*, Roxb. Fl. Ind. I. 145; Wall. Cat. 2149.

MALACCA: perhaps also in some of the other provinces.—DISTRIB. South-east Asia generally; Australia. A very common Indian field-weed, but in our area apparently extremely rare and perhaps only introduced.

11. SCUTELLARIA, Linn.

Herbs or undershrubs. *Flowers* often in long narrow racemes. *Calyx* campanulate, 2-lipped; lips closed in fruit, ultimately free to the base, the upper at length deciduous, with a deciduous dorsal scale or pouch, the lower persistent. *Corolla* 2-lipped; tube long, usually abruptly recurved beyond the calyx and ascending, dilated at the throat, not annulate within; lower lip wide, 3-lobed, the lateral lobes small and often connate with upper lip, which is erect, galeate, entire or notched. *Stamens* 4, didynamous, the upper pair shorter, ascending under the hooded upper lip; anthers connivent, ciliate, those of upper stamens 2-celled, of lower 1-celled. *Disk* elongate. *Style* 2-fid; upper lobe very short. *Nutlets* subglobose, smooth, granulate or hispidulous.—DISTRIB. Species about 90, mainly in the Northern Hemisphere.

| | | |
|---|---------|---------------------------|
| Pubescent; leaves purple beneath; corolla pale-blue | .. | 1. <i>S. discolor</i> . |
| Glabrous; leaves green beneath; corolla dark-blue, with white centre of lower lip | .. .. . | 2. <i>S. andamanica</i> . |

1. SCUTELLARIA DISCOLOR, Colebr. in Wall. Pl. As. Rar. I. 66 (1830). A slender pubescent herb. *Stems* ascending from a creeping rootstock, 1 to 2 ft. high; rarely branched, often naked above. *Leaves* opposite, and crowded towards the base of the stem, pubescent on both sides, often purple beneath, elliptic, obtuse; base rounded or cordate; margin crenate; 1·5 to 4 in. long, ·75 to 2·5 in. wide; petioles 1 to 3 in. long. *Flowers* disposed in slender racemes 2 to 8 in. long; rachis pubescent; bracts ·1 to ·15 in. long; pedicels ·1 in. long. *Calyx* ·12 in. (in fruit ·2 in.) long, pubescent. *Corolla* pale-blue, faintly puberulous externally, ·5 to ·6 in. long; tube ·4 in. long; throat somewhat dilated; lower lip 3-lobed; upper lip galeate, obtuse. *Nutlets* ·03 in. long, scabrid. Benth. in DC. Prodr. XII. 417; Hook. f. Fl. Br. Ind. IV. 667. *S. indica*, Blume Bijdr. 839; Wall. Cat. 2134 (not of Linn.). *S. heteropoda*, Miq. Fl. Ind. Bat. II. 972.

PERAK: *Scortechini*. — DISTRIB. India; Indo-China; Malay Archipelago.

2. SCUTELLARIA ANDAMANICA, Prain Journ. As. Soc. Beng. LIX. ii. 307 (1890). A slender glabrous undershrub. *Stems* many from a woody rootstock with clustered rootlets, 8 to 10 in. high, simple or branched. *Leaves* opposite, rather few, oblong-lanceolate, obtuse; base long-cuneate, entire; margin elsewhere crenate-dentate; 1·5 to 1·75 in. long, ·4 to ·6 in. wide; petiole 1 to 1·5 in. long. *Flowers* opposite above, in whorls of three below, in slender racemes 3 to 4 in. long; bracts ·12 in. long; pedicels ·12 in. long. *Calyx* ·12 in. (in fruit ·2 in.) long, glabrous. *Corolla* blue, with centre of lower lip white; ·6 in. long; throat little dilated; lower lip 3-lobed; upper lip galeate. *Nutlets* ·04 in. long, scabrid, pale-brown. Ann. Roy. Bot. Gard. Calc. IX. i. 56, t. 71 A.

ANDAMANS: Port Blair, in stream beds, not uncommon.

12. ANISOMELES, R. Br.

Herbs, with tall coarse branching *stems*. *Flowers* medium, in axillary whorls, or in lax branching paniculate cymes. *Calyx* ovoid or tubular, straight, equally 5-toothed. *Corolla-tube* short, annulate within; lower lip 3-lobed, broad and patent, the mid-lobe retuse or notched; upper lip entire, erect. *Stamens* exerted; anthers connivent, those of the lower and longer pair dimidiate; of the shorter upper pair 2-celled; the cells parallel, transverse. *Disk* equal. *Style* subequally 2-fid. *Nutlets* smooth.—DISTRIB. Species about 8, South-eastern Asiatic and Australian.

Stems and branches acutely 4-angled, softly pubescent to glabrate; corolla pale-purple; calyx-teeth about as long as the tube 1. *A. ovata*.

Stems and branches obtusely 4-angled, densely white woolly; corolla dark-purple; calyx-teeth much shorter than the tube .. 2. *A. malabarica*.

