



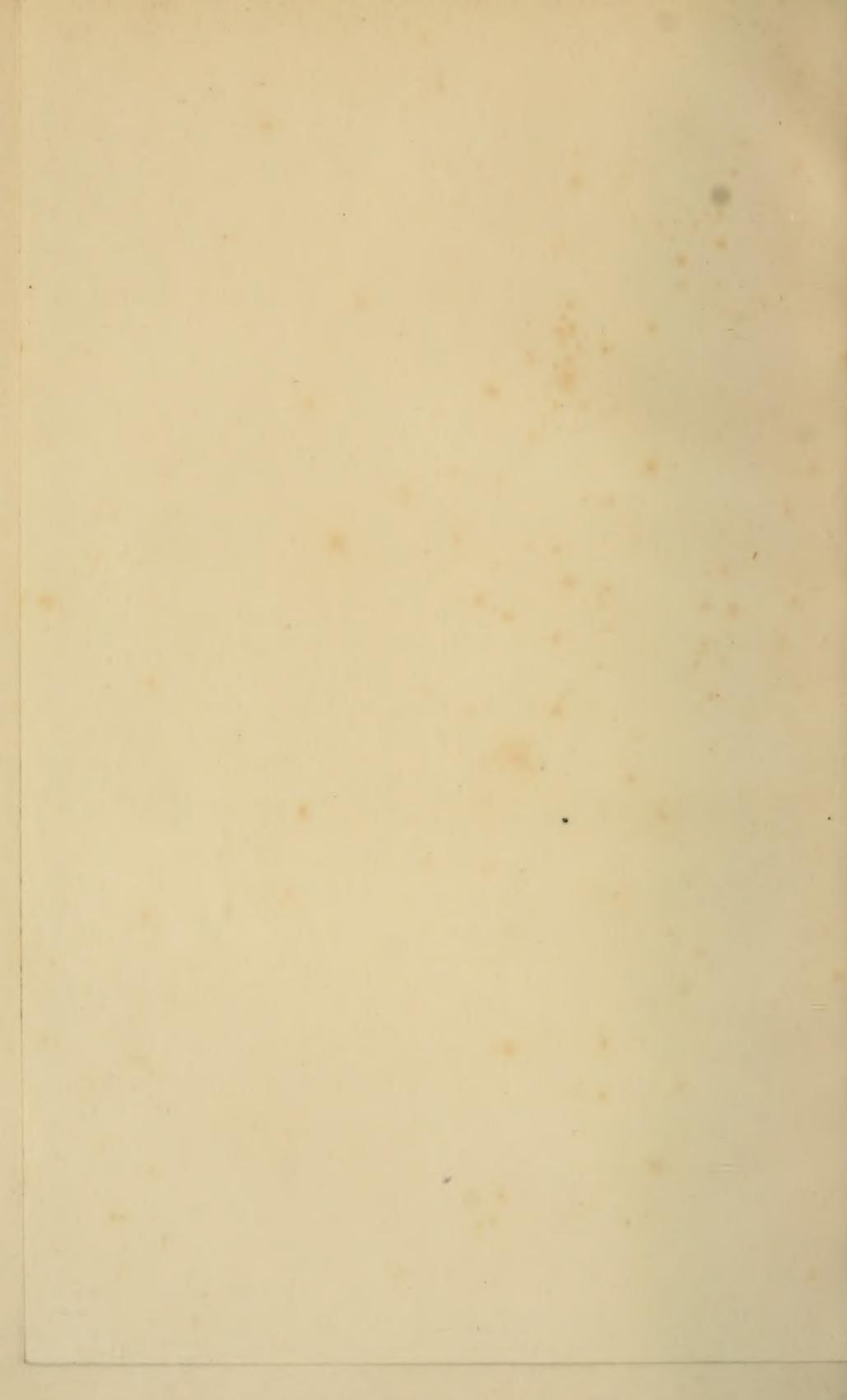




With the compliments of J.S.Gamble,
Highfield, East Liss, Hants, England.

May 17, 1910.





MATERIALS

FOR A

FLORA

OF THE

MALAYAN PENINSULA.

BY

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.,
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GAMOPETALÆ.

(Nos. 14 TO 21 OF THE SERIES.)

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PREFACE.

THE papers contained in this volume originally appeared, like their predecessors, in the *Journal of the Asiatic Society of Bengal*. For the convenience of Botanists, separate copies of each of these papers were printed off as it appeared, and these form a volume dealing with the *Gamopetalæ* as its predecessors dealt respectively with *Thalamifloræ*, *Discifloræ* and *Calycifloræ*. Each page of the volume bears two numbers. The one at the top of the page is that of the volume of the *Journal* in which the paper originally appeared. This number is not referred to in the Index, but it is the one which ought to be used by any one quoting this work. *The numbers at the bottom of the pages (which run continuously) are those used in the index.*

The dates of the publication of the Parts included in the present volume are as follows:—

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„ 18, „	485 to 596, „	„ „ „	do	1905.
„ 19, „	597 to 836, „	„ „ „	do	1907.
„ 20, „	837 to 938, „	„ „ „	do	1907.
„ 21, „	939 to 1125, „	„ „ „	do	1908.

The notes prefaced to the different Parts explain fully the authorship of the different Families.

It may be useful to repeat that, throughout this work, the length given for a leaf is that of the blade only, the measurements of the petiole (if any) being given separately; and that the breadth given for a leaf is that of its broadest part.

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FOR A

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No. 14.

CALCUTTA:

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1904.

From the Journal, Asiatic Society of Bengal, Vol. LXXII, Part II.
No. 4, 1903.

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. 14.

The present contribution contains an account by Mr. Gamble of the few species belonging to the Natural Order *Caprifoliaceæ*, which have so far been collected in the Malay Peninsula and adjacent Islands. But the larger part of it is occupied by a joint account by the authors of the species of the Order *Rubiaceæ*, which are characterised by having more ovules than one in each cell of the ovary. The key which precedes the text is only for these genera. In a paper which the authors hope soon to submit to the Society they will deal with the species of the genera which have only a single ovule in each ovarian cell; and that paper will, in like manner, be preceded by a key to these uniovular genera.

With the exception of the important family of *Leguminosæ*, which was elaborated entirely by Major D. Prain, of the Botanic Garden, Calcutta, and of one genus of *Melastomaceæ*, which was done in conjunction with Dr. O. Stapf, chief assistant in the Kew Herbarium, the whole of the orders dealt with in the preceding thirteen parts of these *Materials* have been worked out by Sir George King. With the view of expedit-

ing the completion of the series, and in consideration of the liberality of the Government of the Straits Settlements which has made feasible a more rapid rate of publication, it has been arranged that Mr. J. S. Gamble will henceforth, in the majority of the orders belonging to *Corollifloræ* and *Incompletæ*, work in collaboration with Sir George King; while certain orders will be worked out independently by botanical friends, who have kindly promised their aid.

Order LVIII. CAPRIFOLIACEÆ.

Small trees or shrubs, erect or climbing, rarely herbs. *Leaves* opposite, rarely alternate, simple, lobed or imparipinnate; stipules usually absent. *Inflorescence* various, usually cymose; flowers hermaphrodite, regular or irregular. *Calyx* adnate to the ovary; lobes 5, superior, usually imbricate, rarely valvate. *Corolla* superior, gamopetalous, tubular, funnel-shaped or rotate; limb 5-fid, lobes imbricate. *Stamens* 5, rarely 4, inserted on the corolla-tube, alternate with the lobes; filaments filiform or subulate; anthers 2-celled, introrse, longitudinally dehiscent. *Ovary* inferior, 2-6-, rarely 1-celled; style terminal, stigma capitate, undivided or bifid, sometimes short and 3-lobed; ovules sometimes solitary, pendulous, sometimes many, biseriata, anatropous. *Fruit* a berry or drupe or sometimes dry and indehiscent, many-celled, 1- to many-seeded. *Seeds* single or many in each cell; testa crustaceous or hard; albumen fleshy, copious; embryo usually minute, ovoid or clavate, 2-fid, radicle smooth, cotyledons ovate.—DISTRIB. Genera 13, species 200 to 220; chiefly found in the Northern Hemisphere more especially in temperate regions; a few in Australia and South America; none in tropical or Southern Africa.

VIBURNUM, Linn.

Shrubs or small trees. *Leaves* opposite, rarely alternately verticillate, simple, petiolate; entire, serrate or dentate, sometimes palmately lobed; sometimes stellately pubescent, sometimes gland-dotted; stipules usually inconspicuous or absent, in a few cases very large. *Flowers* hermaphrodite, in terminal or subterminal subumbellate corymbs, the branches cymose or paniced; bracts few, small; bracteoles 1 to 2, usually very small, generally quickly deciduous. *Calyx-tube* turbinate, cylindric or clavate; limb short, 5-toothed, persistent. *Corolla* white, pink or yellowish; rotate, campanulate or tubular; lobes 5, equal, imbricate. *Stamens* 5, inserted on the corolla, alternate with the lobes; anthers oblong, usually exserted; filaments linear or subulate. *Ovary* 1-3-celled; style short, conical, stigma small, obscurely 3-lobed; ovules solitary in the cells, pendulous. *Fruit* a drupe 1- or rarely 2-3-celled, 1-seeded; endocarp tough, papery or crustaceous. *Seed* oblong, com-

pressed, grooved, the edges sometimes incurved; testa membranaceous; albumen fleshy, sometimes ruminant; embryo minute, cotyledons thin.—
 DISTRIB. Species over 80, chiefly of the temperate and sub-temperate regions of the Northern Hemisphere in Europe and Asia; a few in the West Indies, South America and Madagascar.

Leaves entire :—

Corolla rotate; filaments long, linear; calyx-tube pubescent	...	...	...	1.	<i>V. sambucinum</i> .
Corolla tubular; filaments short, subulate; calyx-tube glabrous	...	...	...	2.	<i>V. Beccarii</i> .
Leaves dentate or serrate; calyx-tube glabrous	...	...	...	3.	<i>V. lutescens</i> .

1. *VIBURNUM SAMBUCINUM*, Reinw.; Blume Bijdr. 656. A large shrub or small tree up to 30 feet high; young branches stout, smooth, somewhat angled; youngest parts and branches of the inflorescence brown, stellate-pubescent. *Leaves* opposite, entire, thinly coriaceous, elliptic-oblong or -lanceolate, abruptly acuminate, the base cuneate; both surfaces glabrous except for a few hairs on the midrib beneath and occasional tufts in the axils of the main-nerve; main-nerve 4-6 pairs, prominent, curved upwards, joined by prominent arches near the margin, lesser nerves reticulate; length 5 to 10 in., breadth 1.5 to 4 in., petiole .75 to 1.25 in., pilose especially on the inner surface. *Corymb* terminal, usually peduncled but sometimes nearly sessile, umbellate, primary branches 6 to 8 and .5 to 1 in. long, upper cymosely branched, short in flower, longer in fruit; bracts of primary branches very early deciduous, linear-spathulate, .2 to .3 in. long, bracteoles also very deciduous, very short, linear-oblong, densely brown stellate-pubescent. *Calyx*-tube cylindric, .05 in. long, pubescent; lobes 5 spreading, lanceolate-acute. *Corolla* hemispheric in bud, rotate when open; lobes 5, rounded, imbricate, yellow-white. *Stamens* 5; anthers oblong, exserted; filaments longer than the petals, much folded in bud. *Ovary* 1-celled, style conical. *Fruit* a drupe, broadly ovate, suddenly acute, compressed, wrinkled, 2-grooved on one and 3-grooved on the other face, .35 in. long, .2 in. broad, endocarp thick, osseous. DC. Prodr. IV. 325; Miq. Fl. Ind. Bat. II. (1856) 120; Oersted in Vidensk. Meddel. (1860) 299, t. 7, figs. 11-13; C. B. Clarke in Hook. fil. Fl. Br. Ind. III. 5; Koord. & Val. Boomsoort. Java in Mededeel. 'sLands Plant. XXXIII. (1900) 40. *V. integerrimum*, Wall. Cat. 457; DC. Prodr. IV. 324; Hook. fil. and Th. in Journ. Linn. Soc. II. 476. *Premna* (?), Wall. Cat. 9077.

PERAK: Wray 1237, 1483, 2951; Scortechini 514. PENANG: Wall. 457; Walker 92, 272; Maingay (K.D.) 712/2; King's Collector 1586, 2273, 5202; Curtis 278. MALACCA: Grijiith 3395. SINGAPORE: Ridley 6335. DISTRIB. Sumatra; Java; Borneo.

The Perak specimens show two forms, the one (No. 1483 *Wray*) with leaves elliptic-oblong, glabrous beneath; the other (No. 2951 *Wray*) with smaller leaves elliptic-lanceolate, with occasional stellate hairs beneath. Other specimens from various localities show intermediate forms so that they are not constant varieties.

2. *VIBURNUM BECCARII*, Gamble n. sp. Apparently a small tree, young branches rather thick, smooth. *Leaves* opposite, entire, coriaceous, ovate, obtuse or very shortly and bluntly acute, base cuneate; glabrous above, minutely glandular-dotted beneath; main-nerves 4 to 6 pairs, smaller nerves reticulate; length 3 to 5 in., breadth 2 to 3 in., petiole .75 to 1.25 in. *Corymb* terminal, long-peduncled (1.5 to 3 in.), umbellate, main branches 6 to 8, upper branches cymose, all brown stellate-pubescent when young; bracts and bracteoles small, linear, very numerous, rusty stellate-pubescent, very quickly deciduous. *Calyx*-tube clavate, glabrous, .1 in. long; teeth very minute. *Corolla* tubular, ovoid in bud, .15 in. long; teeth 5, acute. *Stamens* 5; anthers oblong, pendulous from the summit of a subulate thickened filament, .075 in. long. *Ovary* 1-celled; style short, conical. *Fruit* (young only) a drupe, 1-celled, faintly 1-grooved on one face, 2-grooved on the other.

PERAK: *Scortechini* 375b. *DISTRIB.* Sumatra (*Beccari* No. 194 on Mt. Singalan in Herb. Kew).

Specimens of the fully opened corolla or of the mature fruit are not yet available.

3. *VIBURNUM LUTESCENS*, Blume Bijdr. 655 (1825). A small tree, young branches slender, smooth, youngest parts and branches of the inflorescence brown, stellately-pubescent. *Leaves* opposite, ovate-acuminate, thinly coriaceous, cuneate at base, upper two-thirds deeply crenate-dentate, sometimes serrate, teeth mucronate, lower one-third entire; both surfaces glabrous; main-nerves 6 to 8 pairs, ascending, prominent, lesser nerves reticulate; length 3 to 5 in., breadth 1.5 to 2.5 in., petiole .5 to .75, rough when dry. *Corymb* terminal, long-peduncled (1.5 to 2.5 in.), umbellate, primary branches 3 to 6 and .5 to .75 in. long, paniculate-cymosely branched above; bracts of primary branches deciduous, linear-spathulate, .4 to .5 in. long, bracteoles very minute, ovate-acuminate, both stellately brown-pubescent. *Calyx*-tube angular, glabrous, .05 in. long; lobes 5, erect, ovate, bluntly acute. *Corolla* hemispheric in bud, rotate-campanulate when open; lobes 5, rounded, imbricate, white. *Stamens* 5; anthers oblong, exserted; filaments short, equal to the petals. *Ovary* 1-celled; style short, conical, faintly 3-lobed. *Fruit* a drupe, oblong-ellipsoid, abruptly apiculate, compressed, 1-grooved on one and 2-grooved on the other face, .3 to .4 in. long, .2 in. broad; endocarp thick, hard. DC. Prodr. IV. 325, *V. monogynum*, Blume Bijdr. 655; DC. Prodr. IV. 327. *V. sundaicum*,

Miq. Fl. Ind. Bat. II. (1856) 121; Koord. & Val. Boomsoort. Java in Mededeel. 'sLands Plant. XXXIII. (1900) 43.

PERAK: *Wray* 1496, at 4900 feet on Ulu Batang Padang. DISTRIB. Sumatra; Java.

Nat. Ord. LIX. RUBIACEÆ.

Trees, shrubs or herbs, erect, climbing, twining or prostrate, unarmed or spinous. *Leaves* simple, opposite, usually quite entire; stipules inter- or intra-petiole, free or united to each other or to the petiole; in the tribe *Galieæ* leaf-like and forming a whorl with the leaves. *Inflorescence* various. *Flowers* usually hermaphrodite, mostly regular and symmetrical. *Calyx-tube* adnate to the ovary: its limb various, sometimes petaloid. *Corolla* gamopetalous, regular, usually 4-5-lobed, rarely bilabiate; the lobes of the limb valvate, imbricate or contorted. *Stamens* equal in number to the lobes of the corolla, sessile or on short or long filaments; *anthers* 2-celled, usually linear, dorsifixed, and dehiscing longitudinally, rarely with porous dehiscence. *Disk* epigynous, usually annular or cushion-shaped, sometimes lobed, or reduced to glands. *Ovary* inferior, 1-10-celled; style simple or cleft (but rarely cleft to the base); stigmas various, usually on the style-arms, but sometimes connate and fusiform, oblong, capitate or mitriform and simple or lobed. *Ovules* in the ovarian cells solitary or in pairs, or numerous. *Fruit* capsular, baccate, drupe-like, 2-10-celled, or dehiscing into 2 or more dehiscent or indehiscent cocci. *Seeds* various, with horny albumen; embryo straight or curved; cotyledons flat or semi-terete; radicle superior or inferior.—DISTRIB. About 4,800 species, chiefly tropical and sub-tropical.

Ovules numerous in each cell of the ovary:—

Fruit dry, capsular or separating into 2 or 4 cocci:—

Flowers collected into dense globular heads: corolla funnel-shaped, its lobes valvate or imbricate in bud :

• stigma simple:—

Lobes of the corolla valvate 1. MITRAGYNE.

Lobes of the corolla imbricate:—

Tubes of the calyces concrete 2. SARCOCEPHALUS.

Tubes of the calyces free:—

Seeds not winged 3. ANTHOCEPHALUS.

Seeds winged:—

Trees:—

Capitules solitary or few 4. NAUCLEA.

Capitules numerous, small 5. ADINA.

Climbers:—

Capitules usually solitary, axillary, on peduncles curving into hooks when in fruit 6. UNCARIA.

Flowers in corymbs or panicles, not in globular heads; corolla-lobes valvate, imbricate or contorted in bud. Fruit capsular, 2-celled, seeds winged:—

Corolla funnel-shaped, its lobes twisted in bud; flowers in terminal pendulous panicles; lobes of calyx equal, not petaloid; stigma simple fusiform... 7. COPTOSAPelta.

Corolla with a short tube, its lobes slightly twisted in bud; flowers stalked, in erect corymbs or panicles; one of the lobes of the calyx sometimes large, petaloid and persistent; stigma fleshy, 2-lobed ... 8. MUSSAENDOPSIS.

Flowers in subscorpioid cymes: corolla funnel-shaped, its lobes valvate, but somewhat twisted in bud; capsule 2-celled; seeds numerous, obscurely winged; stigmas 2 linear, revolute ... 9. GREENIA.

Corolla and inflorescence various, corolla-lobes valvate in bud. Stamens 4 or 5. Fruit a loculi- or septicidal capsule with 2 or 4 cells, or consisting of 2 or 4 adnate dry dehiscent or indehiscent (rarely quite indehiscent) cocci; seeds small or minute, rarely winged. Herbs or small shrubs (never trees) with entire leaves:—

Fruit 2-celled, usually indehiscent: stipules entire:—

Corolla funnel-shaped, 4- or 5-toothed; anthers included, dehiscing longitudinally ... 10. DENTELLA.

Corolla rotate; anthers large, exerted, connivent, dehiscing by apical pores ... 11. ARGOSTEMMA.

Fruit oblong, sub-globose, or orbicular, 2- rarely 4-celled, usually dehiscent, many-seeded, rarely 1-seeded; stipules often divided into bristles:—

Corolla funnel-shaped or campanulate, 4-lobed; capsule loculi- or septicidal, rarely indehiscent; calyx-teeth contiguous; seeds usually angular ... 12. HEDYOTIS.

Corolla rotate, funnel- or salver-shaped, 4- rarely 5-lobed; capsule loculicidal above the remote calyx-teeth, rarely indehiscent; seeds minute, angular ... 13. OLDENLANDIA.

Fruit broadly and didymously obovate, compressed, composed of 2 spreading lobes, loculicidal above the calyx; flowers secund on the branches of dichotomous cymes ... 14. OPHIORRHIZA.

Fruit fleshy, dehiscing irregularly or at the apex, or drupe-like and separating into 2 or more many-seeded cocci:—

Flowers in capitula:—

Capitula without involucre: calyx entire: stamens 4 ... 15. LUCINAEA.

Capitula involucrete; calyx obliquely campanulate, obtusely 2-4-lobed or 2-lipped: stamens 5; climbing shrubs ... 16. LECANANTHUS.

- Capitula bracteate, crowded; calyx with 5 ciliate lobes; corolla 5-lobed; stamens 5; arms of style 2, truncate; berry with thin pericarp; herbaceous 17. COPTOPHYLLUM.
- Flowers in terminal corymbs or racemes: one of the calyx-lobes occasionally long, petaloid, persistent; erect or scandent shrubs 18. MUSSAENDA.
- Flowers in paniced terminal umbels; calyx-limb cupular, deciduous; corolla 5-lobed; stamens 5; arms of style linear-lanceolate; woody scandent shrubs ... 19. TRISCIADIA.
- Flowers in axillary cymes; shrubs or small trees:—
Flowers polygamous; cymes paniced; lobes of calyx and corolla and the stamens 8 to 16; disc large, convex, with as many lobes as the stamens and stigma 20. AULACODISCUS.
- Flowers hermaphrodite:—
Cymes short, few-flowered; calyx minutely toothed; fruit with scanty pulp 21. UROPHYLLUM.
- Cymes loose; flowers 4-5-merous; lobes of corolla reduplicate-valvate; fruit baccate, fleshy, 2-5 celled 22. ADENOSACME.
- Corolla-lobes twisted in bud: fruit baccate, fleshy or dry; seeds usually large, cotyledons often foliaceous:—
Seeds numerous in each cell of the fruit:—
Flowers dioecious:—
Cymes from the axils of fallen or undeveloped leaves; style arms 2; berries with thin pericarp, ellipsoid or globular 23. BRACHYTOME.
- Flowers hermaphrodite:—
Flowers in cymes:—
Cymes terminal, corymbose; flowers 5-merous; stigma simple, fusiform; fruit pisiform, 2-celled 24. STYLOCORYNA.
- Cymes usually axillary; stigma fusiform or bifid; fruit baccate with thick pericarp:—
Calyx-limb various; fruit 2-celled ... 25. RANDIA.
- Calyx-limb usually tubular; fruit 1-celled ... 26. GARDENIA.
- Flowers in spikes:—
Calyx-limb minutely 5-toothed: anthers thickened at the apex 27. PETUNGA.
- Ovules and seeds 2 or 3 in each cell:—
Flowers in axillary fascicles on small cymes; calyx-limb truncate or 4-5-toothed; fruit baccate, ovoid or globose, sessile 28. DIPLOSPORA.
- Ovules never more than 2 in each cell of the two-celled ovary:—
Corolla-lobes twisted; ovules inserted together half-way up the ovarian cell, one pendulous, the other erect; flowers in dense axillary pedunculate cymes: a small littoral tree 29. SCYPHIHORA.

Corolla-lobes valvate; ovules erect, on the top of an erect basilar placenta; flowers in scorpioid cymes, collected in corymbose panicles ... 30. JACKIA.

1. MITRAGYNA, Korthals.

Trees with petiolate leaves and large caducous bracts and stipules. *Flowers* sessile, crowded in globose, solitary or paniculate, pedunculate capitules, each peduncle with 2 foliaceous long-petioled bracts near its apex: the flowers mixed in the capitules with numerous, spatulate paleaceous bracteoles. *Calyces* conoid, densely crowded, but quite separable from each other: the calyx-tube short, its mouth truncate or 5-toothed. *Corolla* funnel-shaped; the tube long, the mouth with a ring of villose hairs inside below the base of the lobes; lobes 5, thickened towards the apex, lanceolate, valvate in aestivation. *Stamens* 5, originating just above the ring of hairs; *anthers* lanceolate, apiculate, cordate or sagittate at the base; filaments short. *Ovary* 2-celled; *style* filiform, exserted; *stigma* cylindrical or mitriform, its base overlapping the apex of the style; *ovules* numerous, on pendulous placentas. *Fruit* of two 5-ridged cocci dehiscing at the apex. *Seeds* numerous, small; the testa with thin wings, the albumen fleshy.—DISTRIB. Eight species, 5 of which are Indo-Malayan and 3 tropical African.

Main-nerves of leaves 7 to 9 pairs; corolla .2 in. long; calyx-tube narrow, not ridged ... 1. *M. diversifolia*.
Main-nerves of leaves 12 to 15 pairs; corolla .3 in. long; calyx-tube wide, ridged ... 2. *M. speciosa*.

1. MITRAGYNA DIVERSIFOLIA, Haviland in Journ. Linn. Soc. XXXIII. 71. Young branches pale, compressed. *Leaves* thickly membranous, ovate or elliptic, to rotund-ovate; obtuse or sub-acute; the base rounded (in the lower leaves slightly cordate); both surfaces glabrous, the lower minutely reticulate, sometimes puberulous especially on the nerves; main-nerves 7 to 9 pairs, rather straight, spreading; length 4 to 8 in.; breadth 2 to 6 in.; petiole .35 to 1.25 in.; *stipules* oblong, blunt. *Corolla* .2 in. long; tube of *calyx* not ridged, about .025 in. wide. *Anthers* cordate at the base. *Stigma* cylindrical, overlapping the apex of the style by its hollow base. *Mitragyne javanica*, Koord. & Valet. Bijdr. 8, 38. *Stephegyne diversifolia*, Hook. fil. Fl. Br. Ind. III. 26. *S. parvifolia*, Korth. Verh. Nat. Gesch., p. 161 (in part). *Nauclea diversifolia*, Wall. Cat. 6096: G. Don Gen. Syst. III. 467. *N. rotundifolia*, Roxb. Fl. Ind. I. 516; Kurz For. Fl. Burm. II. 67. *N. Brunonis*, Wall. Cat. 6097: G. Don, l.c. *N. parvifolia*, Roxb. var. 2, Kurz For. Fl. Burm. II. 67.

ANDAMAN ISLANDS.—DISTRIB. Burma; Chittagong; Philippines.

The occurrence of this in a wild state in the Malay Peninsula is doubtful. In the Andaman islands it is common.

The stigma of this is externally almost cylindrical. But it is hollowed at the base like a wine-bottle and covers the apex of the style like a cap. The leaves of the upper part of the branches are smaller and more or less ovoid in form; those of the lower parts are larger and more rotund, hence the specific name. Roxburgh, thinking only of the lower leaves, named the species *Nauclea rotundifolia*.

2. MITRAGYNA SPECIOSA, Korth. Obs. de Naucleés Indicês, p. 19 (name only). Young branches usually dark-coloured, compressed. Leaves membranous, oblong-obovate to oblong, shortly and abruptly acuminate or sub-acute, the base broad and rounded or rarely slightly and suddenly contracted; both surfaces glabrous, the lower minutely reticulate and sometimes puberulous on the 12 to 15 pairs of slightly curved ascending nerves; length 4 to 5·5 in.; breadth 2 to 3·5 in.; petiole thin, ·8 to 1·2 in. long; stipules lanceolate, sparsely pubescent. Corolla ·3 in. long; tube of calyx wide, ridged, its mouth about ·075 in. across. Anthers sagittate at the base. Stigma mitriform. Haviland in Journ. Linn. Soc. XXXIII. 69. *Stephegyne speciosa*, Korth. Verh. Nat. Gesch. Bot., p. 160. *S. parvifolia*, K. Schum. Fl. Kaiser-Wilh. Land., p. 127. *Nauclea speciosa*, Miq. Fl. Ind. Bat. II. 140.

PAHANG: Ridley 2190. PERAK: Wray 1896, 4280; PERAK: Scortechini 616; King's Collector 1770, 10021, 10459.—DISTRIB. Sumatra, Forbes, Borneo; Motley 1169; Korthals, Philippines; Cuming; Motley; Vidal; New Guinea.

2. SARCOCEPHALUS, Afzel.

Shrubs or trees with petiolate leaves and small or large caducous or persistent stipules. Flowers sessile, conjoined by their confluent calyx-tubes into globose, axillary or terminal, pedunculate, ebracteolate heads, the peduncles with 2 small bracts near or below the middle. Calyx-tube short; its mouth with 4 or 5 imbricate, persistent or caducous teeth. Corolla infundibuliform; its mouth with 4 or 5 broad, blunt, imbricate teeth not thickened near the apex. Stamens 4 or 5, inserted in the glabrous throat of the corolla by very short filaments, or sessile; anthers broadly ovate. Stigma clavate, fusiform or capitate, exerted, the style long, filiform. Ovary 2-celled; ovules numerous, on two pendulous placentas. Fruits combined into a globose fleshy mass of 2-celled pyrenes, with thin septa. Seeds ovoid, compressed, not winged; testa crustaceous; albumen fleshy.—DISTRIB. About a dozen species, mostly Indo-Malayan; one Australian and one African.

Leaves pubescent beneath: capitules about ·8 in. in

diam. 1. *S. hirsutus*.

Leaves minutely scaly beneath, more or less obovate;

capitules 1·5 in. in diam. 2. *S. Maingayi*.

Leaves quite glabrous:—

Leaves oblong-lanceolate to elliptic-oblong; capi-

tules ·5 to ·75 in. in diam. 3. *S. subditus*.

Leaves more or less obovate; capitules ·5 in. in

diam. 4. *S. Junghuhnii*.

1. SARCOCEPHALUS HIRSUTUS, Havil. in Journ. Linn. Soc. XXXIII.

32. A tree: young branches slender, pubescent, the bark pale. *Leaves* thickly membranous, oblong-oblancoolate, shortly and abruptly acuminate, the base attenuate: upper surface quite glabrous, shining, the lower with short pubescence on the nerves and midrib, otherwise minutely scaly; main-nerves 7 to 9 pairs, ascending, slightly prominent on the lower surface; length 3 to 5 in.; breadth 1·5 to 2·25 in. petiole ·2 to ·3 in., pubescent; *stipules* oblong-oblancoolate, obtuse, ·3 in. long. *Peduncle* solitary, terminal, about 1 in. long, with 2 lanceolate small bracts about the middle. *Capitules* about ·8 in. in diam. *Calyx* very short; the limb truncate, hairy. *Corolla* infundibuliform, glabrous both outside and inside; the mouth with 4 rarely 5 broad rotund slightly obovate lobes. *Anthers* 4, broadly ovate not apiculate, cordate at the base, inserted at the base of the corolla-lobes by short broad filaments; numerous flattened and ridged imperfect flowers mixed with the perfect ones. *Style* shortly exserted, *stigma* cylindric.

MALACCA: *Ridley* 3214.—DISTRIB. Borneo.

The Malacca specimens described above have their leaves more attenuate at the base and rather more hairy beneath than the Bornean type (Herb. Hav. 3406) on which Haviland founded the species. But in other respects they agree.

2. SARCOCEPHALUS MAINGAYI, Havil. in Journ. Linn. Soc. XXXIII.

33. A spreading tree, 40 to 80 feet high; young branches rather stout, yellowish-brown, glabrous. *Leaves* coriaceous, broadly elliptic or elliptic-obovate, shortly and abruptly acuminate, the base attenuate; upper surface quite glabrous, shining; the lower covered with minute white scales: main-nerves 9 to 14 pairs, impressed on the upper surface, prominent and sparsely puberulous on the lower; length 4 to 8 in.; breadth 2·25 to 3·5 in.; petiole ·5 to ·75 in., slightly winged; *stipules* oblong, sub-acute, thick, conjoined at the base, ·65 in. long. *Peduncles* solitary, terminal, short (·25 to ·5 in. long) bearing several oblong or lanceolate bracts, about ·5 in. in length. *Capitule* 1·5 in. in diam. *Calyx*-tube tomentose, 4-5-lobed. *Corolla* ·3 in. long, infundibuliform; the tube sub-glabrous; the lobes 4 or 5, lanceolate, pubescent on both surfaces. *Anthers* oblong, sub-acute, apiculate, filaments very short. *Style* exserted; *stigma* large, overlapping at its base the apex of the style. *Nauclea Maingayi*, Hook. fil. Fl. Br. Ind. II, 27.

MALACCA: *Maingay* (K.D.) 823. PERAK: *King's Collector* 4470, 4771, 6424, 7768, 7977, 10020, 10363; *Wray* 2043, 4173; *Scortechini* 265. SELANGOR: *Ridley* 2851. PROVINCE WELLESLEY: *Ridley* 9388.

3. SARCOCEPHALUS SUBDITUS, Miq. Fl. Ind. Bat. II. 133. A shrub or small tree; young branches slender, pale, the very youngest dark-coloured, glabrous. *Leaves* dark-coloured (when dry), thickly membranous, glabrous, oblong-oblong to elliptic-oblong, shortly and obtusely acuminate, the base cuneate; main-nerves 6 or 7 pairs, spreading; length 3 to 4.5 in.; breadth 1.25 to 2.5 in.; petiole .2 to .4 in. *Peduncles* usually solitary, slender, axillary or terminal, less than 1 in. long when in flower, longer in fruit, glabrescent or puberulous; bearing two small lanceolate bracts below the middle. *Capitules* .5 to .75 in. in diam. *Calyx-tube* short; the mouth expanded, truncate. *Corolla* with a narrow cylindrical tube; the mouth expanded into 4 broadly oblong or sub-obovate, obtuse lobes, slightly hairy on the inner surface; *anthers* ovate, almost sessile; *style* exerted, stigma clavate. *Syncarpium* globular, .5 to .75 in. in diam.; pale, covered with striate pits. *Seeds* black. Hook. fil. Fl. Br. Ind. II. 22; Havil. in Journ. Linn. Soc. XXXIII. 30; Koord. & Valet. Bijdr. 8, 16. *Platanocarpum subditum*; Korth. Verh. Nat. Gesch. 133, t. 32.

PERAK: *Scortechini*; *Wray* 4167; *King's Collector* 1073, 3027, 6646, 7812, 8854, 10436. SELANGOR: *Ridley* 10212. MALACCA: *Griffith* (K.D.) 1770, 2771.—DISTRIB. Sumatra; Borneo.

4. SARCOCEPHALUS JUNGHUHNII, Miq. Fl. Ind. Bat. II. 133. A tree, 40 or 50 feet high; young branches brown when dry. *Leaves* pale brown (when dry), thinly coriaceous, glabrous, elliptic to obovate-elliptic, abruptly, shortly and bluntly acuminate, the base more or less cuneate; main-nerves 5 to 7 pairs, curving upwards, prominent beneath; length 3.5 to 5.5 in.; breadth 1.65 to 3.5 in.; petiole .35 to .65 in. *Peduncles* axillary or terminal, solitary or in groups of three, from 1 to 1.5 in. long, with four small unequal, ovate-acute bracts below the middle, minutely pubescent. *Capitules* .5 in. in diam. *Corolla* infundibuliform; its mouth with 4 large obovate-rotund blunt lobes, imbricate in aestivation, glabrous; *anthers* short, almost sessile, broadly ovate. *Style* exerted; *stigma* clavate. *Syncarpium* globular, covered with shallow striate pits. *Seeds* black. Hook. fil. Fl. Br. Ind. III. 23; Havil. in Journ. Linn. Soc. XXXIII. 29.

MALACCA: *Griffith* (K.D.) 2772; *Maingay* (K.D.) 822; *Derry* 1110, 1188. SINGAPORE: *Ridley* 2847, 2850, 2880, 3397, 6534, 6897. PENANG: *Curtis* 303; *Fox* 10674. PERAK: *Scortechini* 2166, 2105; *King's Collector* 4440, 4499, 8179, 8315.—DISTRIB. Sumatra; Borneo; Philippines; Cochin-China.

3. ANTHOCEPHALUS, A. Rich.

Large glabrous trees with petiolate coriaceous leaves and large caducous stipules. *Flowers* sessile, crowded in solitary terminal globose pedunculate heads, the peduncles bracteate at the base: the capitules ebracteolate. *Calyx* with a narrow cylindrical tube expanding above and divided into 5 linear-oblong sparsely pubescent persistent lobes. *Corolla* tubular below, infundibuliform above, with 5 deep linear lobes, glabrous. *Anthers* linear-oblong, the apex apiculate. *Style* long, exerted; stigma elongate, cylindrical, slightly fusiform. *Ovary* 2-celled; placentas linear, attached to the middle of the septum; *ovules* numerous. *Seeds* minute, ellipsoid; testa sub-membranous, albumen fleshy.—DISTRIB. 2 species both Indo-Malayan.

ANTHOCEPHALUS INDICUS, A. Rich. in Mém. Soc. Hist. Nat. Paris, 1834, p. 237. A tall tree; young branches slender, dark-coloured. *Leaves* elliptic, elliptic-oblong or ovate; the apex acute; the base cuneate or rounded, sometimes sub-oblique; upper surface glabrous, the lower sometimes puberulous; main-nerves 10 to 12 pairs, spreading, slightly prominent on both surfaces; length 5·5 to 8 in.; breadth 2·5 to 3·5 in.; petiole 1·2 to 1·75 in., somewhat winged near the apex; stipules triangular. *Capitules* 1 to 2 in. in diam.: their peduncles 1·5 to 2 in. long. *Calyx* short, tubular below, infundibuliform above and deeply divided into 5 narrowly oblong lobes with obtuse, somewhat thickened apices, glabrous. *Corolla* elongate, infundibuliform, glabrous; the teeth broadly lanceolate, sub-acute. *Anthers* 5, linear-oblong, apiculate, the filaments short. *Style* long, exerted; *stigma* large, fusiform. *Fruit* 4-celled, with thin walls, the upper part containing 4 cartilaginous, indehiscent several-seeded pyrenes, the lower part only 2-celled and containing numerous seeds. *A. indicus*, Koord. & Valet. Bijdr. 8, p. 8. *A. morindæfolius*, Korth. Verh. Nat. Gesch. 154, t. 48; Miq. Fl. Ind. Bat. II. 135. *A. Cadamba*, Miq. Fl. Ind. Bat. II. 135; Bedd. Fl. Sylv. 127; t. 35; Brand. For. Fl. N.-W. Ind. 261; Hook. fil. Fl. Br. Ind. III. 23. *Nauclea Cadamba*, Roxb. Hort. Beng. 14; Fl. Ind. II. 512. *Sarcocephalus Cadamba*, Kurz. For. Fl. Burm. II. 63; Wall. Cat. 6088 (excl. sheet C).

PERAK: *King's Collector* 6913. ANDAMAN ISLANDS: *Prain's Collector* 43, 93.—DISTRIB. British India; Malayan Archipelago.

A perusal of Richard's original description of *Anth. indicus* convinces one that the shrub which he describes is not *Nauclea purpurea*, Roxb., as he says, but *Nauclea Cadamba* of the same author.

4. NAUCLEA, Linn.

Trees or shrubs with petiolate or sessile, coriaceous or sub-coriaceous leaves, often of rather large size; the stipules caducous or sub-

persistent, large. *Flowers* sessile, in solitary or ternate, pedunculate heads; the peduncles often thickened near the apex and bearing caducous bracts, often of large size, mostly caducous; the flowers mixed with bracteoles consisting of long thin stalks and conical hairy heads, or ebracteolate. *Calyx*-tubes closely adpressed; but not united with each other; the lobes 5, deciduous, filiform or spatulate, often thickened at the apex and hairy, valvate in æstivation. *Corolla* infundibuliform; the lobes 5, short, imbricate, the throat glabrous. *Stamens* 5; the anthers oblong or linear, included in the tube of the corolla; filaments very short. *Style* elongate, rather stout: *stigma* sub-globose or globose-ovoid. *Ovary* 2-celled, the placentas pendulous; ovules imbricate. *Fruit* of 2 cocci, often separating from the persistent axis, dehiscent. *Seeds* flattened; the testa with a wing, bifid at one end, acute at the other.—**DISTRIB.** About 30 species mostly tropical and Indo-Malayan.