1. ANISOMELES OVATA, R. Br. in Ait. Hort. Kew. ed. 2, III. 364 (1811). A stoutish shrubby plant, with acutely 4-angled stems and branches, 2 to 5 ft. high, sparingly hairy to densely pubescent or almost woolly. Leaves opposite, thickly herbaceous, uniformly hairy to woolly-tomentose on both sides, rather pale-green; ovate-acute with entire truncate, rounded, or subcordate, less often shortly cuneate base; margin elsewhere crenate-serrate; 1.5 to 4 in. long, 1 to 2.25 in. wide, rarely rather larger low down on the stem; petiole .6 to 1.5 in. long. Flowers in dense whorls, distant below, approximate above in a dense spicate inflorescence; in fruit the cymes sometimes subsecundly explanate; bracts .15 to .2 in. long, linear, beset with long firm hairs. Calyx .25 in. (in fruit .35 in.) long, subsessile, hirsute with firm hairs; teeth lanceolate, acute, almost as long as tube, hairy within and without, ciliate. Corolla .6 in. long, light-purple with blue lower lip; tube .2 in. long; lower lip 4-lobed from deep division of the middle segment into two oblong lobes; the lateral lobes small, rounded; upper .25 in. long, oblong, entire. Filaments hirsute. Nutlets .1 in. long, wide-ovate, subcompressed; inner face bluntly angular, outer rounded, smooth, shining, nearly black. Wall. Cat. 2040; Jacq. Eclog. I. t. 86; Hook. Bot. Misc. II. 358, Suppl. t. 19; Benth. in Wall. Pl. As. Rar. I. 59, and in DC. Prodr. XII. 455; Wight Ic. t. 865; Miq. Fl. Ind. Bat. II. 975; Hook. f. Fl. Br. Ind. IV. 672. *A. disticha*, Heyne in Roth Nov. Sp. 254; Roxb. Fl. Ind. III. 2. *A. glabrata*, Benth. in Wall. Cat. 2041. *A. mollissima*, Wall. Cat. 2039. *A. indica*, O. Kuntze Rev. Gen. 512. *Nepeta indica*, Linn. Sp. Pl. 571. *N. amboinica*, Linn. f. Suppl. 273. *N. disticha*, Blume Bijdr. 823. *Ballota disticha*, Linn. Mant. 83. *B. mauritiana*, Pers. Syn. II. 126. *Ajuga disticha*, Roxb. Fl. Ind. III. 2. *Marrubium indicum*, Burm. Fl. Ind. 127. *M. odoratissimum*, Burm. Thes. Zeylan. t. 71, f. 1. *Monarda zeylanica*, Burm. Fl. Ind. 12.

In all the provinces, in waste places.—DISTRIB. South-eastern Asia generally; China.

A very variable plant as regards tomentum; the extreme forms being *A. glabrata*, Benth., which is only sparsely hairy, and *A. mollissima*, Wall., which is densely softly woolly-pubescent. The two forms mentioned are probably deserving of separation as varieties; intermediate states, however, occur.

2. ANISOMELES MALABARICA, R. Br. in Bot. Mag. t. 2071 (1819). An erect shrubby plant, with obtusely 4-angled stems and branches, 4 to 6 ft. high, densely tomentose or thickly woolly. Leaves opposite, very thickly herbaceous, pale-green above, white below, uniformly softly woolly tomentose, oblong-lanceolate, acute, with entire rounded or shortly cuneate base; margin elsewhere crenate-serrate; 2.5 to 4 in. long, .75 to 1.75 in. wide; petiole .5 in. long, stout, softly woolly. Flowers in dense whorls, distant below, approximate above, often 1.25 in. across, forming an interrupted spicate inflorescence; bracts .4 to .5 in. long, linear, acute, densely softly woolly. Calyx .3 in. (in fruit .4 in.) long, subsessile, densely villous; teeth about half as long as tube, narrowly lanceolate, acute, villous externally and internally, ciliate. Corolla .8 in. long, dark-purple, somewhat pubescent externally; tube .35 in. long; lower lip 4-lobed from deep division of the middle segment into 2 oblong obtuse lobes; upper lip .35 in. long, obtuse. Filaments pubescent. Nutlets .12 to .15 in. long, ellipsoid, compressed, inner face faintly angled, outer rounded, smooth, shining, brown. Wall. Cat. 2037; Hook. Journ. Bot. I. 225, t. 127; Wight Ic. t. 864; Benth. in Wall. Pl. As. Rar. I. 59, in Lab. Gen. & Sp. 704, and in DC. Prodr. XII. 456; Hook. f. Fl. Br. Ind. IV. 673. *A. intermedia*, Wight in Benth. Lab. Gen. & Sp. 703; DC. Prodr. XII. 456. *Nepeta malabarica*, Linn. Mant. 566. *Ajuga fruticosa*, Roxb. Fl. Ind. III. 1.

PENANG: Wallich 2037! Ayer Etam, Tat's Corner, Curtis 3741!—DISTRIB. Drier parts of India and Ceylon; Mauritius, where it is probably an introduced species.

The fact that this plant is in our area confined, so far as is known, to Penang, makes it not improbable that we have here to deal with an introduced species. It is a common and characteristic plant of the Deccan and of the drier region of Ceylon, but does not occur elsewhere in India.

13. LEONOTIS, R. Br.

Herbs or shrubs, usually tall and coarse. Flowers large, in many-flowered axillary whorls; bracts numerous, slender. Calyx 10-nerved; tube often incurved; mouth oblique, with 8 to 10 rigid teeth, the uppermost longer than the rest. Corolla-tube included or exerted; lower lip small, 3-lobed, the mid-lobe largest; upper lip long, concave, villous above. Stamens 4, didynamous, ascending under upper lip, lower pair longer; anthers connivent; the cells divaricate. Disk equal. Style subulate, with very short upper lobe. Nutlets obovoid or oblong or ovoid, truncate or rounded at the apex, glabrous.—DISTRIB. Species about 12, mostly confined to Africa, the present one occurring also in Asia and America, where probably it was originally introduced.