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------|----|--------------------------|
| Lobes of corolla densely sericeous-strigose externally; peduncles solitary, short, each with 2 large sub-persistent bracts | 1. | <i>N. Gageana</i> . |
| Lobes of corolla minutely glandular-puberulous externally; bracts of peduncle deciduous, minute | 2. | <i>N. synkorynes</i> . |
| Lobes of corolla glabrous or nearly so:— | | |
| Capitule enveloped in two large sub-persistent bracts | 3. | <i>N. purpurascens</i> . |
| Bracts near the base of the capitule, small, deciduous | 4. | <i>N. nicobarica</i> . |
| Bracts near the base of the peduncle, small, ternate, deciduous | 5. | <i>N. peduncularis</i> . |

1. *NAUCLEA GAGEANA* King. n. sp. A tree; young branches rather stout, slightly compressed, when dry pale-brown. *Leaves* coriaceous, broadly ovate-elliptic (sub-rhomboidal) gradually narrowed to the obtuse apex, the base cuneate; both surfaces quite glabrous, the upper shining (when dry); the lower dull, reticulate; main-nerves 8 to 10 pairs, spreading, prominent on the lower surface: the midrib very bold; length 6 to 8 in.; breadth 3·5 to 4·5 in.; petiole '6 to '8 in., flattened, winged in its upper part. *Capitules* about 1·5 in. in diam., solitary or in pairs. *Peduncles* 1 in. long, with a pair of large (1·25 in. long) sub-persistent bracts above the middle. *Calyx* short, cylindric, densely sericeous; the mouth very short, with 5 broad truncate lobes. *Corolla* infundibuliform, '4 to '5 in. long, outside glabrous in its lower, sericeous-strigose in its upper part; inside glabrous; lobes of the mouth 5, ovate. *Style* exerted, glabrous; *stigma* ovoid. *Fruit* villous. *Bracteoles* of the capitulum fusiform, villous.

ANDAMAN ISLANDS: *King's Collector* 463, *Prain's Collector* 76.

A very distinct species named in honour of Captain Gage, Curator of the Calcutta Herbarium, who was the first to recognise it as a hitherto undescribed species.

2. NAUCLEA SYNKORYNES, Korthals Verb. Nat. Gesch. 160. A tree 30 to 40 feet high; young branches thin, compressed, broad at the nodes, pale-coloured (when dry). *Leaves* thinly coriaceous, oblong-ovate or oblong-obovate or narrowly elliptic, shortly rather abruptly acuminate, the base cuneate: both surfaces quite glabrous; main-nerves 7 or 8 pairs, rather straight, ascending, thin but prominent on the lower surface; length 3·5 to 5 in.; breadth 1·5 to 2·5 in.; petiole ·25 to ·4 in., slightly winged near the apex: stipules oblong-obovate, blunt, ·5 in. long. *Peduncles* two or three together, erect, 1·5 to 2·5 in. long, dilated near the minutely bracteate apex. *Capitules* about 1 in. in diam. *Calyx*-tube short: its lobes long, partly deciduous; hirsute and sub-lanceolate in the lower persistent part, glabrous and clavate in the upper deciduous part. *Corolla* infundibuliform; the tube glabrous, ·25 in. long: its lobes minutely glandular, pubescent outside, broadly ovate, blunt. *Anthers* reaching to the top of the tube, linear-oblong, shortly apiculate, the base sub-cordate. *Capsules* cuneiform, ridged, the apex villous, crowned by the calyx-limb. Havil. in Journ. Linn. Soc. XXXIII. 60.

PERAK: *King's Collector* 10276.—DISTRIB. Borneo.

3. NAUCLEA PURPURASCENS, Korth. Verb. Nat. Gesch. 158. A small tree, the young branches brown when dry, purple when fresh. *Leaves* thinly coriaceous, elliptic, elliptic-oblong, oblanceolate or oblong-ob lanceolate, acute or sub-acute, the base attenuate; both surfaces glabrous; main-nerves 7 to 9 pairs, rather straight, spreading, prominent on the lower surface, the midrib broad, length 4·5 to 8·5 in.; breadth 1·75 to 3 in.; petiole ·35 to ·75 in.; *stipules* ovate, acute, ·75 in. long. *Capitules* 1·5 to 1·75 in. in diam., the peduncles 1·5 to 3 in. long, solitary or in threes, with 2 large boat-shaped sub-persistent bracts at the apex embracing the capitule. *Calyx*-tube short; the lobes 5, erect, linear, blunt, adpressed hairy. *Corolla* infundibuliform, glabrous; the lobes 5, short, broad, blunt, puberulous outside. *Anthers* 5, linear with a minute apical appendage; filaments shorter than the anthers. *Fruit* ribbed; the apex depressed, densely villous, the remains of the calyx-lobes short, hairy. Havil. in Journ. Linn. Soc. XXXIII. 58. Koord. & Valet. Bijdr. 8, p. 24. *N. Blancoi*, Vidal Phan. Cum. Phil. 175. *N. purpurea*, Blume Bijdr. 1008 (not of Roxb.).

SELANGOR: *Ridley* 7446. PAHANG: *Ridley* 2189. PERAK: *Scortechini* 112; *Ridley* 9721; *King's Collector* 8603, 10276, 10641; *Wray* 195. ANDAMANS AND NICOBARS: *Kurz*; *Prain's Collector*.—DISTRIB. Java; Borneo; Celebes; Philippines.

The large bracts which envelope the capitules in their younger stages are very characteristic of this species. It is closely allied to *N. peduncularis*, G. Don, as noted under that species.

4. NAUCLEA NICOBARICA, Havil. in Journ. Linn. Soc. XXXIII. 59. A tree; young branches slender, compressed, pale, smooth. *Leaves* thickly membranous, elliptic or obovate-elliptic, shortly and bluntly acuminate, the base cuneate, both surfaces glabrous; main-nerves 5 to 7 pairs, spreading, slightly curved, prominent on the lower surface, midrib very stout; length 3.5 to 7 in.; breadth 2 to 3.5 in.; petiole .5 to .8 in.; stipules shorter than the petiole, obovate-oblong, blunt. *Peduncles* usually in threes, rarely solitary, slightly compressed and thickened towards the bracteate, striate, adpressed hairy apex. *Calyx* with a short cylindrical tube: the mouth with 5 broadly oblong, blunt lobes, pubescent. *Corolla* glabrous, .35 in. long, infundibuliform; the lobes of the mouth 5, broadly oblong, blunt. *Anthers* 5, oblong, sagittate at the base, slightly apiculate at the apex, half exerted from the throat of the corolla; filaments more than half as long as the anthers. *Fruit* ridged, densely villous on the apex and covered by the white calyx-teeth. *N. purpurascens*, var. *latifolia*, Korth. (*vide* Haviland) Korth. ex Miq. Ann. Mus. Lugd. Bat. IV. 182.

NICOBAR ISLANDS: *Kurz*. ANDAMANS: *Prain's Collector* 83.

5. NAUCLEA PEDUNCULARIS, G. Don Syst. III. 469. A tree 40 to 60 feet high; young branches pale purplish-brown when dry. *Leaves* coriaceous, elliptic or elliptic-obovate, sub-acute, the base cuneate or rounded; upper surface quite glabrous, shining, the lower dull, minutely scaly when dry; main-nerves 9 to 11 pairs, ascending, very slightly curved; length 5 to 9 in.; breadth 2.5 to 4 in.; petiole .4 to .6 in. *Capitules* globose-ovoid, 1.25 to 1.5 in. broad; the peduncles usually in threes, sometimes solitary, slightly compressed, thickened at the apex; bracts near the base (*vide* Haviland) small, ternate, deciduous. *Calyx*-tube short, silky, the lobes 5 or 6, erect, ovate, acute or sub-acute. *Corolla* infundibuliform, the tube glabrous; lobes 5, ovate, glabrous, rarely puberulous outside. *Stamens* 5, inserted in the tube of the corolla: *anthers* linear-oblong, sagittate at the base, the apex with a broad membranous apiculus; filaments as long as the anthers. *Style* exerted: *stigma* short, ovoid. *Fruit* cuneiform, boldly ribbed, its apex depressed and slightly hairy. *Bracteoles* of the capitule with filiform stalks and double fusiform heads; the upper part of the head papillose and yellow; the lower covered with pale hair. Wall. Cat. 6091; Hook. fil. Fl. Br. Ind. III. 27; Havil. in Journ. Linn. Soc. XXXIII. 57.

PENANG: *Porter*; *Curtis* 1056, 3405. PERAK: *Wray* 2598, 3197; *King's Collector* 3404, 3578, 6424, 6761.—DISTRIB. Borneo, *Beccari* (P.B. 1890).

Very close to *N. purpurascens*, Korth., but the nerves of the leaves of this are more numerous, the bracts of the peduncles are much smaller; the apical appendage of the anthers is much longer and the filaments shorter.

5. ADINA, Salisb.

Trees or shrubs with petiolate sub-coriaceous or membranous leaves; the stipules small or large. *Flowers* sessile, in small bracteolate capitules. *Peduncles* in large or small panicles, or solitary, terminal or axillary. *Calyces* not concrete; the tube angled: lobes of the limb 5, short, persistent, or none. *Corolla* infundibuliform: the throat glabrous: lobes of the limb 5, imbricate or pseudo-valvate, the flowers mixed in the capitules with bracteoles. *Stamens* 5, on the mouth of the corolla; anthers short, oblong; filaments short. *Ovary* 2-celled; style thin, filiform, elongate; *stigma* clavate or capitate. *Ovules* numerous, imbricate on a pendulous placenta in each cell. *Fruit* 2-coccos, many-seeded. *Seeds* oblong, flat; testa winged; albumen fleshy.—DISTRIB. Eight or nine species, tropical Asiatic or African.

Capitules in threes on axillary peduncles; stigma globose... 1. *A. rubescens*.

Capitules in large lax usually terminal panicles; stigma

clavate 2. *A. polycephala*.

1. ADINA RUBESCENS, Hemsl. in Journ. Bot. XXV. (1887), 204. A tree 60 to 80 feet high; young branches pale, striate, slender. *Leaves* sub-coriaceous, elliptic, shortly caudate-acuminate, the base cuneate; upper surface glabrous, the lower sometimes puberulous on the nerves, faintly reddish-brown in colour (when dry): main-nerves 8 to 10 pairs, spreading, curving, prominent below; length 2.5 to 4 in.; breadth 1.25 to 1.75 in.; petiole .15 to .25 in., slightly winged for half its length; *stipules* small bifid. *Capitules* about .4 in. in diam. when in flower, in short, pedunculate, trichotomous, pubescent panicles, much shorter than the leaves. *Calyx* pubescent; the lobes very short, oblong. *Corolla-tube* .1 in. long, hairy outside; its lobes 4 or 5, ovate, sub-valvate. *Stamens* inserted in the throat; *anthers* extending to the middle of the lobes, sub-setose at their bases. *Style* exerted; *stigma* globose. *Bracteoles* linear, compressed, pubescent. Havil. in Journ. Linn. Soc. XXXIII. 45.

PERAK: Wray 539; King's Collector 7850. SINGAPORE: Ridley 10458. PENANG: Curtis 369.

2. ADINA POLYCEPHALA, Benth. Fl. Hongkong 146. A small tree; the young branches sub-compressed, slender, striate, at first dark but becoming pale. *Leaves* sub-coriaceous, oblong-oblongate, shortly caudate-acuminate, the base alternate; both surfaces glabrous: main-nerves 7 to 10 pairs, curving upwards, slightly prominent beneath;

length 4·5 to 9 in.; breadth 1·5 to 3 in.; petiole ·2 to ·6 in., winged near the apex. *Capitules* about ·35 in. in diam. when in flower, in pedunculate, trichotomously-branched, lax or condensed axillary or terminal pubescent panicles, shorter than the leaves. *Lobes* of the *calyx* oblong, obtuse, persistent. Tube of *corolla* glabrous, narrow; ·1 in. long; lobes 4 or 5, ovate. *Anthers* reaching to the middle of the lobes of the corolla. *Style* exserted, stigma clavate. *Fruit* obovoid, hairy in its upper part: bracteoles filiform. *Seeds* very shortly winged. Miq. Ann. Mus. Lugd. Bat. IV. 183; Koord. & Valet. Bijdr. 8, 17. *Nauclea polycephala*, Wall. Cat. 6100; G. Don Gen. Syst. III. 467; Kurz For. Flora Burma II. 65.

VAR. *macrophylla* Hook. fil. Fl. Br. Ind. II. 25, leaves oblanceolate, with 10 to 12 pairs of main-nerves, 6 to 10 in. long and 2·5 to 4 in. broad. *N. microcephala*, Wall. MSS. in Herb. Hook. *Adina aralioides*, Benth. & Hook. Gen. Plant. II. 30. *Nauclea capitellata*, Voigt Hort. Calc. 375. *N. trichotoma*, Zoll. Verz. Ind. Archipel. 61. *N. aralioides*, Miq. Fl. Ind. Bat. II. 344. *Cephalanthus aralioides*, Zoll. l.c.

PENANG: Curtis 2737, 2751. MALACCA: Ridley 758; Derry 130.—
DISTRIB. Java; Sumatra; Cochin China; Burma; Chittagong.

The variety *macrophylla* is the form most frequent in our region.

6. UNCARIA, Schreb.

Climbing shrubs. *Leaves* shortly petioled; stipules entire or bifid. *Flowers* in peduncled globose heads, solitary and axillary or collected in terminal panicles; peduncles (often without flowers) converted into stout, recurved hooks. *Calyx-tube* cylindric or double fusiform; the limb usually expanded, 5-toothed or 5-lobed. *Corolla* with a long cylindric tube, often expanded towards the apex, the limb with 5 slightly imbricate or valvate lobes, the throat glabrous. *Stamens* 5, inserted by short filaments on the throat of the corolla; *anthers* dorsifixed, with 2 basal bristles. *Ovary* fusiform, 2-celled. *Style* long, slender; *stigma* capitate; ovules many, ascending on the placentas. *Capsule* elongate, usually double fusiform, septicidally 2-valved, many-seeded. *Seeds* minute, numerous, imbricating upwards; the nucleus small, its testa winged at each end; albumen fleshy, embryo clavate, cotyledons short.—DISTRIB.: about 40 species mostly tropical Asiatic.

Lobes of calyx narrow, acute:—

Flowers and capsules sessile 1. *U. Roxburghiana*.

Flowers and capsules distinctly pedicellate:—

Leaves pubescent beneath:—

Calyx-lobes lanceolate, acute, shorter than the tube:—

Flowers ·75 in. long; leaves ovate-lanceolate, 2·5

to 3·5 in. long 2. *U. lanosa*.

- Flowers 1·5 in. long; leaves broadly oblong or ovate-rotund, 5 to 7 in. long ... 3. *U. sclerophylla*.
- Flowers 1 in. long; leaves 4 or 5 in. long, oblong or ovate, never rotund-ovate ... 4. *U. pedicellata*.
- Calyx-lobes filiform, longer than the tube, spreading; tube of corolla very slender; capsules on long, slender stalks:—
- Young branches, under surfaces of leaves, and capsules rusty-pubescent ... 5. *U. ferrea*.
- Young branches and capsules glabrous; leaves slightly pubescent on the under surface only ... 6. *U. glabrata*.
- Leaves glabrous or nearly so on both surfaces:—
- Lobes of the calyx shorter than the tube ... 7. *U. Kunstleri*.
- Lobes of the calyx as long as the tube ... 8. *U. Wrayi*.
- Lobes of the calyx short, broad, blunt:—
- Leaves quite glabrous, not glaucescent beneath:—
- Leaves 1·75 to 2·5 in. long:—
- Leaves with 3 or 4 pairs of nerves; tube of calyx densely pubescent, the lobes of the limb sub-glabrous ... 9. *U. ovalifolia*.
- Leaves with 5 or 6 pairs of nerves; tube and lobes of calyx pubescent externally ... 10. *U. jasminiflora*.
- Leaves 3·5 in. or more in length:—
- Nerves of leaves 5 or 6 pairs ... 10. *U. jasminiflora* var. *macrophylla*.
- Nerves of leaves 3 pairs ... 11. *U. trinervia*.
- Leaves glabrous, glaucescent beneath; nerves of leaves 7 or 8 pairs, the reticulations transverse and very distinct beneath ... 12. *U. pteropoda*.
- Leaves glabrous, but the 4 or 5 pairs of main-nerves with tufts of hair on the lower surface, at their union with the midrib ... 13. *U. Gambier*.
- Leaves uniformly canescent beneath: nerves 5 or 6 pairs ... 14. *U. canescens*.
- Under surfaces of midrib and the 4 to 6 pairs of main-nerves laxly hirsute, sometimes with tufts of hair in the nerve-axils ... 15. *U. dasyoneura*.
- Calyx-tube long, the teeth very short and blunt:—
- Nerves of leaves 6 to 8 pairs, stout, and bearing like the midrib and transverse veins short pale-brownish hairs ... 16. *U. attenuata*.

1. *UNCARIA ROXBURGHIANA*, Korth. in Ver. Nat. Gesch. Bot. 172. Young branches obtusely 4-angled, densely clothed with minute, partially deciduous, harsh, rusty tomentum. Leaves coriaceous, ovate, acuminate sometimes caudately so; the base rounded, emarginate or minutely cordate; both surfaces reticulate, the upper strigose-scabrid, the lower with longer curved hispid hairs; main-nerves 4 or 5 pairs, curved, spreading, ascending, depressed on the upper and prominent on the lower surface like the midrib; length 2·5 to 3·5 in.; breadth 1·5 to

2 in.; petiole .15 in., tomentose; stipules broad, bifid, glabrous, .2 in. long. *Peduncles* five or six times longer than the petioles, axillary, stout, compressed, tomentose, bracteate near the apex, sometimes one of them barren and forming a much-recurved hook; heads in flower about 1 in. in diam., in fruit rather less. *Calyx* almost sessile, .15 in. long, pilose; the tube oblong-ovoid; lobes of its mouth linear, blunt, twice as long as the tube. *Corolla* about three times as long as the calyx, glabrous; the tube narrowly cylindric, angled, the lobes of the limb broadly oblong, very obtuse. *Capsules* sub-sessile, narrowly double-fusiform, glabrous, .35 in. long, crowned by the short calyx-lobes. Hook. fil. Fl. Br. Ind. III. 32; Havil. in Journ. Linn. Soc. XXXIII. 87.

SINGAPORE: *Anderson* 106; *Ridley* 2844. PERAK: *King's Collector*. 2148. MALACCA: *Maingay* (K.D.) 831.—DISTRIB. Sumatra.

2. *UNCARIA LANOSA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 131; Wall. Cat. 6110. Young branches sparsely hirsute, reddish-brown when dry. *Leaves* membranous, ovate-lanceolate, shortly acuminate, the base rounded or narrowed; upper surface of a warm-brown when dry, glaberulous or with scattered hairs, the midrib and nerves pubescent; lower surface pale brown, clothed with soft, adpressed long slender tawny hairs especially on the midrib and 6 or 7 pairs of rather bold slightly curved ascending main-nerves; length 2.5 to 3.5 in.; breadth 1 to 1.6 in.; petioles .15 to .2 in. long, pubescent; *stipules* broadly triangular, deeply bifid, reflexed, glabrous inside. *Peduncles* axillary, several times longer than the petioles, tapering upwards, somewhat compressed, pubescent, with 4 linear reflexed glabrous bracts near the apex. *Capitules* .75 in. in diam. when in flower, 2 in. when in fruit. *Calyx* .2 in. long, pedicellate, glabrescent, the tube double-fusiform, not longer than the 5 linear externally hairy lobes of the limb. *Corolla* glabrous, three times as long as the calyx; the tube very narrow, the lobes linear, spreading. *Capsules* clavate-fusiform; .25 to .35 in. long, on long slender pedicels, longer than themselves, glabrous. Hook. fil. Fl. Br. Ind. III. 33; Havil. n Linn. Journ. XXXIII. 85. *Nuclea lanosa*, Poir. Encycl. Suppl. IV. 64. *N. setigera*, Blume Bijdr. 1013.

PENANG: *Phillips*; *Curtis* 917. PERAK: *Scortechini*.