LEONOTIS NEPETIFOLIA, R. Br. in Ait. Hort. Kew. ed. 2, III. 409 (1811). A tall erect annual herb, 4 to 7 ft. high, with stout obtusely thickly 4-angled *stems* deeply furrowed between the angles, finely pubescent. *Leaves* opposite, membranous, ovate-acute; base shortly cuneate and decurrent on the petiole, entire; margin elsewhere coarsely crenate-serrate, finely pubescent above and below, 2·5 to 6 in. long, 1·5 to 4 in. wide; petiole 1 to 4 in. long, winged near apex. *Flowers* in dense globose, axillary, many-flowered whorls 1·5 to 2·5 in. across; floral leaves lanceolate, deflexed; bracts linear, strongly spinescent at the apex, deflexed, pubescent, the longest ·5 in. long or longer. *Calyx* ·6 in. (in fruit ·75 in.) long, tubular, incurved, strongly ribbed, puberulous below, densely pubescent above, where also hispid with long white hairs, reticulately veined within, glabrous; teeth 8 to 9, unequal, the uppermost ·35 in. long, ovate-acute, much exceeding the triangular others, all with spinescent tips. *Corolla* 1 in. long, orange-scarlet; tube ·5 in. long, glabrous near base, densely beset above with orange-scarlet pubescence, 3-annulate within with transverse bands of white hairs; lower lip ·15 to ·2 in. long, with 3 oblong obtuse lobes, the mesial rather the largest; upper lip ·5 in. long, densely villous with orange-scarlet hairs. *Nutlets* ·15 in. long, oblong-obovoid, obliquely truncate and pitted at apex. Benth. in Wall. Pl. As. Rar. I. 59, in Lab. Gen. & Sp. 618, and in DC. Prodr. XII. 535; Wall. Cat. 2042; Wight III. II. t. 176 B; Wight Ic. t. 867; Bot. Reg. t. 281; Bot. Mag. t. 3700; Miq. Fl. Ind. Bat. II. 984; Hook. f. Fl. Br. Ind. IV. 691. *Phlomis nepetifolia*, Linn. Sp. Pl. 586; Roxb. Fl. Ind. III. 8 (sph. *repetifolia*).

In some of the provinces, as an escape.—DISTRIB. Tropical Africa, where probably indigenous, but also widespread in South-eastern Asia and occurring in Tropical America.

14. LEUCAS, R. Br.

Herbs or undershrubs. *Flowers* medium or small, in dense axillary, usually distant, less often terminal whorls. *Calyx* 10-nerved, often striate; mouth equal or oblique; teeth 6 to 10, usually unequal. *Corolla-tube* not exerted, annulate or not within; lower lip 3-fid, spreading, mid-lobe large; upper lip erect, concave, villous externally. *Stamens* 4, didynamous, the upper pair shorter, ascending under upper lip; anthers connivent; cells divaricate, ultimately confluent. *Disk* entire or lobed, uniform or enlarged anteriorly. *Style* subulate; upper lobe minute or obsolete. *Nutlets* ovoid, triquetrous, obtuse.—DISTRIB. Species about 100, chiefly in Tropics of Old World.

- Whorls numerous, distant, axillary; calyx-teeth long, slender; corolla small; tube not annulate within 1. *L. martinicensis*.
- Whorls few, usually all or nearly all terminal; calyx-teeth short; corolla medium; tube annulate within near the middle:—
- Whole plant sparingly beset with hispidulous hairs; calyx-mouth obliquely campanulate, not contracted; teeth erect .. 2. *L. zeylanica*.
- Whole plant smooth, finely puberulous; calyx-mouth projecting above in a large triangular lip, with the small teeth ascending along its margins, the mouth below forming a rounded sinus 3. *L. lavandulifolia*.

1. *LEUCAS MARTINICENSIS*, R. Br. Prodr. 504 (1810). A tall, stout, annual herb, 2 to 4 ft. high, more or less branched. *Stem* and branches hirsute, 4-angled and 4-grooved, angles rounded. *Leaves* opposite, membranous, hirsute above and below, ovate, oblong or wide-lanceolate, obtuse; base cuneate, rarely rounded, entire; margin elsewhere widely and rather deeply crenate; 2·5 to 3·5 in. long, 1 to 1·75 in. wide; petiole hirsute, 4 to 7 in. long. *Flowers* sessile, in numerous, distant, axillary, globose, many-flowered whorls which are 75 to 1·25 in. across; the floral leaves decreasing upwards, especially in width of blade and length of petiole; bracteoles green, 25 to 35 in. long, narrowly linear-lanceolate or subulate, spinescent at their tips with pale slender awns. *Calyx* 4 in. (in fruit 6 in.) long, tubular, sigmoid, pubescent externally; tube within glabrous and closely reticulate; mouth with a few short villi within, oblique; teeth 10, all lanceolate, ciliate, with fine spinescent tips; the uppermost largest, 2 in. long; the others alternately longer and shorter, 1 and 12 in. long. *Corolla* white, small, 35 in. long; tube 2 in. long, not annulate within; lower lip spreading, the lateral lobes oblong rounded, wider than the oblong 2-fid central; upper lip erect, white-villous. *Nutlets* 1 in. long, obovoid-oblong, obliquely truncate at apex, angular on inner face, rounded on outer, dark-brown, shining. Benth. in Wall. Pl. As. Rar. I. 60, in Lab. Gen. & Sp. 617, and in DC. Prodr. XII. 533; Miq. Fl. Ind. Bat. II. 983; Hook. f. Fl. Br. Ind. IV. 688. *L. polycephala*, Wall. Cat. 2051. *Phlomis martinicensis*, Sw. Prodr. Veg. Ind. Occ. 88.

PERAK: in waste places, *Scortechini*!—DISTRIB. Tropical America; Tropical and South Africa; India and Indo-China.

An introduced and as yet apparently a rare plant in our area.