3. *UNCARIA SCLEROPHYLLA*, Hunter in Roxb. Hort. Beng. 86; Fl. Ind. ed. Wall. II. 130; idem ed. Carey I. 520. Very large; young branches as thick as or thinner than a goose-quill, densely rusty-pubescent or villous, 4-angled, sometimes bearing stout recurved hooks. *Leaves* coriaceous, broadly oblong or ovate or rotund-ovate; shortly and bluntly apiculate, the base rounded and sometimes minutely cordate; upper surface dark-coloured, shining, the nerves hairy; the lower densely rusty-pubescent; the midrib, 8 to 10 pairs of main-nerves and

the transverse veins much depressed on the upper, very prominent on the lower surface; length 5 to 6·5 in.; breadth 3 to 5 in.; petiole 4 to 6 in.; stipules large, rounded, bluntly bifid, sparsely hairy, reflexed, 5 in. long. *Heads* from 4 to 5·5 in. in diam. to the ends of the style, on thick, axillary, rusty-pubescent spreading peduncles shorter than the leaves, bearing a whorl of bracts about the middle. *Calyx* pedicellate about 5 to 8 in. long, densely adpressed-sericeous, the tube short, ovoid; the limb campanulate, cut into 5 narrowly lanceolate, acute lobes. *Corolla* villous or sericeous externally; about twice as long as the calyx; its tube narrow, cylindric below; the mouth funnel-shaped and deeply cut into 5 oblong or lanceolate sub-acute, erect lobes. *Capsules* on slender, rusty stalks; 5 to 1 in. long, oblong, tapering much to each end; densely but shortly rusty-pubescent, ribbed, 6 or 7 in. long, crowned by the large funnel-shaped calyx-limb. *U. sclerophylla*, DC. Prod. IV. 347; Miq. Fl. Ind. Bat. II. 148; Hook. fil. Fl. Brit. Ind. III. 28; Koord. & Valet. Bijdr. 8, 42. *U. speciosa*, Wall. Cat. 6106. *U. insignis*, DC. Prod. IV. 348; Havil. l.c. 78; *U. Ralli*, Korth. Verh. Nat. Gesch. Bot. 165, t. 33. *Nauclea rotundifolia*, DC. Prod. IV. 346. *Nauclea sclerophylla*, Hunter in Trans. Linn. Soc. IX. 223.

In all the provinces except the Andamans, more or less common.—
DISTRIB. Malay Archipelago.

This is closely allied to *U. pedicellata*, Roxb., which see.

4. *UNCARIA PEDICELLATA*, Roxb. Hort. Beng. 86; Fl. Ind. ed. Carey I. 520; idem, ed. Wall. II. 128. Like *U. sclerophylla*, Roxb. in all its parts, but somewhat less robust and much less hairy, the leaves smaller, narrower, never subrotund, paler and much less hairy beneath; sometimes even sub-glabrous; the flowers smaller (only about 1 in. long); the lobes of the calyx only 25 in. long; the tube of the corolla only 4 or 5 in. long, more slender, ferruginous-silky, rather than pilose or villous; capsule shorter (5 to 6 in.) but wider in proportion. DC. Prod. IV. 348; Korth. Verh. Nat. Gesch. 166; Miq. Fl. Ind. Bat. II. 142; Hook. fil. Fl. Brit. Ind. II. 28; Havil. in Journ. Linn. Soc. XXXIII. 77 (in part); Koord. & Valet. Bijdr. 8, 43. *U. sclerophylla*, Deless. Ic. Pl., t. 81; Havil. l.c. (in part). *U. ferruginea*, DC. Prod. IV. 348; Korth. Verh. Nat. Gesch. 166; Kurz. Fl. Burm. II. 69. *U. sclerophylla* Havil. (not of Roxb.) in Journ. Linn. Soc. XXXIII. 78. *Uncaria pedicellata*, Bl. Bijdr. 1012. *Nauclea ferruginea*, Bl. Bijdr. 1013.

In all the Provinces, very common.

This closely resembles *U. sclerophylla*, Roxb., and should probably be treated as a variety of that species. In a few specimens of this the under surfaces of the leaves between the reticulations are pale-grey and pitted.

5. *UNCARIA FERREA*, DC. Prod. IV. 348. Young branches much thinner than a goose-quill, minutely but deciduously rusty-pubescent, the bark dark-coloured. *Leaves* membranous, ovate or ovate-lanceolate, shortly and bluntly acuminate, the base rounded or slightly emarginate; upper surface dark-coloured when dry, glabrous or with a few scattered deciduous sub-adpressed pale hairs, the midrib and sometimes the main-nerves pubescent; lower surface pale, minutely reticulate, sub-adpressed rusty-pilose on the midrib and nerves; main-nerves 7 or 8 pairs, curving upwards, depressed on the upper surface like the midrib and prominent on the lower; length 2.5 to 3.25 in.; breadth 1.35 to 2 in.; petioles .1 to .2 in., tomentose; stipules broadly semilunar, deeply two-lobed, adpressed rusty-pilose, .25 in. long. *Peduncles* much longer than the petioles, but shorter than the leaves, lengthening in fruit, compressed, densely ferruginous-tomentose; bracteate above the middle; heads about 1.5 to 2 in. in diam. when in flower, and 2 to 3 in. when in fruit. *Calyx* shortly stalked, .25 in. long, silky; the tube narrowly oblong-ovoid; the limb deeply divided into filiform lobes longer than the tube. *Corolla* about twice as long as the calyx, glabrous; its tube very narrowly cylindric, angled: the lobes of the mouth broadly oblong or obovoid, very obtuse. *Capsules* double-fusiform, ridged, pubescent, .5 to .75 in. long, crowned by the filiform calyx-lobes, tapered into slender pedicels as long as themselves. Hook. fil. Fl. Br. Ind. III. 33; Havil. in Journ. Linn. Soc. XXXIII. 87; Koord. & Valet. 8, 44. *U. Horsfieldiana*, Miq. Fl. Ind. Bat. II. 151. *Nauclea ferrea*, Blume Bijdr. 1014.

PERAK: *Scortechini* 130; *Wray* 2555; *Curtis* 1305; *King's Collector* 2240, 2453, 4899. SELANGOR: *Goodenough*.—DISTRIB. Sumatra; Borneo; Java.

VAR. *tomentosa*; young branches, under-surfaces of leaves and peduncles densely rusty-tomentose, calyx and capsules more silky than in the type.

MALACCA: *Maingay* (K.D.) 830; *Derry* 1070; *Ridley* 10078. PERAK: *King's Collector* 429, 790, 5390. PAHANG: *Ridley* 2192. NEGRI SEMBILAN: *Ridley* 10080. ANDAMANS: *Helper* 2761.—DISTRIB. Java; Sumatra.

6. *UNCARIA GLABRATA*, DC. Prod. IV. 348. As in *U. ferrea* but with young branches glabrous and often bearing shining, much recurved slender hooks about than .5 in. long; longer peduncles (which are glabrous and bracteate not much below the apex); less filiform, blunt calyx lobes; and glabrous capsules which are thicker but shorter (about .4 in. long). Havil. in Journ. Linn. Soc. XXXIII. 85; Koord. & Valet. Bijdr. 8, 44. *U. Lobbiai*, Hook. fil. in Fl. Br. Ind. III. 33.

SINGAPORE: *Lobb*. 100, 332; *Ridley* 2846, 2853, 8035; *Hullett*; *King's Collector* 277. SELANGOR: *Goodenough*.—DISTRIB. Sumatra; Java; Borneo.

7. *UNCARIA KUNSTLERI*, King n. sp. Young branches thinner than a goose-quill, 4-angled, grooved, deciduously puberulous. *Leaves* coriaceous, elliptic or obovate-elliptic, narrowed to the petiole, the apex with a small blunt acumen; both surfaces sparsely and minutely puberulous especially on the midrib and 5 or 6 pairs of ascending slightly curved main-nerves; main-nerves depressed on the upper surface, thin but prominent on the lower; length 2·5 to 4 in.; breadth 1·25 to 2·25 in.; petiole ·35 to ·5 in., puberulous; stipules ·3 in. long. *Peduncles* as long as or slightly longer than the petioles, axillary, compressed in the lower half, often hooked, bracteate about the middle; *heads* nearly 1 in. in diam. when in flower. *Calyx* ·1 in. long, its stalk ·05 in., densely pubescent, the tube narrowly funnel-shaped, the lobes of the mouth narrowly oblong, acute, shorter than the tube. *Corolla* three times as long as the calyx, adpressed-pilose, very narrowly cylindrical, funnel-shaped in its upper third, the lobes of the limb oblong, blunt.

PERAK: *King's Collector* 5376, 6843.

Very near *U. jasminiflora*, but with more coriaceous leaves, and narrower, more oblong calyx-lobes.

8. *UNCARIA WRAYI*, King n. sp. A bush (?). Young branches half as thick as a goose-quill, dark-coloured, with small pale white lenticels, obtusely 4-angled, glabrous. *Leaves* coriaceous, broadly obovate-elliptic, shortly and bluntly acuminate, narrowed at the base; both surfaces glabrous, the upper shining olivaceous when dry: the lower paler and minutely reticulate (the veinlets very dark); main-nerves 5 pairs, slightly curved, ascending, inconspicuous; length 2·5 to 3 in.; breadth 1·35 to 1·9 in.; petioles ·5 in., slender. *Peduncles* axillary, slightly longer than the petioles, compressed; bracteate above the middle; glabrous below the bract and pubescent above it. *Calyx* shortly pedicelled, densely pubescent, ·2 in. long; the tube cylindrical or somewhat double fusiform, about as long as the narrowly campanulate limb; lobes lanceolate, sub-acute. *Corolla* softly pubescent, known only in bud.

PERAK: *Wray* 2383.

9. *UNCARIA OVALIFOLIA*, Roxb. Hort. Beng. 86; Fl. Ind. I. 519; in Wall. Cat. sub. 6103 B, C, (*U. Gambier*). Young branches thinner than a crow-quill, obtusely 4-angled, glabrous. *Leaves* membranous, elliptic to ovate-elliptic, the apex shortly and obtusely acuminate or sub-acute, the base cuneate; both surfaces glabrous; main-nerves 3 or 4 pairs, ascending, slightly curved, thin; length 1·75 to 2·75 in.; breadth ·85 to 1·4 in.; petiole ·35 to ·45 in., slender, stipules broad, lunate-acute, bifid, ·35 in. long. *Peduncles* axillary, about twice as long as the

petioles, slender, rusty-puberulous, or glabrous, occasionally forming compressed tapering much recurved hooks, the bract small and near the base. *Head* about 1 in. in diam. in flower and 1·5 in. in fruit. *Calyx* ·15 in. long, nearly sessile, densely rusty-pubescent except the lobes; the tube narrowly ovoid, contracted into a cylindric deeply lobed limb, the lobes short, broadly oblong, blunt, spreading, sub-glabrous. *Corolla* twice as long as the calyx, very narrowly funnel-shaped, pale pubescent outside, the teeth narrowly oblong, blunt, glabrous inside. *Capsules* narrowly double-fusiform, occasionally somewhat curved, about ·4 or ·5 in. long, crowned by the thick, erect calyx-tube, narrowed into the short rusty pilose pedicel, adpressed-pubescent. Hook. fil. Fl. Br. Ind. III. 30. *N. ovalifolia*, Spreng. Syst. IV. Curæ Post. 80.

MALACCA: *Griffith* (K.D.) 2758, 2759; *Cunning* 2292. SELANGOR: *Curtis* 2342. PERAK: *Scortechini*; *King's Collector* 5262.—DISTRIB. Burma; Bornéo.

10. UNCARIA JASMINIFLORA, Hook. fil. Fl. Br. Ind. III. 32. Young branches thinner than a goose-quill, somewhat compressed, 4-angled, puberulous. *Leaves* thinly coriaceous, broadly elliptic, rarely elliptic-lanceolate, with an abrupt, short, blunt acumen, the base rather abruptly narrowed to the slender petiole; both surfaces glabrous; when adult the nerves and midrib on the lower surfaces puberulous; when young the upper pale brown and shining when dry; the lower paler and minutely reticulate; main-nerves 5 or 6 pairs, spreading, curving upwards, thin; length 2 to 2·5 in.; breadth 1 to 1·5 in.; petiole ·5 in., puberulous; stipules entire, ·2 in. long. *Peduncles* axillary, longer and thicker than the petioles; compressed, puberulous; heads rather more than 1 inch in diam. when in flower, about 1·75 when in fruit, bracteate near the apex. *Calyx* shortly pedicellate, ·15 in. long, adpressed pilose; the tube shortly double-fusiform, about as long as the campanulate limb, lobes short, broad, obtuse, glabrous inside. *Capsules* about ·5 in. long, double-fusiform, crowned by the calyx-limb, ridged, puberulous, their pedicels slender, ·15 to ·2 in. long. Wall. Cat. 6103 C.F.; Havil. in Journ. Linn. Soc. XXXIII. 80.

MALACCA: *Griffith* (K.D.) 2766; *Maingay* (K.D.) 832, 833. SINGAPORE: *Ridley* 10415, 6467; *King* 382. PERAK: *King's Collector* 4619, 7860; *Wray* 3124. SELANGOR: *Ridley* 8579.—DISTRIB. Borneo.

VAR. *macrophylla*, King. Stem-hooks stout, compressed, much curved. *Leaves* 3·5 to 5 in. long, dark brown and very shining in the upper surface, 3·5 to 5 in. long and 2 to 2·5 in. broad; capsules nearly glabrous.

SINGAPORE: *Schomburgk* 65; *Anderson* 87; *Hullett* 41, 75.

11. UNCARIA TRINERVIS, Haviland in Journ. Linn. Soc. XXXIII.

80. Young branches thinner than a goose-quill, obtusely 4-angled, compressed and broad at the nodes, pale brown, glabrous; the hooks much curved and compressed. *Leaves* coriaceous, pale brown when dry, ovate or elliptic, slightly and abruptly narrowed at the base, the apex shortly, abruptly and broadly acuminate; both surfaces quite glabrous, with fine transverse veins and minute reticulations; main-nerves 3 pairs, ascending, depressed on the upper, but prominent on the lower surface; length 3·5 to 4·5 in.; breadth 1·75 to 2·5 in.; petiole ·7 to ·9 in.; stipules small, broad, entire. *Inflorescence* racemose; peduncles ·75 in. long, compressed, minutely pubescent; their bases broad and glabrous; bracts (*file* Haviland) entire, ·15 in. long. *Heads* (including the styles) about 1 in. in diam., the flowers sub-sessile, pale tomentose externally. *Calyx* ·1 in. long, its lobes broad, blunt. *Corolla* ·25 in. long, the tube cylindrical; the lobes broad, blunt. *Capsules* double-fusiform, crowned by the conspicuous calyx, minutely pilose, ·5 in. long; *receptacles* without bracteoles, hirsute.

PENANG: *Curtis* 1247. PERAK: *Curtis* 2981.

Allied to *U. pteropoda*, Miq., but with smaller quite glabrous leaves which have only 3 pairs of nerves and with smaller flowers. Allied also to *U. canescens*, Korth., from which it is distinguished by its smaller, fewer-nerved, glabrous leaves.

12. UNCARIA PTEROPODA, Miq. Fl. Ind. Bat. II. 343. Young branches 4-angled, somewhat compressed, broadly grooved, as thick as a goose-quill, glabrous. *Leaves* coriaceous, elliptic-rotund, the apex with a short, broad, blunt point, the base broad and rounded; both surfaces glabrous, the upper shining, minutely reticulate (when dry): the lower pale-glaucous; main-nerves about 8 pairs, deeply depressed like the midrib on the upper surface, prominent on the lower, spreading, curving slightly upwards; length 5 to 6·5 in.; breadth 3·5 to 5 in.; petiole ·35 to ·85 in. long, with a broad undulate wing. *Peduncles* axillary, strong, much compressed, grooved, somewhat longer than the petioles, often much recurved, bracteate near the apex; sometimes collected into a terminal panicle longer than the leaves; *heads* about 1 inch across when in flower, two or three times as much when in fruit. *Calyx* shortly stalked, ·25 to ·3 in. long in flower, rusty-pubescent; its tube narrow, double-fusiform, about ·25 in. long, crowned by the short narrowly campanulate limb, its lobes narrowly oblong, blunt or sub-acute. *Corolla* nearly three times as long as the calyx, silky, the tube narrowly cylindrical; the lobes of the limb broad, obovate, blunt. *Capsules* narrowly double-fusiform, ·6 to ·75 in. long, up to 1 in. when quite ripe; on stalks nearly as long, minutely rusty-pubescent, crowned by the short calyx-tube. Hook. fil. Fl. Br. Ind. III. 29; Havil. in Journ. Linn. Soc. XXXIII. 82.

SINGAPORE: *Ridley* 2854; *Anderson* 105. PERAK: *Wray* 2738, 3115
Scortechini 256; *King's Collector* 2528, 4587, 6576, 7831, 7882, 10189,
 10593. PENANG: *Phillips*; *Curtis* 332. MALACCA: *Maingay* (K.D.) 829.
 —DISTRIB. Sumatra; Borneo.

A very distinct species, the leaves drying of a pale colour.

13. *UNCARIA GAMBIEI*, Hort. Beng. 86; Fl. Ind. I. 517. Young branches thinner than a goose-quill, obtusely 4-angled, glabrous. *Leaves* thinly coriaceous, olivaceous; brown when dry, the lower surface paler; ovate or oblong-ovate, shortly acuminate, the base usually rounded, occasionally a little narrowed and oblique; both surfaces glabrous except for the tufts of hair at the origin of the main-nerves from the midrib on the lower: main-nerves 4-5 pairs, curved, spreading, obscure on the upper, bold on the lower surface (when dry); length 3 to 4.5 in.; breadth 1.85 to 2.25 in.; petioles .2 to .25 in.; *stipules* ovate, bluntly acuminate, .3 in. long. *Peduncles* axillary, usually shorter than the leaves, slightly compressed, bracteate above the middle, glabrous below and pubescent above the bract; *heads* 1.75 in. in diam. when in flower, 2.75 in. in fruit. *Calyx* shortly stalked, .35 in. long, densely adpressed-silky; the tube cylindrical, ridged; the mouth campanulate, somewhat shorter than the tube; its lobes spreading, ovate, blunt, glabrous inside. *Corolla* .5 in. long, narrowly funnel-shaped, with sparse (rarely dense) white hairs outside, the lobes broadly oblong, blunt, densely silky outside, glabrous inside. *Capsules* narrowly double-fusiform, sometimes curved, .75 to 1 in. long, crowned by the large calyx-tube, ridged, sparsely pubescent; the pedicels unequal, .2 to .4 in. long. Korth. Verh. Nat. Gesch. Bot. t. 34: Hook. fil. Fl. Br. Ind. III. 31: Havil. in Journ. Linn. Soc. XXXIII. 81; Wall. Cat. 6103 A.E.C. (in part) and 6107 in part. *Nauclea Gambier*, Hunter in Linn. Trans. IX. 218 t. 22; Flem. in As. Res. XI. 187. *U. acida*, Roxb. Fl. Ind. I. 520. *Nauclea acida*, Hunter in Linn. Trans. IX. 223.

SINGAPORE: *Cunning* 2403; *Anderson* 95; *Ridley* 2843; *Walker* 90; *King's Collector* 1158; *Hullett* 361. PERAK: *King's Collector* 2262. JOHOR: *King* 671. MALACCA: *Derry* 59; *Griff.* 2757.—DISTRIB. Over the whole Malayan Archipelago either cultivated or wild.

Maingay No. 827 differs from the sheets above noted in having brown leaves and rusty-pubescence. This may be the species named *U. acida* by Roxburgh whose description makes it impossible now to distinguish it from *U. Gambier*.

14. *UNCARIA CANESCENS*, Korth. Verh. Nat. Gesch. 172. A slender creeper; young branches thicker than a crow-quill; grooved, compressed and obtusely 4-angled, minutely pubescent. *Leaves* coriaceous,

olivaceous and shining on the upper surface, pale and dull on the lower (when dry), elliptic or ovate-elliptic, abruptly, bluntly and shortly acuminate, rounded or slightly narrowed at the base; upper surface glabrous except the puberulous midrib and nerves, the lower minutely pale-puberulous; main-nerves 5 or 6 pairs, depressed on the upper and prominent on the lower surface, slightly curved, ascending; length 3·5 to 5 in.; breadth 1·85 to 3 in.; petioles ·5 to ·7 in., pubescent. *Peduncles* slender, slightly longer than the petioles, densely rusty-pubescent in the upper parts bracteate about or below the middle; heads ·5 or ·6 in. in diam. *Calyx* ·15 in. long, shortly stalked, adpressed rusty-pilose, the tube double-fusiform, the mouth expanded, its lobes broad, blunt, glabrous within. *Corolla* rather more than twice as long as the calyx, pilose, the tube very narrowly cylindrical; the lobes of the mouth short, lanceolate-ovate, sub-acute, glabrous inside. *Capsules* unknown. Hook. fil. Fl. Br. Ind. III. 29: Havil. in Journ. Linn. Soc. XXXIII. 80.

PERAK: *King's Collector* 3871, 4584. PENANG: *Griffith, Curtis* 331.

15. *UNCARIA DASYONEURA*, Korth. Ver. Nat. Gesch. 169. Young branches obtusely 4-angled, glabrous. *Leaves* elliptic or elliptic-rotund, shortly, abruptly and bluntly acuminate, the base rounded or narrowed, upper surface dark-brown when dry, glabrous, shining; the lower paler brown; laxly hirsute on the midrib and nerves, otherwise glabrous, rarely with tufts of hair in the nerve axils; main-nerves 4-6 pairs, very slightly curved, ascending, distinct below; the intermediate veins horizontal: length 3 to 4 in.; breadth 1·75 to 2·25 in.; petioles about ·5 in. long, narrowly winged above, glabrous; *stipules* minute; entire. *Peduncles* shorter than the petioles, broad, glabrous and compressed at the base, thin and pubescent in the upper two-thirds, with deciduous, linear-oblong bracts at the point of constriction. *Flowers* sub-sessile. *Calyx* narrowly urceolate, minutely ferruginous-tomentose, about ·15 in. long; its limb with broad, blunt lobes. *Corolla* three times as long as the calyx: the tube narrowly cylindrical, adpressed hairy, the limb shortly campanulate, with 5 blunt lobes, glabrous inside. *Capsules* narrowly double-fusiform, glabrous, ·8 in. long, their pedicels shorter. Miq. Fl. Ind. Bat. II. 143; Hook. fil. Fl. Br. Ind. III. 31; Havil. in Linn. Journ. XXXII. 82. *U. Gambier*, Thw. Enum. Pl. Zeyl. 138. *U. elliptica*, R. Br. in Wall. Cat. 6104 A. (in part), B.

MALACCA: *Griffith* 2756; *Maingay* (K.D.) 827/2. SINGAPORE: *Lobb*. PENANG: *Phillips; Curtis* 1070. PERAK: *King's Collector* 2501.—DISTRIB. Java, Ceylon.

16. *UNCARIA ATTENUATA*, Korth. in Verh. Nat. Gesch. Bot. 170; t. 34. Young branches thinner than a goose-quill, obtusely 4-angled, minutely rusty-pubescent. *Leaves* coriaceous, broadly elliptic or ovate-

elliptic, slightly narrowed at base, the apex with a very short, blunt acumen; upper surface dark olivaceous-brown, shining; lower warm brown, with short pale brownish hairs on the midrib, nerves, and their axils, and on the distant transverse veins: main-nerves 6 to 8 pairs, boldly prominent on the lower, depressed on the upper surface; rather straight, ascending; length 3 to 5 in.; breadth 1.75 to 3 in.; petiole .4 to .5 in. *Peduncles* solitary, axillary, about twice as long as the petioles, much compressed in the lower half, rusty-pubescent. *Heads* (to the ends of the styles) nearly 1.5 in. in diam. *Flowers* shortly pedicellate. *Calyx* .15 in. long, funnel-shaped, rusty-tomentose; the tube slightly inflated, the limb as long as the tube with short blunt teeth. *Corolla* twice as long as the calyx, narrowly cylindric, the mouth abruptly expanded and cut into 5 deep, broad, blunt, oblong lobes. *Capsules* narrowly double-fusiform, crowned by the wide calyx-limb, .7 to .9 in. long, rusty-tomentose. *U. Gambier*, Wall. Cat. 6105 C. *in part.* Hook. fil. Fl. Br. Ind. I. 29; Havil. in Journ. Linn. Soc. XXXIII, 83. ? *U. sclerophylla*, Deless. Ic. Select. III. t. 81.

MALACCA: *Holmberg* 889. PENANG: *Hunter, Phillips, Curtis* 135. PERAK: *King's Collector* 4880; *Wray* 3150. TENASSERIM and ANDAMANS: *Helper (K.D.)* 2767.—DISTRIB. Borneo; ? Java.

DOUBTFUL SPECIES.

UNCARIA OVATA, R. Br. in Wall. Cat. 6112: Hook. fil. Fl. Br. Ind. III. 29. The single sheet bearing the No. 6112 in the Wallichian Herbarium at Burlington House has two things glued down on it, viz., two twigs of *U. Gambier*, Roxb., and a third twig which must, by exclusion, be this. Unfortunately a specimen exactly resembling this third twig, collected by Finlayson and probably, like so many of his plants, in Siam, was issued by Wallich under the number 6103 D. and the name *U. Gambier*, while another also exactly like it, but collected in Sylhet, was issued by him under the number 6107 and the name *U. sessilifolia*. I have seen no Malayan specimens which resemble these two except the one attributed by Wallich to Singapore, which I, therefore, believe must have been so attributed as the result of some confusion of specimens at the time of issue.

7. COPTOSAPelta, Korth.

Scandent shrubs with terete branches. *Leaves* coriaceous, softly hairy beneath; stipules small, triangular, deciduous. *Flowers* in terminal many-flowered often thyrsoid panicles; the buds 5-angled; the pedicels short, bi-bracteolate. *Calyx-tube* ovoid, 5-ridged, the limbs shortly 5-toothed, persistent. *Corolla* coriaceous, salver-shaped; the tube narrow, its throat naked or hairy; the limb deeply divided into 5 linear-oblong, blunt, valvate lobes, longer than or as long as the tube. *Stamens* 5, inserted on the throat; anthers long, linear, flexuose, bifid at

the base, hairy on the back; filaments short, subulate. Ovary 2- to 3-celled, with many ascending ovules, the placentas on the septum. Style short; stigma exserted, long-fusiform, or quadrangular. Capsule 2-3-celled, sub-globose, loculicidally dehiscing by 2 or 3 valves. Seeds small, numerous, peltate, imbricate, winged; embryo straight, in fleshy albumen.—DISTRIB. Species all Malayan.

Corolla-tube nearly as long as the lobes, its throat glabrous;

calyx-tube under .05 in. in diam. 1. *C. flavescens*.

Corolla-tube much shorter than the lobes, its throat densely

woolly; calyx-tube more than .15 in. diam. 2. *C. Griffithii*.

1. COPTOSAPelta FLAVESCENS, Korth. in Ned. Kruidd. Arch. II. 113. Young branches, panicles and under surfaces of the leaves covered with soft, minute, partly deciduous hair. Leaves elliptic or ovate, minutely apiculate, the base rounded, somewhat narrowed; upper surface glabrous and shining; main-nerves 4 or 5 pairs, curving upwards, slightly prominent on the lower surface; length 2.5 to 4 in.; breadth 1.5 to 2.5 in.; petiole .2 to .3 in., pubescent. Stipules very acuminate, .15 in. long. Flowers about 1 in. long (of which the calyx forms only .15 in.) Calyx under .05 in. in diam., tubular, 5-ridged, pilose; the 5 teeth small, erect, sub-glabrous. Corolla-tube .3 in. long, narrow; the lobes of the limb oblong, blunt, .4 in. long, reflexed, glabrous or sub-glabrous. Anthers and stigma nearly as long as the corolla-lobes. Stigma cylindric-fusiform, puberulous. Capsule broadly obovoid, glabrous, .3 or .4 in. in diam. Hook. fil. Fl. Br. Ind. III. 35. *Stylcoryne macrophylla*, Wall. Cat. 8405 (excl. syn.) *Webera macrophylla*, Roxb.

PENANG: Porter, Griffith (K.D.) 2788. MALACCA: Maingay (K.D.) 908. PERAK: Wray 1801, 2521, 4276; King's Collector 4651, 7938, 10384, 10393, 10853. PAHANG: Ridley 2192.—DISTRIB. Burma; Malay Archipelago.

2. COPTOSAPelta GRIFFITHII, Hook. fil. Hook. Ic. Plant. t. 1089: Fl. Br. Ind. III. 35. Leaves as in *C. flavescens*; but with only 3 pairs of nerves and the under surface paler and rather more hairy; also the panicles with fewer flowers. Flowers only .85 in. long, their buds nearly .15 in. in diam. Calyx rather more than .2 in. long and .15 in. in diam., the tube densely tomentose: the limb scantily hairy, cylindric, nearly as long as the tube; its 5 or 6 teeth short, broad, erect. Corolla-tube .25 in. long and half as much wide, the throat densely woolly, the lobes of the limb linear-oblong, obtuse, reflexed, twice as long as the tube, rusty adpressed-pubescent on the lower, glabrous or sub-glabrous on the upper surface.

MALACCA and SINGAPORE: Griffith (K.D.) 2789; Maingay (K.D.) 907. PERAK: Scortechini 1983; Wray 1827; King's Collector 4366, 7938.

SINGAPORE: *King's Collector* 75. *Anderson* 101; *Ridley* 6824, 6891.
PAHANG: *Ridley* 2229.

8. MUSSAENDOPSIS, Baillon.

A tall tree, all parts glabrous except the inflorescence. *Leaves* very coriaceous, broad, entire, petiolate, main-nerves few, stout, veins indistinct; stipules coriaceous, oblong, blunt. *Flowers* shortly pedicellate in lax, axillary, cymose panicles, with opposite spreading branches. *Calyx* puberulous, campanulate; the limb truncate, with 5 minute, broad lobes, one of them occasionally developed into a large coloured obovate 5-nerved lobe attenuate at base, 1 in. long. *Corolla* short, puberulous outside, ovoid in bud: the tube very short or none, the lobes 5, thick, oblong, slightly twisted in bud, slightly papillose near the margin. *Disc* fleshy. *Stamens* 5; anthers linear-oblong, curved. *Style* fleshy, short, lobes of the stigma short, thick, rounded. *Ovary* 2-celled, the placentas attached to the septum. *Ovules* numerous. *Fruit* capsular, many-seeded, septicidal. *Seeds* small, winged at the margin; embryo fleshy with scanty albumen. A single species, Malayan.

MUSSAENDOPSIS BECCARIANA, Baillon in *Adansonia*, XII. 282. A tree 100 feet high. *Leaves* sub-orbicular to elliptic, shortly apiculate, 4 to 6 in. long and 2·75 to 4·5 in. broad: main-nerves about 6 pairs, rather straight, depressed on the upper and prominent on the lower surface: petiole 75 to 1 in. long: stipules oblong, blunt, almost as long as the petiole. *Panicles* about 8 in. in diam., and half as much long; their peduncles 3 to 4 in. long. *Calyx* 15 in. long: the foliaceous lobe obovate, tapering to the base, 1 to 1·25 in. long and 6 to 8 in. broad, white. *Corolla* lobes about 15 in. long and 1 in. broad, spreading or reflexed. *Capsule* oblong-subclavate, slightly compressed, 6 in. long; puberulous, very coriaceous, splitting from above downwards, the septum also coriaceous. *Stapf* in *Hook. Ic. Pl.* 2388. *Creaghia fagraeopsis*, *Scortechini* in *Journ. Bot.* 1884, 370.

MALACCA: *Maingay* (K.D.) 835, 1692; *Derry* 1044. PERAK: *Scortechini*, *King's Collector* 6195.—DISTRIB. Borneo, *Beccari*, *Haviland*; Sumatra, *Ridley* 9016.

9. GREENIA, W. & A.

Shrubs with terete branches. *Leaves* sometimes in whorls of three, membranous; stipules various. *Flowers* small, sessile, in terminal, paniced, scorpioid cymes, with or without bracteoles. *Calyx-tube* turbinate with 4 or 5 short, erect, persistent, subulate or ovate lobes, one longer than the others. *Corolla* funnel-shaped, pointed in bud, pubescent outside: the tube long almost glabrous inside; the limb with 4 or 5 erect ovate lobes, valvate in bud, but twisted. *Stamens* 4 or 5, inserted

by short filaments on the mouth of the corolla; anthers bifid at base and apex, slightly exerted. *Ovary* 2- (rarely 3-) celled; ovules numerous on peltate placentas attached to the septum: *style* filiform; stigmas 2, exerted, linear, revolute. *Capsule* small, globose, crustaceous, 2-celled, dehiscing septicidally by 2 valves. *Seeds* falcate or rather square, somewhat compressed; the testa reticulate and sub-acute; embryo small, clavate, in fleshy albumen.—*DISTRIB.* Species 5 or 6, Malayan and Burmese.

GREENIA JACKII, W. & A. Prod. 404. An evergreen shrub. *Leaves* oblanceolate, minutely acuminate, gradually narrowed from above the middle to the short petiole, drying brown: upper surface with the midrib minutely pubescent; otherwise sparsely adpressed-puberulous, or quite glabrous; lower surface softly tawny-pubescent, especially on the midrib and 20 to 30 pairs of slightly curved, spreading main-nerves, or subglabrous; length 6 to 12 in.; breadth 2 to 3.5 in.; petioles .4 to 1 in., pubescent. *Stipules* broad, abruptly acuminate, .4 in. long, or broadly lanceolate and about .6 in. long. *Panicles* terminal, branched, shorter than the leaves, on long, compressed, pubescent peduncles, the lower branches nearly as long. *Flowers* numerous, secund, sessile, .3 to .35 in. long; the corolla several times longer than the calyx. *Capsule* globose, less than .1 in. in diam. crowned by the spreading calyx-lobes; the epicarp adpressed, pubescent, peeling off and showing the glabrous endocarp. Hook. fil. Fl. Br. Ind. III. 41. *Rondeletia corymbosa*, Jack in Mal. Misc. I. 4; *R. spicata*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 139. *Wendlandia? corymbosa*, Wall. Cat. 6276; DC. Prod. IV. 413; Kurz For. Fl. Burma. II. 75; *W. ? spicata*, DC. l.c. 412.

In all the Provinces.

Rather variable as regards pubescence and the shape of the stipules: differs from the closely allied *G. Wightiana*, W. & A., chiefly in its leaves, having twice as many nerves as that species.

10. DENTELLA, Forst.

A small prostrate much-branched herb with 4-angled stems thinner than a crow-quill, rooting at the nodes, 4 to 12 inches long. *Leaves* small, shortly petioled; the stipules short, scarious. *Flowers* small, solitary in the axils of the leaves and forks of the branches, sessile or shortly pedicelled. *Calyx-tube* sub-globose; the limb membranaceous, tubular, toothed, persistent. *Corolla* white, funnel-shaped; the tube hairy inside: the limb with five 2- or 3-toothed lobes, valvate in the bud, but with the edges induplicate. *Stamens* 5, attached in the middle of the corolla-tube; *anthers* included, dorsifixed, linear, entire at base and apex; filaments short. *Ovary* 2-celled, with numerous ovules or hemispheric

placentas. *Style* short; stigmas 2, filiform, papillose. *Fruit* rather large for the size of the plant, dry, globose, 2-celled, indehiscent, with many minute, angled, dotted seeds.—**DISTRIB.** A single species inhabiting Asia, tropical Australia, and the islands of the Pacific.

DENTELLA REPENS, Forst. Char. Gen. 26; t. 13. *Leaves* obovate-spathulate or oblanceolate, one-nerved, puberulous, .2 to .3 in. long, and less than .1 in. broad. *Flowers* .25 to .3 in. long. *Calyx-tube* somewhat compressed, shorter than the 5-toothed erect limb. *Corolla* longer than the calyx. *Style* bifid nearly to the base. *Capsule* pellucid-hispid or glabrous, somewhat compressed, broadly ovoid, with 2 vertical grooves, about .1 in. long, crowned by the membranous calyx-tube. Roxb. Fl. Ind. I. 532; Wall. Cat. 6206; W. & A. Prod. Fl. Penins. Ind. 405; Dalz. & Gibs. Fl. Bomb. 115; Hook. fil. Fl. Br. Ind. III. 42. *Oldenlandia repens*, Linn. Mant. 40. *Hedyotis repens*, Lam. III. 1424 (not of Don). *Lipaya telephioides*, Endl. Atakt. t. 13.

In moist spots near cultivation: in all the provinces.

11. ARGSTEMMA, Wall.

Small, delicate, flaccid or somewhat fleshy herbs, glabrous or pilose, the hairs sometimes jointed. *Leaves* usually membranous, the leaves in pairs, equal or very unequal, opposite or sub-verticillate. *Stipules* entire, persistent, or obsolete. *Flowers* in pedunculate cymes or umbels. *Calyx-tube* short, campanulate, turbinate or obconic: its lobes usually 4 or 5 (sometimes 3-7). *Corolla* white, rotate, with 4 or 5 valvate lobes. *Stamens* 4 or 5; anthers large, elongate, free, connivent or coherent, erect or declinate, dehiscing by 1 or 2 terminal pores or by longitudinal slits; filaments short. *Ovary* 2-celled; ovules numerous on placentas projecting from the septum. *Style* filiform, stigma capitellate. *Capsule* membranous or coriaceous, 2-celled, many-seeded, dehiscence valvular or opercular. *Seeds* minute, angled or compressed; testa reticulate or muriculate, punctate; embryo very small, in dense fleshy albumen.—**DISTRIB.** Species about 40 or 50, mostly from mountains, in sub-tropical Asia and in Malaysia.

Leaves of the pairs equal in size, or one smaller but not minute:—

- | | | | | | |
|--------------------------------------------------------------|-----|-----|-----|-----|----------------------------|
| Leaves numerous, in a pseudo-whorl near the apex of the stem | ... | ... | ... | ... | 1. <i>A. acuminatum</i> . |
| Leaves a single pair at the apex of the stem:— | | | | | |
| Flowers .15 in. long | ... | ... | ... | ... | 2. <i>A. pictum</i> . |
| Flowers .3 in. long | ... | ... | ... | ... | 3. <i>A. subinequale</i> . |
| Leaves two pairs at the apex of the stem | ... | ... | ... | ... | 2. <i>A. pictum</i> var. |

tetraphylla.

- Leaves in a pseudo-whorl at the base of the stem ... 6. *A. nutans* var.
verticillata.
- Leaves numerous scattered along the whole length of the stem :—
- Leaves glabrous :—
- Leaves thickly membranous, narrowly elliptic, acute at the base ... 4. *A. Yappii*.
- Leaves thinly membranous, broadly ovate, the base widely cordate ... 5. *A. membranaceum*.
- Leaves more or less pubescent :—
- Cymes dense, many-flowered :—
- Leaves oblong-elliptic, oblong, or elliptic, sub-acute, flowers drooping in bud ... 6. *A. nutans*.
- Leaves broadly oblanceolate, shortly acuminate; flowers erect in bud ... 7. *A. urticifolium*.
- Cymes lax, few-flowered ... 8. *A. Ridleyi*.
- Leaves of the pairs very unequal, the smaller one minute and about equal to the stipules :—
- Leaves a single pair at the apex of the stem :—
- Corolla with narrow buds, its lobes lanceolate; anthers with apical appendages longer than themselves, the filaments thick; leaves with 5 or 6 pairs of main-nerves ... 9. *A. unifolium*.
- Corolla ovate in bud; its lobes boldly nerved, ovate; anthers sessile, their apical appendages short: leaves with 9 to 14 pairs of main-nerves ... 10. *A. unifolioloide*.
- Leaves several pairs crowded near the apex of the (often short) stem, pubescent; flowers 35 to 4 in. long, glabrous: calyx-lobes short, acute; calyx and corolla glabrous ... 11. *A. spinulosum*.
- Leaves scattered along the whole length of the stem :—
- Leaves more or less pubescent on both surfaces, the lower not glaucous: calyx hairy and corolla glabrous externally ... 12. *A. Elatostemma*.
- Leaves pubescent on both surfaces; or if glabrescent (var.) the midrib, nerves and edges with a few short, thick hairs; calyx and corolla pubescent externally ... 13. *A. involucreatum*.
- Leaves quite glabrous, succulent :—
- Leaves linear-oblong; main-nerves obscure ... 14. *A. Curtisii*.
- Leaves elliptic- or oblanceolate-oblong; with 7 to 12 pairs of main-nerves ... 15. *A. subcrassum*.
- Leaves glabrous on both surfaces, occasionally with a few adpressed hairs, not glaucous beneath :—
- Leaves thinly membranous, broadly oblanceolate, flowers in terminal umbels ... 16. *A. perakense*.
- Leaves thickly membranous :—
- Leaves with broad, obliquely pseudo-cordate bases ... 17. *A. oblongum*.