2. *LEUCAS ZEYLANICA*, R. Br. Prodr. 504 (1810). An erect annual herb, 6 to 20 in. in height, simple or branched. *Stems* and branches 4-angled, hispidulous with scattered spreading hairs. *Leaves* opposite, decussate, membranous, dark-green above, uniformly but sparsely beset

with spreading hispidulous hairs, paler and subglaucescent beneath, with spreading hispidulous hairs on the nerves, the hairs on both sides curved towards leaf-apex, ovate-lanceolate, or occasionally lanceolate, acute; base long-cuneate, entire; margin elsewhere entire or remotely and sparingly serrate; 1·5 to 3 in. long, ·25 to ·5, rarely ·75 in. wide; petiole ·1 to ·2 in. long, hispidulous. *Flowers* sessile or subsessile, in terminal usually 6- to 8-leaved whorls ·5 to ·75 in. across, occasionally also axillary whorls occur below; bracts ·25 in. long, linear, spinescent, hispidulous along the margin with stiff spreading hairs. *Calyx* ·2 in. (in fruit ·3 in.) long, turbinate, slightly curved; the tube below glabrous or faintly pubescent externally, above beset with scattered, spreading, hispidulous hairs; the mouth subcampanulate, oblique, distinctly transversely veined between the 10 nerves, and sparingly pubescent within with short white hairs, the uppermost of which project beyond the limb; teeth 8, the uppermost ·05 in. long, slightly longer than the others, all subulate, spinescent at the tip. *Corolla* white, medium, ·5 in. long; tube ·25 in. long, glabrous below, enlarged upwards where pubescent externally, annulate within near the middle; lower lip patent, the mid-lobe large, shortly widely clawed, the lateral lobes small; upper lip obovate, white-woolly. *Nutlets* ·15 in. long, obovoid-oblong; apex subtruncate; inner face angular, outer rounded; dark-brown or black, shining. Benth. in Wall. Pl. As. Rar. I. 60, in Lab. Gen. & Sp. 614, and in DC. Prodr. XII. 531; Wight Ill. t. 176; Hook. f. Fl. Br. Ind. IV. 689. *L. involucrata*, Benth. in Wall. Cat. 2047. *L. dimidiata*, Benth. in DC. Prodr. XII. 532 (*probably not of Spreng. Syst. II. 743*). *L. nutans*, Benth. in Wall. Pl. As. Rar. I. 60 (*not of Spreng.*); Wall. Cat. 2523 (*not of Spreng.*). *L. malayana*, Hance in Walp. Ann. III. 269. *L. bancana*, Miq. Fl. Ind. Bat. Suppl. 572; Hallier f. Ann. Jard. Bot. Buitenz. XIII. 293. *L. aspera*, Hook. f. Fl. Br. Ind. IV. 690 (*in part; not of Spreng.*). *Phlomis zeylanica*, Linn. Sp. Pl. ed. 2, 820. *Leonurus Marrubiastrum*, Burm. Fl. Ind. 127 (*not of Linn.*).

SINGAPORE: in waste places, frequent, *G. Thomson!* Kurz 2906! *Deschamps!* MALACCA: *Griffith!* — *DISTRIB.* Throughout South-eastern Asia.

3. *LEUCAS LAVANDULIFOLIA*, Smith in Rees Cyclop. XX. n. 2 (1819). An erect, slender, annual herb, 1 to 2 ft. high, usually branching. *Stems* and branches 4-angled, finely adpressed-puberulous. *Leaves* opposite, herbaceous, finely puberulous on both surfaces, rather pale-green, linear-lanceolate, less often lanceolate, subacute; base tapering gradually from about the middle, entire; margin elsewhere entire in linear-lanceolate leaves, sometimes remotely and sparingly serrate in lanceolate ones; petiole usually very short or obsolete, rarely as much as ·35 in. long.

Flowers subsessile or shortly pedicelled, in axillary and terminal but always leafy whorls, and always towards apex of stem and branches, .4 to .6 in. across; bracts .2 to .3 in. long, narrowly linear, subsperescent, finely puberulous. *Calyx* .35 in. (in fruit .45 in.) long behind, .2 to .25 in. long in front, sparingly puberulous or glabrous externally; tube curved; mouth pubescent within with adpressed white short hairs, contracted, very oblique, rounded below, and forming above a large acute lobe much produced forward and tipped by a minute spinescent tooth; the remaining teeth variable in number, also minute, distant, erect along the oblique margin, usually 3, occasionally 4, sometimes only 2 on each side, with often a small tooth in the centre of the rounded sinus opposite the acute posterior lobe. *Corolla* white, medium, .5 in. long; tube .25 in. long, annulate within near the middle; lower lip patent, the mid-lobe large, obovate, rounded, lateral lobes small; upper lip oblong, white-woolly. *Nutlets* .12 in. long, oblong, rounded at apex; inner face angular, outer rounded; pale-brown, dull. *L. linifolia*, Spreng. Syst. II. 743 (1825); Wall. Cat. 2048; Benth. in Wall. Pl. As. Rar. I. 60, in Lab. Gen. & Sp. 617, and in DC. Prodr. XII. 533; Miq. Fl. Ind. Bat. II. 983; Hook. f. Fl. Br. Ind. IV. 690. *Phlomis linifolia*, Roth Nov. Sp. 260 (1821). *P. zeylanica*, Roxb. Fl. Ind. III. 9; Jacq. Ic. Pl. Rar. I. 11, t. 111 (not of Linn.). *Leonurus indicus*, Burm. Fl. Ind. 127. *Herba admirationis*, Rumph. Herb. Amboin. VI. t. 16, f. 1.

PENANG: Penara Bukit, *Curtis* 1115! SINGAPORE: in cultivated ground, *G. Thomson*! *Kunstler* 48!—DISTRIB. South-eastern Asia generally; Mascarenes (Madagascar, Mauritius, Réunion, Seychelles).

The calyx-mouth of this species has been described in works of much authority as glabrous within; it is pubescent within.

15. LEONURUS, Linn.

Stout, erect, leafy herbs, with lobed *leaves*. *Flowers* small, in densely congested, axillary distant whorls. *Calyx* turbinate, 5-nerved, with 5 spreading spinescent teeth. *Corolla-tube* naked or annulate within; lower lip 3-fid, with obcordate mid-lobe; upper lip entire, erect. *Stamens* 4, didynamous, ascending under upper lip, lower pair longer; anthers connivent; the cells parallel, transverse. *Disk* uniform. *Style* equally 2-fid; the lobes obtuse or subulate. *Nutlets* smooth, dry, truncate at the apex.—DISTRIB. Species 10; almost cosmopolitan.