Leaves with narrow bases never pseudo-cordate:—

- Stem terete, scurfy; leaves more or less oblong-lanceolate, 1·35 to 4·5 in. long: flowers 4 in. long: calyx-lobes broad, ovate ... 18. *A. ophirensis*.
 Stem angled, not scurfy; leaves lanceolate, 2 to 3 in. long: calyx-lobes lanceolate, acuminate ... 19. *A. Wrayi*.

Leaves glabrous except the midrib and nerves, under surfaces glaucous:—

- Leaves distinctly petiolate, ovate, or oblong-lanceolate, unequal but not cordate at the base, 75 to 1·35 in. long: calyx campanulate ... 20. *A. Hookeri*.
 Leaves sessile or very nearly so, elliptic-oblong, unequal and cordate at the base, 1·5 to 2·15 in. long: calyx rotate ... 21. *A. bicolor*.

1. ARGOSTEMMA ACUMINATUM, King n. sp. Glabrous except occasionally for a few scattered minute pale hairs on both surfaces of the leaves; about 12 in. high. *Stem* erect, unbranched, twice as thick as a crow-quill when dry, obscurely 4-angled or minutely winged, naked. *Leaves* crowded near the apex of the stem, thinly membranous when dry, very unequal; the larger of each pair oblong-lanceolate, sometimes sub-oblique or sub-falcate, the apex acuminate, gradually narrowed from above the middle into a petiole of varying length; both surface glabrous; drying of a deep olivaceous colour, the midrib broad and rather distinct and the 10 to 15 pairs of curved spreading nerves indistinct; length 3·5 to 6·5 in.; breadth 1 to 1·5 in.; petioles 1 to 4 in.; the smaller leaf of the pair sessile, sub-rotund, under 1 in. long. *Stipules* usually with broad bases and acuminate apices about the same length as the smaller leaf. *Cymes* terminal, about half as long as the leaves, pedunculate, di- or tri-chotomous; the peduncle and branches slender, slightly swollen and bracteolate near the divisions. *Flowers* few, 3 in. long on capillary pedicels longer than themselves and bracteolate at the base. *Calyx* campanulate with 5 broad, blunt, spreading lobes. *Corolla* nearly three times as long as the calyx, its lobes slightly shorter than the staminal cone: *anthers* linear-lanceolate, acuminate, dehiscing longitudinally, the connective forming narrow marginal wings and long flattened, apical appendages. *Style* somewhat longer than the anthers: stigma clavate. *Capsules* almost hemispheric, crowned by the obscurely toothed cupular remains of the calyx, smooth, 15 in. in diam. *Seeds* rather large for the genus, angled, pitted, black.

PENANG: Wallich. SELANGOR: Ridley 8233.

This plant was collected 65 years ago in Penang by Wallich, and until Mr. Ridley obtained it in Selangor it does not appear to have been found since. In the

Flora of British India it has been put under *A. verticillatum*, Wall.—a species originally described by Wallich from the Nepal Himalaya, from which species this differs amongst other things in its larger size and more numerous leaves.

2. ARGOSTEMMA PICTUM, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 327. A succulent herb 3 to 5 in. high. *Stem* 1 to 2 in. long, twice as thick as a crow-quill, ebracteate, glabrous. *Leaves* a single pair at the apex of the stem, membranous, sub-equal, broadly or rotund-ovate, sub-acute or obtuse; the base broad, sub-truncate or slightly cordate, upper surface blackish-brown when dry, glabrous or with sparse, short, thick hairs, the midrib and nerves faint (when dry); lower surface paler, glabrous or with a few coarse hairs on the 4 or 5 pairs of rather straight, ascending, broad, flat main-nerves; midrib broad, flat; length 1.5 to 3.5 in.; breadth 1.25 to 2.5 in.; petiole under .1 in. or none. *Stipules* lanceolate or ovate, acute, .2 to .3 in. long. *Umbel* solitary, terminal, on a slender, ebracteolate peduncle, more slender than the stem and from .75 to 2 in. long. *Flowers* from 8 to 12, drooping in bud, .15 in. long (to the end of the exerted style), on pedicels more than twice as long, with a whorl of small bracteoles at their bases. *Calyx* narrowly campanulate, coarsely puberulous, with 5 acute, triangular, erect lobes. *Corolla* nearly twice as long as the calyx, its 5 lobes oblong, obtuse, reflexed, rather longer than the stamens. *Anthers* free, oblong, blunt, dehiscing longitudinally, not apiculate, the base bifid, the connective behind the cells thickened; filament short, broad, thick. *Style* filiform, longer than the anthers: stigma small, capitate. Wall. Cat. 8392: Benn. Pl. Jav. Rar. 94: Hook. fl. Fl. Br. Ind. II. 43.

PERAK: *King's Collector* 3105, 3110, 10585, 10586; *Scortechini* 310; *Wray* 1202. PENANG: *Curtis* 480. MALACCA: *Maingay* (K.D.) 896.

VAR. *tetraphylla*. Leaves in two unequal pairs, or three in a whorl.

PERAK: *Wray* 1202.

3. ARGOSTEMMA SUBINEQUALE, Benn. Pl. Jav. Rar. 95. Glabrous; succulent when fresh, 4 to 8 in. high: *stem* fleshy when fresh, thinner than a goose-quill, 1.5 to 4.5 in. long, ebracteolate. *Leaves* membranous, only a single pair, somewhat unequal (rarely a whorl of three) broadly ovate-oblong to ovate-elliptic, acute or bluntly acuminate, the base truncate and broad or slightly cuneate; upper surface brown when dry, glabrous, the nerves and midrib indistinct; lower surface paler, glabrous except for a few hairs on the broad flattened midrib and 5 or 6 pairs of broad, flat, obliquely ascending main-nerves; length of the longer leaf 4 to 6 in.; breadth 2.5 to 3.5 in.; of the smaller leaf 2 to 3 in.; breadth 1.75 to 2 in.; petioles .1 to .2 in. *Stipules* lanceolate, .3 to .75 in. long. *Cymes* umbellate, terminal, solitary or in pairs, pedunculate; peduncles slender, bearing a pair or whorl of lanceolate bracteoles near the middle.

Flowers '3 in. long, numerous, on pedicels shorter or longer than themselves, pubescent, bracteolate at the base. *Calyx* campanulate; the tube small, narrow; the 4 lobes thin, lanceolate, much longer than the tube. *Corolla* longer than the calyx; its lobes 5, imbricate, ovate-lanceolate, acute, spreading slightly, imbricate. *Anthers* alternately quite free, at first slightly cohering in the upper half, linear, not winged but with a flattened, 2-pored apical appendage, the bases thickened and cordate: filaments free, nearly half as long as the anthers. *Style* as long as the anthers; stigma filiform.

PERAK: *King's Collector* 2242.—DISTRIB. Sumatra.

4. ARGOSTEMMA YAPPII, King n. sp. Glabrous; stem erect, unbranched, 6 to 12 inches high, succulent, when dry nearly as thick as a goose-quill at the base, tapering rapidly upwards. *Leaves* almost equal in size, thick (almost fleshy when fresh), elliptic, narrowed pretty equally at both ends, shining, upper surface pale-olivaceous, minutely scaly when dry, the lower olivaceous yellow, the midrib distinct and the 6 to 8 pairs of spreading main-nerves indistinct on both: length 2 to 3·5 in.; breadth '75 to 1·35 in., petiole '15 to '5 in., winged in its upper half. *Stipules* free, ovate-oblong, blunt, '4 to '7 in. long. *Cymes* terminal, trichotomous, on pedicels exceeding an inch in length, with a whorl of bracteoles at the apex and (like the branches) pink when fresh, branches often trichotomous. *Flowers* few, '5 in. long, on slender pedicels longer than themselves. *Calyx* campanulate; the lobes 5, triangular, acute, spreading, as long as the tube. *Corolla* more than twice as long as the calyx, green; its 5 lobes oblong-lanceolate, sub-acute, spreading, much longer than the short tube and slightly longer than the staminal cone. *Anthers* lanceolate, dehiscing longitudinally, coherent by the marginal wings of the connective, shortly apiculate, slightly shorter than the filiform style: stigma small.

PERAK: *Scortechini* 245, 1334; *Wray* (no number); *Yapp* 435.

Named in honour of Mr. R. H. Yapp who, as botanist, accompanied an exploring party sent to the Malayan Peninsula by the University of Cambridge.

5. ARGOSTEMMA MEMBRANACEUM, King n. sp. Glabrous; except for a few slender adpressed hairs on the upper surface of the leaves and on the calyx and pedicels. *Stem* erect, 8 to 10 in. high, thinner than a goose-quill, angled. *Leaves* sub-equal, few, scattered, large, thinly membranous, green when dry, slightly unequal-sided, the apex sub-acute; the base broadly ovate-cordate, main-nerves 4 or 5 pairs, the lower one branched on the side and spreading, the upper ascending, all distinct and pale on both surfaces, length 2·5 to 5 in.; breadth 1·5 to 3·5 in.; petiole about as long as the blade. *Cymes* axillary and terminal, condensed, 6- to 12-flowered, on long, slender, sometimes puberulous

peduncles, bearing 1 or 2 small leaf-like bracts near the apex, otherwise naked. *Calyx* broadly ovoid, about .1 in. long, puberulous, the tube broadly ovoid, the teeth narrowly lanceolate; pedicel nearly as long and also puberulous. *Corolla* unknown.

PENANG: *Curtis* 955.

6. ARGOSTEMMA NUTANS, King n. sp. *Stem* erect, 4 to 12 in. high, sometimes decumbent and rooting at the base, thicker than a crow-quill, bearing many scurfy but deciduous hairs. *Leaves* somewhat unequal but not conspicuously so, membranous, oblong, elliptic, or elliptic-oblong, occasionally slightly obovate, often more or less oblique, the apex acute, the base cuneate rarely rounded; upper surface dark olivaceous-brown, densely and uniformly adpressed glandular-hispidulous; the lower surface paler, coarsely pubescent on the midrib and nerves; almost glabrous between; main-nerves 5 to 8 pairs, curved, spreading and ascending, rather prominent on the lower surface only; length from 1.75 to 4 in.; breadth .75 to 2 in.; petioles .2 to .8 in., pubescent. *Stipules* ovate-lanceolate, .15 to .25 in. long, deciduous. *Umbels* cymose, terminal, usually solitary, on deciduous, pubescent peduncles, 1 to 2.5 in. long, surrounded at their bases by a whorl of lanceolate, small, pubescent bracteoles; many-flowered. *Flowers* .3 in. long, pendulous on pubescent pedicels 2 or 3 times as long as themselves. *Calyx* campanulate; the tube short, densely hairy outside: the lobes 5, ovate, sub-erect, longer than the tube, almost glabrous. *Corolla* slightly longer than the calyx, sparsely glandular-hairy outside; the 5 lobes membranous, reflexed, lanceolate, acute, longer than the *stamens*. *Stamens* 5, free, basifixed by the short flat filaments opposite the lobes of the corolla; *anthers* linear, dehiscing longitudinally, the connective coriaceous, with a short broad slightly notched apical appendage. *Style* filiform; stigma small, slightly exerted. *Capsules* erect, ovoid-globular, ridged, hairy, crowned by the short erect calyx-teeth, 2-celled, many-seeded, .05 in. in diam.

PERAK: *Wray* 843, 1296; *King's Collector* 585, 7190, 7802, 8060; *Scortechini* 157.

VAR. 1 *glabra*. Only a few inches high; all parts glabrous; *leaves* with shorter petioles and less narrowed at the base than in the type.

PERAK: *Scortechini* 297; *Wray* 2646; *King's Collector* 1985.

VAR. 2 *verticillata*. Only a few inches high; glabrous; *leaves* few (often only a single pair) lying flat on the ground: peduncle of umbel several times longer than the leaves; *umbels* often few-flowered.

PERAK: *Scortechini* 310; *King's Collector* 427, 1920.

7. ARGOSTEMMA URTICIFOLIUM, n. sp. King. *Stem* decumbent and rooting at the base, 8 to 12 in. long, thinner than a goose-quill and scurfy when dry. *Leaves* membranous, somewhat unequal in size;

broadly oblanceolate, shortly acuminate, cuneate and sometimes slightly unequal at the base; upper surface dark-brown with sparse, coarse, glandular, bulbous hairs, the midrib and main-nerves obscure; lower surface paler, with many glandular hairs on the bold midrib and slightly prominent 7 or 8 pairs of spreading, slightly curved main-nerves; the interspaces with a few similar hairs, minutely papillose; length of larger leaf of the pair 3 or 4 in.; of the smaller 2 to 2.5 in.; breadth of the larger 1.7 to 2 in.; of the smaller .9 to 1.2 in.; petioles from .3 to .7 in., glandular-pubescent. *Cyme* umbellate, terminal, solitary, 10- to 12-flowered, pedunculate; the peduncle 4-angled, scurfy like the stem and also glandular-hairy. *Flowers* on deciduously hairy pedicels, .3 to .4 in. long, bracteolate at the base. *Calyx* globular-campanulate, densely glandular-hairy outside; the teeth short, erect, acute, fleshy, glabrous inside; disk large tumid. *Corolla* unknown. *Capsule* globular, crowned by the small erect calyx-teeth and the disk hairy at first, but becoming glabrous; 2-celled, the placentas axile. *Seeds* numerous, triangular, pitted, black.

PERAK: *Scortechini*.

This appears to be the same species as one of Beccari's Sumatra plants (Herb. Becc. Argostemma 33).

8. ARGOSTEMMA RIDLEYI, King n. sp. Stem decumbent or prostrate rooting in its lower half, about as thick as a crow-quill, 6 or 8 in. long, 4-angled, softly rusty-pubescent. *Leaves* in each pair slightly unequal, membranous, narrowly oval or oval-oblong, acute, the base cuneate; upper surface darkly olivaceous, densely and coarsely pubescent on the midrib and nerves and with some scattered hairs on the spaces between; lower surface paler, the pubescence on the midrib and 5 or 6 pairs of main-nerves not so coarse as on the upper, the reticulations with a single row of hairs, the areolæ glabrous, but with minute white scales; length .8 to 1.8 in.; breadth .4 to .8 in.; petioles .15 to .6 in., densely and coarsely pubescent. *Stipules* lanceolate to broadly ovate, their apices acute and bifid, about .2 in. long. *Cyme* terminal, solitary, pedunculate, longer than the leaves, umbellately 2-3-flowered; rusty-pubescent in all its parts; peduncle .75 to 1.5 in. long, bearing a whorl of bracteoles about the middle and another at the base of the pedicels. *Flowers* .4 in. long, their pedicels much longer. *Calyx* campanulate with 5 broad spreading ovate-acute lobes slightly longer than the tube. *Corolla* unknown. *Capsules* obconic, crowned by the prominent calyx-teeth, .15 in. in diam., pubescent. *Seeds* numerous, small.

MALACCA: *Ridley* 10110.

9. ARGOSTEMMA UNIFOLIUM, Benn. Pl. Jav. Rar. 94. Rhizome short, fleshy; whole plant glabrous, succulent, 6 to 8 in. high. *Stem*

simple, erect, bearing, about or below the middle, a pair of lanceolate bracts about .2 in. to .4 in. long and, at the base of the peduncle, a whorl composed of a single pair of very unequal thin membranous (when dry) leaves and a pair of stipules; the larger leaf broadly ovate, shortly acuminate, the base rounded or cordate; when dry the upper surface dark brown, the midrib broad and channelled, the nerves elevated; lower surface pale brown, the midrib and 5 or 6 pairs of spreading slightly curved nerves slightly prominent; length 3 to 6 in.; breadth 1.5 to 3 in.; petiole .4 to .8 in. Smaller leaf sessile, ovate-lanceolate, acute, 1-nerved, .2 to .5 in. long. *Stipules* similar to smaller leaf. *Cymes* terminal, simply or compoundly and laxly *umbellate*, few- or many-flowered; peduncle slender, 1.5 to 8 in. long, with a whorl of narrow bracteoles at the origins of the branches. *Flowers* narrow in bud, .25 in. long; their slender pedicels slightly longer, sometimes lengthening in fruit. *Calyx* under .1 in. long, campanulate, with broad, blunt, thick, short, spreading lobes. *Corolla* narrow in bud, more than twice as long as the calyx; its 5 lanceolate lobes slightly shorter than the erect staminal cone. *Anthers* lanceolate, the cells narrowly linear, cordate at the base, edged by the cohering wings formed by the connective and surmounted by membranous, flat, apical appendage longer than themselves; filaments short, thick, curved. *Capsule* hemispheric, crowned by the rather large calyx, subglabrous, .1 in. in diam., 2-celled, dehiscence circumscissile. Hook. fil. Fl. Br. Ind. III. 45.

JOHOR: *Ridley* 3730. PENANG: *King*; *Curtis* 990; *King's Collector* 2276. MALACCA: *Maingay* (K.D. 895).

10. ARGOSTEMMA UNIFOLIOLIDE, King n. sp. Rhizome woody; stem fleshy when fresh, glabrous, thinner than a goose-quill and angled when dry, 3 to 7 in. high, bearing one or more pairs of lanceolate, glabrous bracts about .25 in. long, and at the base of the peduncle a pair of very unequal membranous leaves and a pair of stipules all in a whorl; the longer leaf sessile, broadly ovate or ovate-rotund, shortly acuminate, the base rounded or cordate; upper surface dark brown when dry, with sparse, coarse, glandular hairs or (in var. *glabra*) glabrous; lower surface pale brown, the broad midrib and main-nerves sparsely glandular-pubescent, otherwise glabrous; main-nerves 9 to 14 pairs, curved, spreading, slightly prominent on both surfaces (when dry) but chiefly on the lower length 5.5 to 10 in.; breadth 3.5 to 6.5 in.; smaller leaf sessile, narrowly ovate, acute, about .5 in. long; the stipules similar but usually narrower. Inflorescence terminal, solitary, pedunculate, paniculately umbellulate, lax, usually many flowered; peduncle and branches glabrous, fleshy when fresh and somewhat stout; bracteoles in whorls (usually of 4), oblong obtuse, concave, connate at the base, about .3 in. long. *Flowers*

rather broad in bud, .2 to .25 in. (sometimes .4 in.) long, the pedicels varying in length, the ultimate umbellules with rather large, broad, blunt bracteoles at the base. *Calyx* under .1 in. long, campanulate, the lobes 5, broad, blunt, thick, spreading. *Corolla* several times longer than the calyx, broadly ovate and angled in bud; the 5 lobes ovate, acute, boldly 1-nerved, longer than the cone of anthers, spreading or reflexed. *Anthers* almost sessile, narrowly linear-lanceolate, the connectival margin narrow and the apicular appendage short. *Capsules* somewhat fleshy, hemispheric, .1 in. in diam., crowned by the small calyx, 2-celled, the dehiscence circumscissile.

PERAK: at elevation of from 2,500 to 4,500 feet; *Scortechini* 282, 384; *Wray* 410.

VAR. *glabra*. *Leaves* glabrous on both surfaces.

PERAK: *Scortechini* 412, 1204; *Wray* 2814; *King's Collector* 5064; *Curtis* 3146.

This differs from *A. unifolium* in its corolla being broadly ovate in bud and having ovate, boldly 1-nerved lobes, in having its anthers almost sessile, with very long cells and short apical appendages. This has also larger leaves with more nerves which are sometimes hairy; its stems are also shorter and stouter.