LEONURUS SIBIRICUS, Linn. Sp. Pl. 584 (1753). A rather coarse annual herb, with obtusely 4-angled, furrowed, usually softly pubescent *stems*, 2 to 6 ft. high. *Leaves* opposite, herbaceous, palmatipartite, with linear incised segments, dark-green and glabrous or nearly so

above, paler and more or less pubescent on the nerves beneath; 1·5 to 4 in. long, 1 to 3 in. wide; petiole 1 to 2 in. long. *Flowers* in axillary whorls; the upper floral leaves usually entire; bracts ·5 in. long, spinescent. *Calyx* ·25 in. (in fruit ·35 in.) long, glabrous or sparingly pubescent; tube ·2 in. long; teeth spinescent from a shortly triangular base. *Corolla* ·4 to ·5 in. long, red; tube ·25 in. long, annulate within; lower lip 3-lobed, mid-lobe obcordate, the lateral lobes rounded; upper lip obovate, galeate, entire, pubescent. *Filaments* exerted. *Nutlets* ·1 in. long, triquetrous, truncate. Wall. Cat. 2071; Benth. in DC. Prodr. XII. 501; Miq. Fl. Ind. Bat. II. 978; Hook. f. Fl. Br. Ind. IV. 678. *L. tataricus*, Burm. Fl. Ind. 127; Roxb. Fl. Ind. III. 8 (*not of* Linn.)

In some of the provinces, in waste places; an introduced weed of waysides and waste places.—**DISTRIB.** Originally Asiatic, now almost cosmopolitan.

Though described by Bentham, and by Hooker, *l.c.*, as not annulate, the corolla-tube of this species is distinctly annulate within. The annulus is slightly oblique, rather higher anteriorly, and is slightly imperfect, there being a small hiatus behind where the style comes in contact with the corolla-tube.

16. PARAPHLOMIS, Prain.

Herbs or shrubs. *Leaves* membranous. *Flowers* medium, yellow or whitish, in dense axillary, many-flowered whorls; bracteoles numerous, filiform. *Calyx* 10-nerved, equally 5-toothed; tube slightly incurved. *Corolla-tube* annulate within; upper lip erect, pubescent externally, quite glabrous within; lower lip spreading, 3-lobed. *Stamens* 4, ascending under upper lip, lower pair longer; all filaments without basal appendages; anthers connivent; cells divaricate. *Disk* uniform, entire. *Style* 2-fid, lobes subequal or the upper shorter than lower. *Nutlets* obovoid, triquetrous below, rounded above, glabrous.—**DISTRIB.** Species 3; two Malayan, one extending from the Eastern Himalaya to the Philippines.

PARAPHLOMIS RUGOSA, Prain in Ann. Roy. Bot. Gard. Calc. IX. i. 60 (1901). A coarse shrubby plant, 2 to 3 ft. high. *Stems* stout or slender, minutely hirsute with deflexed hairs. *Leaves* opposite, membranous, dark-green above, paler beneath, glabrous or with minute scattered hairs on the upper surface, elliptic or oblong-ovate, acuminate; base cuneate or truncate, entire; margin elsewhere shortly toothed, 6 to 8 in. long, 3 to 4 in. wide; petiole slender, 2 to 4 in. long. *Flowers* in small distant or rather approximate whorls, axillary and

also often many on the stem below the leaves, .75 to 1.25 in. across; bracteoles filiform, glabrescent, rather shorter than the calyx, .3 in. long. *Calyx* .4 in. (in fruit .5 in.) long, obconic-campanulate; tube slightly curved forwards, glabrous upwards where thickly membranous, usually hispid towards the coriaceous base; teeth 5, slender, lanceolate, from a triangular membranous base, two-thirds the length of the tube, glabrous. *Corolla* pale-yellow or white, 1 in. long, with a distinct annulus within; both lips pubescent externally; lower 3-lobed with oblong mid-lobe and lanceolate lateral lobes; upper narrow, rounded at apex, half the length of the tube, glabrous within. *Filaments* all devoid of basal appendages. *Style-arms* subequal. *Nutlets* .25 in. long, obovoid, acute below and triquetrous, rounded above, glabrous. *Phlomis rugosa*, Benth. in Wall. Cat. 2067, in Wall. Pl. As. Rar. I. 63, in Lab. Gen. & Sp. 634, and in DC. Prodr. XII. 545; Hook. f. Fl. Br. Ind. IV. 693; Prain Ann. Roy. Bot. Gard. Calc. III. 231; IX. i. 60. *Gomphostemma membranifolium*, Miq. Fl. Ind. Bat. II. 988.

PERAK: Kinta, on limestone rocks, *King's Collector (Kunstler) 7095!* *Scortechini!*—DISTRIB. Eastern Himalaya; Indo-China; Malay Archipelago; Philippines.

The specific name applied to this plant by Mr. Bentham is, as Sir Joseph Hooker remarks, wholly inapplicable. Its characters are so different from those of the genus *Phlomis*, and its habit so unlike that of any member of that genus, that it is necessary to consider it the type of a distinct genus.

17. GOMPHOSTEMMA, Wall.

Coarse, stellately pubescent or tomentose perennial herbs or shrubs. *Roots* sometimes tuberous. *Flowers* large or medium, in 6- to 24-flowered whorls, sessile and densely or peduncled and laxly cymose; bracteoles lanceolate or linear. *Calyx* campanulate, 10-nerved, subequally 5-toothed. *Corolla-tube* slender; throat inflated; limb 2-lipped; lower lip spreading, broadly 3-lobed; upper lip galeate, entire or emarginate. *Stamens* 4, pubescent, the lower longer, all ascending; anthers connivent in pairs, 2-locular; cells transverse, parallel. *Disk* subequal or gibbous behind. *Style* 2-fid; the lobes subulate, the anterior slightly the longer. *Nutlets* drupaceous, glabrous or pubescent, the pericarp usually fleshy and white, with a broad hilum; rarely all developed.—DISTRIB. Species 26, South-eastern Asiatic.