11. ARGOSTEMMA SPINULOSUM, Clarke in Hook. fil. Fl. Br. Ind. III. 46. *Stem* only 3 to 8 inches long, nearly as thick as a goose-quill, decumbent and rooting at the base, obscurely 4-angled; with a few deciduous flexuose hairs. *Leaves* crowded, subcoriaceous, very unequal, the larger of each pair oblong-ob lanceolate, acute or acuminate, slightly narrowed from above the middle to the somewhat unequally-sided base; upper surface olivaceous, with a few thick, scattered hairs chiefly on the broad depressed midrib and near the edges, otherwise glabrous; the lower pale brown with many thinner hairs on the prominently raised broad midrib and on the nerves, and a few on the interspaces; main-nerves 10 to 14 pairs, curved, spreading, distinct on the lower surface, faint on the upper; length 2.5 to 5 in.; breadth 1 to 1.75 in.; petiole .2 to .5 in. Smaller leaf lanceolate to oblong, sessile, 3- to 5-nerved, .5 to .75 in. long. *Stipules* like the smaller leaves but shorter and with only one nerve. *Umbels* terminal, simple or compound, solitary or several, all on long peduncles shorter than the leaves, sometimes united at their bases; succulent, few-flowered, glabrous, 1.5 to 2 in. long; umbels or umbellules 3- or 4-flowered. *Flowers* .35 to .4 in. long, on slender pedicels of about the same length, with lanceolate scarious bracteoles at their bases, glabrous. *Calyx* campanulate; the limb with 5 triangular acute spreading lobes shorter than the tube. *Corolla* about twice as long as the calyx; its lobes broadly lanceolate, acuminate, shorter than the erect staminal cone: filaments short, curved; *anthers* linear-oblong,

dehiscing longitudinally; the connective with long linear apical process. *Capsule* obconic, smooth, .2 in. long, crowned by the calyx, 2-celled, 2-seeded. *Seeds* minute, dark brown.

PERAK: *Scortechini* 454, 500; *Ridley* 2920; *Wray* 463, 1083, 2910, 2953, 3936; *King's Collector* 2789, 2892, 7520. SELANGOR: *Ridley* 7409.

This species is closely allied to *A. Elatostemma*. It has, however, a shorter stem and larger fewer leaves.

12. ARGOSTEMMA ELATOSTEMMA, Hook. fil. Fl. Br. Ind. III. 45. *Stem* thinner than a goose-quill, 4 to 12 in. long, decumbent and rooting at the lower nodes, deciduously scurfy-hairy, sometimes becoming sub-glabrous. *Leaves* thickly membranous, very unequal; the longer one of the pair somewhat oblique, oblong-lanceolate; the apex broad or sub-acute, sometimes shortly apiculate, more or less narrowed from a little above the middle to the often somewhat unequally-sided or obliquely-cordate base, the edges not ciliate; upper surface glabrous or nearly so, the slightly depressed midrib and main-nerves sometimes puberulous; the lower surface minutely scaly, rusty adpressed-pubescent on the prominent midrib, reticulations, and 10 to 12 pairs (only 7 or 8 in var.) of slightly curved spreading main-nerves; length 1.25 to 2.25 in.; (shorter in var.); breadth .75 to 1 in.; petioles unequal, .15 to .2 in long, scurfy-pubescent; the smaller leaf ovate-lanceolate (broadly ovate in var.) sessile, .15 to .2 in. long, with 2 to 4 pairs of nerves. *Stipules* about the same in size and shape as the smaller leaves. *Corymbs* terminal, solitary, pedunculate, few-flowered, usually shorter than the leaves; the peduncles slender, minutely pubescent or sub-glabrous; bracteoles at the forks, minute. *Flowers* .4 in. long, on slender sometimes puberulous pedicels about as long as themselves. *Calyx* .1 in. long, pubescent, campanulate, with 5 triangular, spreading, acute lobes. *Corolla* white, glabrous, with 5 long lanceolate much reflexed lobes. *Anthers* linear-lanceolate, cohering by the narrow wings and long terminal appendage of the connective, erect, dehiscing by long vertical slits. *Style* long, slender, cylindrical: stigma small, slightly exserted beyond the narrow staminal cone. *Capsule* pyriform, glabrous, crowned by the calyx-teeth, .2 in. long.

PENANG: *Hullett* 195; *Curtis* 962, 2250; *King's Collector* 1605, 1752. SINGAPORE: *Lobb* 295. MALACCA: *Griffith* (K.D.) 2876. PERAK: *Scortechini*; *Wray* 3334; *King's Collector* 2131.

VAR. *obovata*, King. *Leaves* obovate, minutely apiculate, the base obliquely cordate: upper surface with a few scattered, short, thick hairs, length .9 to 1.4 in.; breadth .5 to .75 in. *Corymb* 2- to 4-flowered, its peduncle pubescent, with a whorl of minute bracts near its apex.

PERAK: *King's Collector* 10815.

13. ARGOSTEMMA INVOLUCRATUM, Hemsl. in Hook. Icon. t. 1556. *Stems* thinner than a goose-quill, succulent, decumbent, 4 to 12 in. long with partially deciduous, long, flexuose, white hairs. *Leaves* membranous, very unequal in size, the larger of the pair obliquely and narrowly lanceolate or oblanceolate (linear-ovate-lanceolate or ovate in vars.) more or less narrowed to the slightly unequal base; both surfaces greenish or olivaceous-brown when dry, the lower paler, the upper more or less bulbous-strigose especially on the midrib and nerves: the under hispidulous, sometimes pitted, the edges shortly ciliate, main-nerves 7 or 8 pairs (in var., glabrous sometimes only 5 or 6 pairs) curved, spreading or ascending, slightly conspicuous when dry; length 1.25 to 3 in.; breadth .5 to 1.25 in.; petiole .1 to .4 in.; the smaller leaf ovate or ovate-lanceolate, 3-nerved, sessile, from .1 to .4 in. long. *Stipules* like the smaller leaves, but not cordate, free. *Flowers* .5 in. long, from 1 to 3 in a multibracteolate pubescent terminal raceme shorter than the leaves; the pedicels about as long as the flowers, hairy. *Calyx* densely hairy; the tube short; the 5 lobes many times longer, lanceolate, acuminate, spreading. *Corolla* with lobes like the calyx but slightly broader and less hairy, not reflexed. *Stamens* 5, erect; the filaments short, thick, curved, dorsifixed near the base of the linear-lanceolate, acuminate, apiculate, but not winged, longitudinally dehiscent anthers. *Capsule* small, compressed, obovoid, crowned by the long spreading calyx-teeth, 2-celled, 2-seeded: *seeds* compressed, brown.

PERAK: *King's Collector* 2204, 2820, 8062. PENANG: *Ridley* 10273; *Curtis* 342, 3148; Gunong Tahan, *Yapp*.

VAR. *mollis*, King. *Leaves* usually more than 1 in. broad, obliquely ovate-lanceolate, acuminate, the under surfaces and inflorescence with soft flexuose rather coarse hair.

PERAK: *Ridley* 2927; *King's Collector* 2898; *Scortechini* 38.

VAR. *glabrescens*, King. *Leaves* linear-lanceolate to oblanceolate, rarely ovate, glabrous except for a few stiff strigose hairs on the midrib and main-nerves; .9 to 2 in. long.

PERAK: *Scortechini* 303, 455; *Ridley* 9763; *King's Collector* 2714; *Wray* 696.

The bracteoles on the inflorescence often form an involucre at the bases of the pedicels, hence the specific name.

14. ARGOSTEMMA CURTISII, King n. sp. All parts quite glabrous; *stems* succulent, decumbent, glabrous, reddish when fresh, rooting in the lower part, thicker than a crow-quill when dry; 4 to 8 in. long. *Larger leaves* succulent, unequal; the larger linear-elliptic, much attenuated to either end, the apex gradually acuminate, the base more abruptly so; both surfaces olivaceous when dry, the lower the paler; main-nerves

invisible; the midrib depressed on the upper surface, prominent on the lower; length 1.25 to 2.75 in.; breadth .1 to .4 in.; petiole .1 to .25 in.; the smaller leaves linear, .3 in. long. *Stipules* like the smaller leaves but somewhat shorter and broader. *Cymes* terminal, pedunculate, shorter than the leaves, 2-4-flowered. *Peduncles* slender, longer than the pedicels, with one or two whorls of small lanceolate bracteoles; pedicels longer than the flowers, bracteolate at the base. *Flowers* .35 in. long, white. *Calyx* campanulate; with 5 triangular, acute, spreading teeth as long as the short tube. *Corolla* with 5 spreading lanceolate, acuminate lobes twice as long as the calyx. *Stamens* 5 in an erect cone; the filaments short, thick, curved; *anthers* linear-lanceolate; the connective margined and apiculate.

PERAK: *Scortechini* 1890. PENANG: *Curtis* 3332.

15. ARGOSTEMMA SUBCRASSUM, King n. sp. A glabrous herb 12 to 18 in. high; *stems* succulent, thinner than a goose-quill when dry, little branched, decumbent near the base, ascending, covered with a layer of smooth, oblong scales. *Leaves* very unequal, membranous; the larger of each pair membranous when dry, succulent when fresh; elliptic- or oblanceolate-oblong, somewhat oblique, acuminate, narrowed at the base; both surfaces olivaceous-brown when dry, the lower the paler; main-nerves 7 to 12 pairs, ascending, much curved, faint on both surfaces when dry; the midrib raised on the upper surface, flat and broad on the lower; length 3.5 to 7 in.; breadth 1 to 1.5 in.; petioles .1 to .3 in.; slightly winged. *Smaller leaf* ovate-cordate, sessile, only .1 to .25 in. long. *Stipules* like the small leaves but smaller. *Cymes* with few or many umbellate branches, the ultimate branches few-flowered, lax; the branches with small lanceolate bracteoles at the forks. *Flowers* .4 or .5 in. long, on slender pedicels as long as themselves and minutely bracteolate at the base. *Calyx-tube* short, campanulate, its 5 lobes thick, short, broadly ovate, blunt or acute, spreading. *Corolla* three times as long as the calyx; its 5 lobes lanceolate, .25 in. long, spreading. *Stamens* conjoined in an erect cone longer than the corolla; *anthers* linear-lanceolate, the connective with a long terminal process half as long as the anther; filaments short, thick, curved, dorsi-fixed near the base of the anther. *Capsule* obovoid-globular, truncate, crowned by the calyx, smooth, 2-celled, many-seeded.

PERAK: *Scortechini* 1203, 1912; *King's Collector* 10154; *Ridley* 9762. SELANGOR: *Ridley* 7408.

16. ARGOSTEMMA PERAKENSIS, King n. sp. *Stem* erect, unbranched, with the peduncle 8 in. high, thicker than a crow-quill, bearing a few scattered coarse hairs near the base, otherwise glabrous. *Leaves* 2 pairs, thinly membranous, very unequal; the larger oblanceolate-elliptic,

the apex acuminate, the base much narrowed; both surfaces dirty olivaceous when dry, glabrous; main-nerves 5 or 6 pairs, ascending, faint; length 2·5 to 3·5 in.; breadth 1·2 to 1·5 in.; petiole ·4 in.; winged near the apex: smaller leaf about ·1 in. long, lanceolate, sessile. *Peduncle* terminal, erect, 3 in. long; minutely hairy, with a whorl of lanceolate bracts near its base and another ·2 in. long at the base of the 10- to 12-flowered terminal umbel. *Flower-pedicels* about ·3 in. long, slightly unequal, flattened, sub-glabrous. *Calyx* with a broadly ovate-rotund puberulous tube ·1 in. long, and 5 minute radiating teeth. *Corolla* unknown.

PERAK: *Ridley* 110.

17. ARGSTEMMA OBLONGUM, King n. sp. *Stem* 6 to 15 in. high, slightly branched, half as thick as a goose-quill, rooting in its lower part, covered with scaly deciduous pubescence. *Leaves* membranous, very unequal; the larger of each pair elliptic to oblong, acute, the base rounded and slightly and obliquely cordate; upper surface brownish, olivaceous, everywhere glabrous, the midrib depressed; the lower pale, glabrous except the midrib and 6 to 8 pairs of curved spreading slightly prominent main-nerves; length 2 to 3 in.; breadth 1 to 1·35 in.; petiole ·1 to ·2 in.; smaller leaf sessile, ovate-oblong or ovate-cordate, ·25 to ·4 in. long: *stipules* like the smaller leaf but not so large. *Cymes* few-flowered, solitary, pedunculate, terminal or from the upper axil, shorter than the leaves, with very few, shortly pubescent branches, often with a whorl of lanceolate bracts below the middle of the peduncle and at the base of the umbels. *Flowers* ·25 in. long, on pubescent pedicels of about the same length. *Calyx* pubescent, campanulate, with 5 short, triangular, acute, spreading teeth. *Corolla* twice as long as the calyx, slightly hairy outside; the lobes broadly lanceolate, nerved, reflexed. *Stamens* 5, coherent in an erect cone slightly shorter than the corolla. *Anthers* dehiscent longitudinally; the connective forming marginal wings and a long flat apical process slightly recurved at the point; filaments short, curved, thick, attached to the back of the anther near its base. *Capsule* sub-globular, crowned by the slightly enlarged calyx-lobes, minutely pubescent, ·1 in. in diam. *Seeds* numerous, angled, black, large in size for the genus.

PERAK: *King's Collector* 907, 10261, 10675; *Scortechini* 159.

SELANGOR: *Ridley* 7410. JOHOR: *King*.

18. ARGSTEMMA OPHIRENSE, Maing. ex Hook. fil. Fl. Ind. III. 45. *Stem* ascending, rooting at the base, little-branched, minutely nodose, succulent, terete and thicker than a crow-quill when dry, deciduously scurfy-hairy, 4 to 10 in. high. *Leaves* sub-coriaceous, glabrous but occasionally with a few scattered hairs on the midrib, very unequal, the

larger of each pair oblanceolate or elliptic-oblanceolate or elliptic, often more or less oblique, acuminate or acute, narrowed to the base; upper surface olivaceous when dry; the lower pale brown, sometimes scurfily puberulous on the short midrib and nerves; main-nerves 5 to 8 pairs, curved, ascending, obscure on the upper but slightly prominent on the lower surface when dry; length 2 to 3.5 in.; breadth .7 to 1.25 in.; petiole .1 to .35 in. *Smaller leaf* of the pair obliquely ovate-cordate, or lanceolate, acute, sessile, .1 to .2 in. long. *Stipules* like the small leaves but not so large. *Cymes* terminal, spreading, sometimes branched, solitary, usually shorter than, but sometimes as long as the leaves, glabrous, with whorls of small lanceolate or ovate bracteoles in the lower part of the 1 to 2 in. long peduncle and at the forks of the branches. *Flowers* .4 in. long; their pedicels about as long and minutely bracteolate at the base. *Calyx* pubescent, short, campanulate, with 5 broadly ovate spreading lobes half as long as the tube. *Corolla* more than twice as long as the calyx, glabrous; its 5 lobes lanceolate, shorter than the stamens, their edges waved. *Anthers* lanceolate, dehiscing longitudinally; connective forming narrow marginal wings and a long apical appendage. *Style* filiform, slightly exserted; stigma clavate. *Capsule* obconic, crowned by the broadly toothed calyx, .15 in. in diam.; *seeds* numerous, minute.

MALACCA: *Griffith* (K.D.); *Maingay* (K.D.) 897; *Ridley* 3210.
PERAK: *Wray* 2197.—DISTRIB. Borneo.

19. ARGOSTEMMA WRAYI, King n. sp. *Stem* procumbent, rooting at the nodes in the lower half, when dry 4-angled and somewhat thicker than a crow-quill, sparsely hairy in the upper, but glabrous in the lower part. *Leaves* of the pairs very unequal, membranous; the larger lanceolate, acuminate, narrowed and slightly unequal at the base; upper surface, when dry, dark olivaceous, glabrous, the midrib broad and depressed, the main-nerves obscure; under surface pale, reticulate, sparsely pubescent on the midrib and 6 or 7 pairs of curved ascending rather distinct main-nerves; length 2 to 3 in.; breadth .6 to .9 in.; petioles .3 to .4 in., puberulous: the smaller leaf sessile, ovate-lanceolate, .15 to .2 in. long. *Stipules* like the small leaf but not so large. *Cyme* terminal, shorter than the leaves, pedunculate, dichotomous, few-flowered. *Peduncle* about .5 in. long, glabrous, with a whorl of lanceolate glabrous bracteoles at its division into the 2 short branches. *Flowers* .25 in. long; their pedicels about as long, bracteolate at the base, pubescent. *Calyx* campanulate, puberulous, lobes deeply-lanceolate, acuminate, spreading, longer than the tube. *Corolla* nearly twice as long as the calyx, glabrous: its 5 lobes lanceolate, slightly longer than the staminal cone. *Anthers* linear-lanceolate, coherent by the narrow marginal wing

of the connective, the apex with a long flat process, stigma oblong, about as long as the anthers.

PERAK: elevation 3400 feet; *Wray* 1012.

20. ARGOSTEMMA HOOKERI, King n. sp. Stem slightly thicker than a crow-quill, decumbent and rooting in its lower part, obscurely 4-angled, 6 to 12 in. long, covered with long, soft, pale, flexuose hairs. *Leaves* thickly membranous, very unequal; the larger of each pair lanceolate, ovate-lanceolate or oblong, sub-acute or obtuse, somewhat narrowed to the unequal-sided base; upper surface (when dry) olivaceous, with a few scattered, thick, adpressed, pale hairs near the edges and on the midrib; the lower pale, glaucous; the broad midrib and somewhat prominent 5 or 6 pairs of curved spreading nerves scurfy and sparsely pubescent; length .75 to 1.35 in.; breadth .35 to .6 in.; petiole .1 to .2 in. *Smaller leaf* ovate-lanceolate, cordate, sessile; *stipules* like the smaller leaves. *Cymes* umbellately 2-3-flowered, terminal, solitary, on slender, sparsely pubescent peduncles, about 1.5 in. long, and with a whorl of narrow bracteoles about the middle. *Flowers* .3 in. long; their pedicels puberulous and bracteolate at the base. *Calyx* widely campanulate, tomentose outside, the 5 lobes broadly triangular, spreading, shorter than the tube. *Corolla* twice as long as the calyx, white, sparsely hairy outside; the 5 deep lobes lanceolate, acuminate, spreading or reflexed. *Anthers* lightly cohering by their exalate edges into an erect cone, lanceolate, the base acute and entire, the apex with a long, flat, minutely bifid appendage. *Style* filiform, longer than the anthers, stigma clavate. *Capsule* obconic, very hairy, .15 in. in diam. crowned by erect calyx-lobes. *A. parvifolium*, Hook. fil. (not of Benn.) Fl. Br. Ind. III. 45.

PENANG: *King's Collector* 1747, 1756. JOHOR: *King*.

21. ARGOSTEMMA BICOLOR, King n. sp. Whole plant 3 or 4 in. high. *Stem* erect, simple, as thick as a crow-quill, pubescent. *Leaves* thickly membranous, very unequal; the larger of each pair subsessile, elliptic or oblong, tapering to the sub-acute apex and to the oblique, minutely cordate base; when dry the upper surface pale-olivaceous and bearing a few adpressed hairs on the midrib and near the margins; lower surface pale-yellowish, minutely hairy on the midrib and 5 or 6 pairs of spreading, little-curved main-nerves; length 1.5 to 2.15 in.; breadth .65 to .85 in.; smaller leaf only .25 to .3 in. long, ovate, sessile. *Stipules* broad, rounded, shorter than the smaller leaf. *Peduncles* axillary or terminal, as long as or longer than the leaves, erect, adpressed-pubescent, bearing a whorl of ovate-lanceolate bracts at or below the middle and another at the base of the terminal 3- to 6-flowered (sometimes branched) umbel. *Flower-pedicels* .2 to .25 in. long, densely pubescent like the calyx.

Flowers 3 in. long. *Calyx* rotate, only .05 in. long; its lobes triangular, spreading. *Corolla* five times as long as the calyx, glabrous, rotate, its 5 lobes broadly oblong-lanceolate, sub-acute, spreading, puberulous. *Anthers* glabrous.

PERAK: *Curtis* (without number).

12. HEDYOTIS, Linn.

Erect, decumbent or climbing herbs, or undershrubs, with 4-angled or terete stems, the stipules free or united with the petioles to form a cup, often bristly on the edge. *Leaves* sometimes whorled, often with bold nerves. *Flowers* in terminal or axillary, often much condensed cymes, 4-merous. *Calyx* with a globose ovoid or turbinate tube, and 4 acute persistent lobes without interposed teeth. *Corolla* white or lilac, funnel-shaped or campanulate; the lobes 4, valvate, ovate to linear; the throat naked or hairy. *Stamens* 4, in the tube or throat of the corolla; *anthers* dorsifixed, oblong or linear. *Disk* fleshy, inconspicuous. *Ovary* two-celled, many-ovuled, the style filiform, stigma bifid or bilobed, rarely entire; *ovules* on sessile or pedicelled placentas attached to the septum at or below the middle. *Fruit* small, membranous coriaceous or crustaceous, septi- or loculi-cidal, or splitting into two separable or united, 2- or many-seeded cocci, or indehiscent. *Seeds* plano-convex, or angled, granulate or pitted, rarely winged; embryo sub-cylindric, in horny albumen, radical short.—DISTRIB. Species about 100, chiefly Tropical Asiatic.