Corolla with almost straight tube and narrow throat; calyx-tube hispidly hairy within; ovary glabrous; nutlets solitary, glabrous (§ STENOSTOMA):—

- Calyx-teeth triangular, much shorter than the tube; whorls few-flowered, densely congested; flowers yellow 1. *G. microcalyx*.
- Calyx-teeth linear-subulate, longer than the tube; whorls many-flowered, laxly cymose; flowers yellow 2. *G. crinitum*.
- Corolla with distinctly incurved tube and wide-campanulate throat; nutlets 4 (§ EUGOMPHOSTEMMA):—
- Calyx-tube hirsute within, ribbed, green; ovary villous; nutlets hispid at apex:—
- Corolla yellow; style hirsute; calyx-teeth longer than tube 3. *G. Scortechinii*.
- Corolla white; style usually glabrous; calyx-teeth not longer than tube 4. *G. oblongum*.
- Calyx-tube glabrous within, not ribbed, reddish; corolla white; nutlets quite glabrous, punctulate 5. *G. Curtisii*.

Sect. 1. STENOSTOMA, Prain. *Corolla-tube* straight, glabrous within, longer than the calyx, the limb narrow, the lips small. *Nutlets* usually solitary, smooth.

1. GOMPHOSTEMMA MICROCALYX, Prain Journ. As. Soc. Beng. LIX. ii. 316 (1890). A coarse perennial herb, 3 to 5 ft. high. *Stems* stout, erect, sulcate, woody, hoary-pubescent or scabrid. *Leaves* opposite, herbaceous, dark-green above, hoary beneath, finely closely stellate-pubescent on both surfaces, oblong-ovate, acute; base cuneate, entire; margin elsewhere entire or widely and minutely toothed; 4·5 to 6 in. long, 3 to 3·5 in. wide; petiole of lower leaves 1·5 to 2 in., of upper leaves ·5 in. long, scabrid. *Flowers* in dense, few-flowered whorls in the axils of the lower leaves and on the bare stem below the leaves; bracts ovate-lanceolate, entire, ·25 in. long, ·12 in. wide. *Calyx* ·3 in. long; teeth short, triangular, less than half as long as the tube. *Corolla* yellow, 1·25 in. long, slightly puberulous externally; the throat very narrow. *Style* and ovary glabrous. *Nutlets* smooth, glabrous. Ann. Roy. Bot. Gard. Calc. III. 251.

PERAK: Larút, 1800 to 2000 ft. elev., *King's Collector (Kunstler)* 2155! *Scortechini* 842! *Wray* 835! Ulu Bubong, *King's Collector* 10455!

Nearest to *G. parviflorum*, Wall., but with a much smaller calyx with diminutive teeth and a much narrower corolla. *G. parviflorum*, though stated by Bentham, Miquel, and Hooker to occur in Penang, has never been met with in our area. The specimens on which the statement is based were collected by Wallich, who in 1828 issued them as the types (Lith. Cat. n. 2159-1) of his own species *G. crinitum*, to which they most undoubtedly belong. A year later Wallich referred these same specimens (as n. 2158-c) to his own *G. parviflorum*; this quite erroneous afterthought has been accepted by the three authors referred to.

2. GOMPHOSTEMMA CRINITUM, Wall. Cat. 2159 (1828). A coarse perennial herb, 3 to 4 ft. high. *Stems* stout, erect, sulcate, woody,

hoary-pubescent or scabrid. *Leaves* opposite, herbaceous, dark-green, pubescent above, hoary beneath with a close stellate tomentum, or softly pubescent, elliptic-ovate or oblanceolate, acute; base cuneate, entire; margin elsewhere entire or serrate; 8 to 12 in. long, 2.5 to 5 in. wide; petiole .5 to 1.5 in. long, scabrid. *Flowers* in rather lax, rarely condensed, many-flowered axillary cymes; bracts lanceolate, ovate-lanceolate or linear, .5 to .75 in. long. *Calyx* .7 to .75 in. long; teeth long, linear-subulate, considerably longer than the tube. *Corolla* yellow, 1.25 in. long, slightly puberulous externally; the throat narrow. *Style* and ovary glabrous. *Nutlets* smooth, glabrous.

VAR. *typica*. Bracts all lanceolate-acute or linear, almost as long as the calyx; leaves closely tomentose beneath; petioles 1.5 in. long. *G. crinitum*, Wall. Cat. (*uti supra*); Benth. in Wall. Pl. As. Rar. II. 12, in Lab. Gen. & Sp. 648, and in DC. Prodr. XII. 552; Miq. Fl. Ind. Bat. II. 987; Hook. f. Fl. Br. Ind. IV. 698 (*partly*); Prain Ann. Roy. Bot. Gard. Calc. III. 254. *G. parviflorum*, Benth. Lab. Gen. & Sp. 648, and in DC. Prodr. XII. 551; Miq. Fl. Ind. Bat. II. 987 (*not of Wall.*).

PENANG: *Wallich* 2159/1! PERAK: Kampong Kota, *Wray*! Sungei Ujong, *Ridley* 1870!—DISTRIB. Indo-China.

VAR. *Griffithii*, Prain Ann. Roy. Bot. Gard. Calc. III. 254. Outer bracts ovate-lanceolate obtuse, distinctly shorter than the calyx; leaves softly pubescent beneath; petioles .5 in. long.

MALACCA: Mount Ophir and Chabu, *Griffith* 4042! PERAK: Gunong Ijok, *Scortechini* 5! Ulu Kwangsa, *Scortechini* 928!

Sect 2. EUGOMPHOSTEMMA, Prain. *Corolla-tube* incurved, glabrous within, longer than the calyx, the limb campanulate, the lips large. *Nutlets* usually 4, smooth or punctulate.

3. GOMPHOSTEMMA SCORTECHINII, Prain Journ. As. Soc. Beng. LIX. ii. 315 (1890). A coarse perennial herb, 3 to 5 ft. high. *Stems* stout, erect, sulcate, woody, scabrid. *Leaves* opposite, herbaceous, dark-green, sparsely hirsute above, closely tomentose on the nerves, otherwise sparsely tomentose beneath, elliptic-oblong or obovate, acute; base rather long-cuneate; margin entire or serrate; 6 to 12 in. long, 3 to 6.5 in. wide; petiole usually short, sometimes obsolete, occasionally as much as 1 in. long. *Flowers* in many-flowered rather dense axillary whorls; bracts subulate, .2 in. long, as long as the pedicels. *Calyx* .75 in. long, prominently ribbed, hirsute within; teeth lanceolate, longer than the tube. *Corolla* yellow, 2.25 in. long, distinctly incurved, tomentose externally; limb .35 in. wide. *Style* hirsute towards the apex, with spreading hairs; ovary densely villous. *Nutlets* white,

smooth, hispid towards the apex. Ann. Roy. Bot. Gard. Calc. III. 260.

PERAK: Gunong Tujok, *Scortechinii*!; Larút, *Kunstler* 1959!—
DISTRIB. Indo-China.

Very closely related to *G. oblongum*, Wall., of which it appears to be the representative in the Malayan Peninsula. It extends northwards to Tenasserim, and its area thus to some extent overlaps that of *G. oblongum*.

4. GOMPHOSTEMMA OBLONGUM, Wall. Cat. 2154 (1828). A coarse perennial herb, 3 to 5 ft. high. *Stems* stout, erect, woody, somewhat 4-angled, densely tomentose. *Leaves* opposite, herbaceous, dark-green, hispidly hairy above, densely pubescent beneath, elliptic-oblong, acute; base rather abruptly cuneate or subtruncate; margin crenate or crenate-serrate; 6 to 12 in. long, 2 to 3.5 in. wide; petiole .35 to 1 in. long, densely tomentose. *Flowers* in rather dense few-flowered axillary whorls; bracts ovate-lanceolate, .25 in. long. *Calyx* .5 in. long, prominently ribbed, hirsute within; teeth lanceolate, not longer than the tube. *Corolla* white, 1.75 in. long, distinctly incurved, tomentose externally except on the mid-lobe of the lower lip; limb .35 in. wide. *Style* glabrous or, when young, sparingly hirsute; ovary villous. *Nutlets* white, smooth, hispid at the apex. Benth. in Wall. Pl. As. Rar. II. 12, in Lab. Gen. & Sp. 648, and in DC. Prodr. XII. 551 (*partly*); Miq. Fl. Ind. Bat. II. 986 (*partly*); Hook. f. Fl. Br. Ind. IV. 697; Prain Ann. Roy. Bot. Gard. Calc. III. 261.

ANDAMANS: Port Blair, not uncommon.—DISTRIB. Indo-China.

This species is very closely related to *G. Scortechinii*, from which it differs mainly in its rather smaller white flowers and its less hirsute or quite glabrous style. It has not yet been collected in any of the Malayan provinces, but having regard to the fact that *G. Scortechinii* extends northwards to Tenasserim, where *G. oblongum* is common, and thus invades the area in which *G. oblongum* occurs, it is not impossible that this species may yet be met with in the northern part of the Malayan Peninsula; it seems therefore advisable to give it a place in these *Materials*.

5. GOMPHOSTEMMA CURTISII, Prain Journ. As. Soc. Beng. LIX. ii. 315 (1890). A coarse perennial herb, 3 to 4 ft. high. *Stems* rather weak, flexuous, ascending, scabrid. *Leaves* opposite, the pairs rather remote, herbaceous, dark-green, hirsute above, adpressed-tomentose beneath, oblong-ovate, acute; base very shortly cuneate; margin denticulate; 3 to 5 in. long, 2 to 2.75 in. wide; petiole 1.25 to 4.5 in. long, adpressed-tomentose. *Flowers* in many-flowered lax axillary cymes; bracts narrow-ovate, long-acuminate, entire, reddish, .4 to .6 in. long. *Calyx* .5 in. long, smooth, glabrous within, reddish; teeth lanceolate-subulate from a short wide base, longer than the tube. *Corolla* white, 1 in. long, distinctly incurved, puberulous externally; limb .3 in.

wide. *Style* glabrous; ovary glabrous. *Nutlets* white, glabrous, punctulate. Ann. Roy. Bot. Gard. Calc. III. 266.

PENANG: *Curtis* 1310! PERAK: Larút, *Scortechini* 924! *Wray* 1233!

18. CYMARIA, Benth.

Shrubs. *Flowers* small, in lax, many-flowered, peduncled, raceme-like cymes, all axillary, or the upper ones forming a terminal thyrsoid panicle. *Calyx* erect, 10-nerved, the intermediate nerves weaker than the other 5, equally 5-toothed; the tube in fruit urceolate; the throat within naked or with a few setose hairs. *Corolla-tube* straight, exerted; limb 2-lipped; lower lip 3-lobed, spreading, the mid-lobe larger than the lateral; upper lip arched, erect. *Stamens* 4, ascending under the upper lip, didynamous, the upper pair shorter; anthers connivent, the cells divaricate. *Disk* equal, entire. *Style-arms* unequal, the upper very short. *Nutlets* subglobose or obovoid, rugosely pitted; hilum very large, lateral.—DISTRIB. Species 3, in Indo-China and Malaya.

CYMARIA DICHOTOMA, Benth. in Wall. Cat. 2080 (1828). A shrub, 2 to 3 ft. high. *Stems* and branches faintly 4-angled, finely pubescent. *Leaves* opposite, membranous, dark-green and almost glabrous except on the pubescent nerves above, paler, glandular, and closely grey-pubescent beneath, ovate or rhomboid, acute or subacute, rarely acuminate; base cuneate, decurrent on the petiole, entire; margin elsewhere distinctly to faintly crenate or sometimes subentire; 1.5 to 4 in. long, 1 to 2.25 in. wide; petiole .25 to .75, rarely 1 in. long, finely pubescent. *Flowers* in once, or sometimes twice, dichotomously branching cymes with terminal flowers and 6 to 12 secundly arranged flowers on each branch; the main peduncles .5 to 1 in. long, finely pubescent; the flower-bearing branches .6 to 1.5 in. long; bracts under branches spatulate-acute to lanceolate, .1 to .2 in. long; bracteoles subulate, .05 in. long, finely pubescent. *Calyx* in flower campanulate, .08 in. long, in fruit urceolate, .15 in. long, glandular and pubescent, especially on the nerves externally, within sparingly beset with white setose hairs above the constriction; teeth 5, equal, triangular, as long as the portion of tube above the constriction; pedicels slender, finely pubescent, .05 in. long. *Corolla* yellow, .16 in. long, uniformly finely pubescent externally; tube distinctly exerted; lower lip spreading, 3-lobed, mid-lobe wide-oblong; upper lip erect, oblong; the apex notched. *Filaments* ascending under upper lip, included. *Nutlets* obovoid, .03 in. long, wide-reticulate on back, the upper third glandular; the apex beset with very short white hairs. Benth. in Wall. Pl. As. Rar. I. 64, in Lab. Gen. & Sp. 705, and in DC. Prodr. XII. 603; Miq. Fl. Ind. Bat. II. 992; Hook. f. Fl. Br. Ind. IV. 705; Prain Journ. As. Soc. Beng. LXVI. ii. 522.

PERAK: on limestone hills, *Scortechini*! Ipoh Quarries, *Ridley* 9734! Marble Hill, Ipoh, *Fox* (*Ridley* 10686)!—DISTRIB. Burma.

The Perak specimens have rather more numerous flowered cymes than those from Burma, but are in other respects indistinguishable.

Family XCII. PLANTAGINACEÆ.

[By D. PRAIN.]

Annual or perennial scapigerous herbs. *Leaves* usually radical; scapes axillary. *Flowers* small, greenish, bracteate, often dimorphic, spicate. *Sepals* 4, imbricate in bud, persistent. *Corolla* scarious, hypogynous; lobes 4, short, imbricate in bud. *Stamens* 4, inserted on the corolla-tube or hypogynous; filaments filiform, persistent; anthers large, pendulous, versatile. *Ovary* superior, 1- to 4-celled; ovules in each cell 1 to 8. *Capsule* 1- to 4-celled, membranous: dehiscence circumscissile. *Seeds* 1 or more, usually attached by the centre; testa thin, mucilaginous; albumen fleshy; embryo cylindric, transverse; radicle inferior.—DISTRIB. Species under 100; cosmopolitan.

PLANTAGO, Linn.

Annual or perennial herbs with a dense rosette of radical *leaves*. *Flowers* small, greenish, in dense spikes. *Sepals* 4, free, imbricate, persisting. *Corolla* 4-lobed, scarious; lobes short, imbricate. *Stamens* 4, adnate to corolla-tube; filaments filiform; anthers 2-celled, versatile. *Ovary* superior, 2- to 4-celled; ovules one or more in each cell. *Fruit* a small membranous capsule; dehiscence circumscissile. *Seeds* peltate, albuminous, mucilaginous.—DISTRIB. Species under 100, mainly in temperate regions.

PLANTAGO MAJOR, Linn. Sp. Pl. 112 (1753). A perennial herb with an erect stout rhizome. *Leaves* alternate, spirally disposed, all radical, sometimes sparsely pubescent, sometimes nearly glabrous on both sides, ovate or ovate-oblong, obtuse or subacute; base long-cuneate, tapering to and decurrent on the petiole; margin often irregularly and somewhat abruptly toothed; 3- to 7-, usually 5-nerved; 1 to 5 in. long, very variable in width; petiole often longer than the leaf-blade, broad and sheathing at the base. *Flowers* crowded or dispersed in slender rather lax spikes 2 to 6 in. long; bracts .05 to .08 in. long, broadly ovate-oblong, obtuse, with scarious margins. *Calyx* .12 in. long, glabrous; sepals oblong, obtuse or subacute, bluntly keeled externally,

margins widely scarious. *Corolla* .18 in. long, glabrous; lobes lanceolate-acute, reflexed. *Capsules* ovoid, .12 to .15 in. long, glabrous, dehiscing horizontally a little above the base, the upper portion separating as a conical lid tipped by the remains of the style. *Seeds* 4 to 8, angular, rugulose, dull, blackish, length .03 in. Dene. in DC. Prodr. XII. 696; Miq. Fl. Ind. Bat. II. 709; Hook. f. Fl. Br. Ind. IV. 705. *P. asiatica*, Linn. Sp. Pl. 163; Wall. Cat. 6412; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 423.

SINGAPORE: *Hullett*; *Kurz*. PENANG: *Walker*. MALACCA: *Griffith*. —DISTRIB. Almost cosmopolitan. In our area doubtless an introduced plant.

ERRATA.

P. 642, line 20, for "4. CARDANTHERA, Voigt.," read "4. CARDANTHERA, Ham. MS." Line 7 from bottom, for "CARDANTHERA TRIFLORA, Voigt.," read "CARDANTHERA TRIFLORA, Ham. MS. in Voigt."