Cymes pedunculate, umbellate or capitate, terminal or axillary:—

Scandent:—

Cymes umbellate, collected in a terminal leafy panicle; flowers distinctly pedicelled 1. *H. mollis*.

Cymes capitate, collected in a terminal leafy panicle; flowers on very short pedicels:—

All parts pubescent; flowers 1 in. long ... 2. *H. Prainiana*.

All parts glabrous; flowers 15 in. long ... 3. *H. capitellata*.

Erect or diffuse, herbaceous:—

Cymes capitate, solitary or in small axillary panicles shorter than the leaves; pubescent herbs ... 4. *H. vestita*.

Cymes umbellate, in small trichotomous axillary branches shorter than the leaves; glabrous erect herbs 5. *H. glabra*.

Cymes capitate, on slender axillary peduncles longer than the leaves; puberulous decumbent herbs ... 6. *H. stipulata*.

Erect woody glabrous shrubs:—

Cymes capitate, solitary, on stout peduncles much longer than the leaves 7. *H. peduncularis*.

- Cymes in terminal little-branched shortly pedunculate compound umbels ... 8. *H. Maingayi*.
- Cymes sessile, axillary, dense, capitate:—
- Leaves elliptic to ovate-lanceolate, 2·5 to 6 in. long and 1·5 to 3 in. broad (about twice as long as broad):—
- Flowers 4-merous, not glaucous beneath:—
- Leaves and corolla glabrous; shrubby, with herbaceous branches ... 9. *H. congesta*.
- Leaves rounded or abruptly narrowed at the base; main-nerves curved; flowers only 1 in. long ... 10. *H. macrophylla*.
- Leaves gradually narrowed to the base; nerves not curved; flowers 1·5 in. long ... 11. *H. Kunstleri*.
- Leaves narrowly elliptic to elliptic-lanceolate, 1 to 2 in. long, 3 to 8 in. broad (about three times longer than broad):—
- Stipules with numerous filiform bristles, much longer than the sheath; leaves sessile, with broad bases, their main-nerves 4 or 5 pairs, very faint ... 12. *H. connata*.
- Stipules with a few bristles, not much longer than the sheath; leaves at the base petiolate:—
- Main-nerves of leaves 4 to 6 pairs, straight, oblique, very prominent ... 13. *H. Auricularia*.
- Main nerves of leaves 3 or 4 pairs, curved, faint ... 14. *H. Havilandi*.
- Leaves linear-oblong or linear, many times longer than broad:—
- Leaves glabrous, sessile:—
- Leaves glabrous beneath; flowers 1·5 in. long; calyx obovoid-campanulate with 4 lanceolate-ovate spreading lobes; lobes of corolla short with thickened apices; anthers broadly ovate ... 15. *H. tenelliflora*.
- Leaves not glaucous beneath; flowers 2 in. long; calyx tubular-campanulate, with 4 ovate ciliate suberect lobes; lobes of corolla narrowly ovate, sub-acute; anthers oblong ... 16. *H. nitida*.
- Leaves with weak hispid hairs on the upper surface, glabrous on the lower, sessile; capsule sparsely pubescent ... 17. *H. pinifolia*.
- Leaves with both surfaces slightly scaberulous, shortly petiolate; capsule coarsely pubescent ... 18. *H. hispida*.

1. HEDYOTIS MOLLIS, Wall. Cat. 859. Scandent; the older stems terete, thickened towards the nodes, the younger 4-angled, grooved, softly but minutely pubescent like the branches of the inflorescence. *Leaves* membranous, lanceolate to elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface olivaceous when dry, glabrous or subglabrous, the midrib often puberulous; lower surface paler and puberulous; main-nerves 3 or 4 pairs, ascending obliquely, little curved, slightly depressed on the upper and prominent on the lower surface like

the midrib; length 1·75 to 3·5 in.; breadth ·6 to 1·15 in.; petiole ·05 in. *Stipules* pubescent, short, broad, truncate, the upper edge bearing 3 or 4 stout black erect bristles. *Inflorescence* 1 to 1·75 in. long, terminal and from the upper leaf-axils, paniculate; the branches diverging, each with a minute linear bracteole at its base and at its apex a lax few-flowered umbel ·4 in. in diam. *Flowers* about ·15 in. long, their pedicels about as long or shorter. *Calyx* narrowly campanulate, glabrous; the mouth with 4 rather broad triangular teeth. *Corolla* about twice as long as the calyx, glabrous; the tube funnel-shaped; the mouth deeply divided into 4 oblong blunt teeth. *Capsules* narrowly obovoid, glabrous, crowned by the small spreading calyx-teeth, faintly 2-grooved, under ·7 in. long. *Seeds* several in each cell, dark brown. G. Don Gen. Syst. III. 527; Hook fil. Fl. Br. Ind. III. 57.

PERAK: *Scortechini* 55; *King's Collector* 2704. PENANG: *Curtis* 1096.

VAR. *laxa*. *Inflorescence* 1·5 to 3 in. long, much more lax than in the type; flower-pedicels slender, often ·15 in. long; flowers ·2 in. long.

PERAK: *King's Collector* 2926. PENANG: *Curtis* 1096.

2. HEDYOTIS PRAINIANA, King n. sp. Scandent, at first green but ultimately olivaceous-brown when dry; young branches thinner than a goose-quill, broadly two-grooved, very slightly angled, uniformly clothed with short yellowish pubescence. *Leaves* thickly membranous, broadly lanceolate or narrowly elliptic, acute, the base narrowed into the petiole; both surfaces minutely pubescent; midrib prominent; main-nerves 4 or 5 pairs, rather straight, ascending; length 2 to 4 in.; breadth 1 to 1·5 in.; petioles ·3 to ·8 in. long, tomentose; the leaves of the inflorescence becoming smaller and with shorter petioles upwards, the uppermost pair sessile. *Stipules* broad at the base, the mouth with numerous long linear or lanceolate unequal lobes. *Inflorescence* a narrow panicle 6 to 15 in. long, with short simple or ternate spreading umbel-bearing branches ·75 to 2·5 in. long, everywhere clothed with rather dense yellowish pubescence. *Umbels* capituliform, ·3 to ·5 in. in diam. when dry, bi-bracteolate at the base, 10- to 12-flowered. *Flowers* rather more than ·1 in. long, on short pedicels about as long as their acute bracteoles. *Calyx* narrowly campanulate, with 4 long erect lanceolate lobes, pubescent outside like the corolla. *Corolla* slightly exserted, tubular, with 4 short broad teeth. *Stamens* 4, included; anthers narrowly ovate, filaments short. Fruit oblong, pubescent, the cocci plano-convex, each containing a large placenta and 2 or 3 large compressed seeds.

PENANG: *Curtis* 977.

Allied to *H. capitellata*, Wall., but pubescent and with flowers only half as large. *Scortechini* (Herb. 34) collected in Perak specimens in advanced fruit which may belong to this.

3. *HEDYOTIS CAPITELATA*, Wall. Cat. 837 (in part). Scandent, glabrous, greenish when dry; young branches slender, 4-angled, the older usually terete. *Leaves* thickly membranous, lanceolate or elliptic-lanceolate, acuminate, the base more or less cuneate; lower surface darker than the upper; main-nerves 3 or 4 pairs, ascending, very little curved, rather prominent (like the midrib) beneath length 1·5 to 2·75 in.; breadth ·75 to 1·25 in.; petiole ·1 to ·15 in. *Stipules* short, broad, with long coarse teeth. *Inflorescence* paniced, pedunculate, mostly terminal; the primary branches trichotomous; the secondary branches divaricate, each bearing a linear reflexed bracteole at its base and at its apex a dense capitulum of flowers. *Flowers* ·4 in. long, sub-sessile. *Calyx* a little more than ·1 in. long, campanulate, ribbed; the mouth with 4 broad, ovate, lanceolate, acute spreading teeth, with a few hairs on their edges. *Corolla* tubular in bud, deeply divided into 4 narrowly oblong blunt spreading lobes, glabrous outside but with many coarse hairs inside. *Capsule* narrowly obovoid, sub-compressed, grooved, glabrous, a little more than ·1 in. long. *Seeds* several in each cell, black. G. Don Gen. Syst. III. 527; Kurz in Journ. As. Soc. Beng. 1877, II. 135 (excl. var. 7). Hook. fil. Fl. Br. Ind. III. 57. *Oldenlandia rubioides*, Miq. Fl. Ind. Bat. II. 353. *H. Finlaysoniana*, Wall. Cat. 6189.

In all the provinces; common.—DISTRIB. Malay Archipelago.

4. *HEDYOTIS VESTITA*, R. Br. in Wall. Cat. 847. A diffuse little-branched herb 1 to 4 feet long, all parts, except the upper surfaces of the leaves, softly pubescent; stems and branches slender, 4-angled and 4-grooved when dry. *Leaves* membranous, narrowly elliptic-lanceolate, more or less acuminate, the base narrowed; upper surface sparsely adpressed-pubescent; main-nerves 5 or 6 pairs, ascending obliquely, almost straight, depressed on the upper and prominent on the lower surface; length 2 to 3·5 in.; breadth ·6 to 1 in.; petiole ·15 to ·25 in.; *Stipules* short, broad, crowned by one to three bristly or subulate processes. *Inflorescence* axillary, consisting of few-flowered head-like umbellate cymes, on simple peduncles or in small panicles, bracteolate. *Flowers* about ·05 in. long, sessile or sub-sessile. *Calyx* cupular, with 4 deltoid or lanceolate, spreading, narrow acuminate lobes. *Corolla* blue or violet, funnel-shaped, hairy externally and in the throat, its lobes recurved. *Fruit* dry, sub-indehiscent, broadly turbinate or obovate, less than ·05 in. long; *seeds* numerous, compressed. G. Don Gen. Syst. III. 526; Hook. fil. Fl. Br. Ind. III. 58. *H. costata*, Kurz in Journ. As. Soc. 1877, II. 135 (not of R. Br.) *H. cœrulea*, Korth. in Ned. Kruidk. Arch. II. 160. *H. capituliflora*, Miq. Fl. Ind. Bat. II. 183. *Metabolus cœruleus*, Bl. Bijd. 992; DC. Prod. IV. 435. *M. lineatus*, Bartl. in DC. Prod. l.c. *Spermacoce costata*, Roxb. Fl. Beng. 10; Fl. Ind. I. 370.

In all the Provinces.—DISTRIB. Sub-tropical Himalaya; Assam; Malay Archipelago.

5. HEDYOTIS GLABRA, R. Br. Wall. Cat. 848. A glabrous erect herb, 18 to 24 in. high; stems woody at the base, terete even when dry, slightly striate, thicker than a crow-quill, somewhat smaller near the nodes. *Leaves* linear-lanceolate tapering much to each end, when dry pale yellowish-olivaceous and with recurved edges; main-nerves 3 or 4 pairs, straight, oblique, ascending, prominent like the midrib on the lower and depressed on the upper surface, length 1·75 to 3 in.; breadth ·15 to ·4 in.; petiole ·1 to ·15 in. long. *Stipules* adnate to the petioles to form a campanulate cup with truncate mouth bearing a few long bristles. *Cymes* in small trichotomous axillary pedunculate panicles from ·35 to 1·25 in. long, minutely puberulous, and minutely bracteolate. *Flowers* less than ·1 in. long, on short pedicels of varying length. *Calyx* narrowly campanulate; the lobes spreading, triangular, sub-acute. *Corolla* tubular, its lobes oblong, blunt, sub-erect. *Fruit* globular, crowned by the calyx-lobes, about ·1 in. in diam. Miq. Fl. Ind. Bat. II, 183; Hook fil. Fl. Br. Ind. III. 59. *Spermacoce glabra*, Roxb. Fl. Ind. I. 368. *Knoxia glabra*, DC. Prod. IV. 569.

PENANG: *Schomburgh, King, Deschamps, Ridley* 5749; *King's Collector* 1370. MALACCA: *Maingay* (K.D.) 892; *Griffith* (K.D.) 2885.—DISTRIB. British India.

6. HEDYOTIS STIPULATA, R. Br. in Wall. Cat. 6195 and 863a. *Stems* herbaceous decumbent, rooting, less than a foot high, branching; branches (when dry) slightly compressed, deeply 2-grooved, slightly 4-angled, puberulous. *Leaves* membranous, ovate to narrowly elliptic-oblong, the apex sub-acute, the base much narrowed to the short winged petiole; both surfaces olivaceous brown when dry; the upper glabrous; the lower paler, sparsely pubescent on the 3 or 4 pairs of spreading slightly curved little prominent main-nerves; length ·75 to 1·75 in.; breadth ·4 to ·8 in.; petioles ·2 to ·3 in. *Stipules* cupular, short, the mouth wavy and bearing a few short bristles. *Peduncles* axillary and terminal, from half as long to as long as the leaves, each bearing a dense 3- to 6-flowered head about ·35 in. in diam. (when dry). *Flowers* ·15 in. long, sub-sessile. *Calyx* compressed, obovoid, glabrous, the lobes deep lanceolate, acuminate, spreading. *Corolla* short tubular, with oblong blunt broad lobes. *Anthers* oblong, large, sessile. *Capsules* longer than the flowers, broadly obovoid, almost reniform, compressed, glabrous, crowned by the enlarged triangular acuminate recurved calyx-lobes, dehiscent by apical valves; *seeds* numerous, brown. Hook. fil. Fl. Br. Ind. III. 63. *H. Lindleyana*, Hook. MSS. in W. & A. Prod. 409. *Oldenlandia japonica*, Miq. in Ann. Mus. Lugd. Bot. II. 194. *O. hirsuta*,

Linn. fl. Suppl. 127; DC. Prod. IV. 127. ?*Anotis capitata*, Korth in Ned. Kruidk. Nat. Gesch. II. 151.

PERAK: at 2000 feet, *Wray* 1450. PAHANG: *Ridley* 2233.—
DISTRIB. Java; British India.

7. *HEDYOTIS PEDUNCULARIS*, King n. sp. A low glabrous under-shrub; young branches slender, angled, slightly winged, shining, pale brown. *Leaves* coriaceous, linear-lanceolate, tapering acutely to each end, nerveless, the midrib strong; length 1·5 to 2·5 in.; breadth ·2 to ·35 in.; petiole ·15 to ·4 in., winged. *Stipules* with broad triangular bases, much acuminate, sparsely glandular hairy. *Peduncle* solitary, terminal, 2 to 4 in. long, bearing usually a single terminal dense, many-flowered capitulum ·75 in. in diam., sometimes with smaller capitules in the upper leaf axils; the terminal capitule with two deflexed leaf-like linear bracts. *Flowers* sessile or nearly so. *Calyx* ·15 in. long, coriaceous; its 4 lobes lanceolate, spreading, persistent in fruit. *Fruit* obovoid, ·1 in. long, the two cocci with tough integuments.

KEDAH: *Ridley* 5546.

8. *HEDYOTIS MAINGAYI*, Hook. fl. Fl. Br. Ind. III. 49. A low branching glabrous shrub; young branches slender, angled, slightly winged, greenish when dry. *Leaves* coriaceous, lanceolate, acute, the base rounded or slightly narrowed, nerves obsolete, the midrib bold; length 1·5 to 1·75 in.; breadth ·4 to ·6 in.; petiole ·05 to ·1 in. *Stipules* broadly triangular, acute, not acuminate, thick, persistent. *Cymes* terminal and axillary, on slender peduncles varying from ·25 to 1 in. in length; the terminal ones the longest; bracteoles thick, lanceolate; branches of inflorescence and flower-pedicels slightly winged. *Flowers* ·3 in. long, their pedicels under ·1 in. *Calyx* campanulate, deeply divided into 4 linear-lanceolate, acuminate, spreading lobes. *Corolla* salver-shaped; the limb extending beyond the calyx, divided into 4 oblong, blunt lobes. *Capsules* ovoid-globular, less than ·1 in. long, ridged, crowned by the deflexed calyx-lobes.

MALACCA: *Griffith*; *Lobb*, *Cuming* 2348; *Maingay* (K.D.) 887; *Ridley* 3211; *Derry* 619; *Hullett* 796. JOHOR: *Ridley*.

9. *HEDYOTIS CONGESTA*, R. Br. in Wall. Cat. 844. Shrubby glabrous, much-branched; branches thinner than a goose-quill, acutely 4-angled. *Leaves* thinly coriaceous, lanceolate ovate-lanceolate or elliptic, shortly acuminate, the base rounded or slightly cuneate, both surfaces pale brown tinged with yellow or green when dry: main-nerves 5 or 6 pairs, curved, spreading, indistinct on both surfaces when dry; length 2·5 to 5 in.; breadth 1·5 (rarely ·75) to 2 in.; petioles ·15 to ·35 in. *Stipules* triangular, much acuminate, nearly as long as the petioles, with many linear lobes, the middle one pectinate. *Cymes* sessile, axillary,

dense, many-flowered. *Flowers* under .15 in. long, surrounded by numerous scarious broad acute bracteoles. *Calyx* campanulate, .15 in. long, the mouth wide and divided into 4 large triangular sub-acute ciliate lobes. *Corolla* tubular, connected by the calyx-lobes, glabrous, the mouth with 4 lanceolate sub-acute much reflexed lobes. *Fruit* oblong, crowned by the large incurved calyx-lobes, glabrous, .15 in. long; *seeds* numerous. G. Don Gen. Syst. III. 525; Hook. fil. Fl. Br. Ind. III. 61. *H. argentea*, Wall. Cat. 858.

In all the provinces, common.—DISTRIB. Borneo; Sumatra.

VAR. *nicobarica*. Leaves narrowly elliptic, 3.5 to 5.5 in. long and .8 to 1.4 in. broad, much tapered at either end; the petioles .3 or .4 in. long; cymes half as long as the petioles, with fewer flowers than in the type. ? *H. carnososa*, Korth. in Ned. Kruidk. II. 161.

NICOBAR ISLANDS: *King's Collector* 506.

10. HEDYOTIS MACROPHYLLA, Wall. in W. & A. Prodr. 408 (excl. syn.) A low shrub; stem short, as thick as a swan-quill; branches thinner than a goose-quill, pale when dry, acutely 4-angled and sometimes winged, glabrous. *Leaves* membranous, shortly petioled, ovate or ovate-lanceolate, shortly acuminate or acute, the base broad, narrowed, or rounded; upper surface olivaceous when dry, glabrous, sometimes scaberulous; the lower pale brown, glabrous, sometimes puberulous on the midrib and nerves; main-nerves 6 or 7 pairs, curved, ascending, rather distinct; length 3 to 6 in.; breadth 1.5 to 3 in.; petiole .3 to .7 in. *Stipules* cupular, hairy, truncate, with 8 to 10 stout erect pubescent bristles. *Cymes* axillary, sessile, globular, many-flowered, densely crowded, .5 in. across. *Flowers* .1 in. long, sessile or shortly pedicelled, mixed with linear hairy bracteoles some of them longer than themselves. *Calyx* compressed, narrowly funnel-shaped, pubescent, the 4 lanceolate lobes as long as the tube. *Corolla* pubescent, shorter than the calyx-lobes; its lobes 4, broad, blunt. *Capsule* many-seeded, ovoid, hairy, not longer than the persistent calyx-lobes. Wall. Cat. 841; Hook. fil. Fl. Br. Ind. III. 54 (excl. syn.) *H. nodiflora*, Wall.

MALACCA: *Griffith* (K.D.) 2889 in part. PENANG: *Wallich*.

The description given above is founded on the Penang plant on which Wight and Arnot based the species. In the Kew Herbarium the species issued by Wallich as *H. nodiflora* (Cat. 855) has been put with this, the latter seems, however, to be a totally different species with much narrower leaves and smaller heads with fewer flowers.

11. HEDYOTIS KUNSTLERI, King n. sp. Herbaceous, erect, 12 to 18 in. high; stems glabrous, thinner than a goose-quill, acutely 4-angled. *Leaves* membranous, oblong-elliptic, tapering to each end but more gradually to the apex than to the base, both surfaces glabrous,

olivaceous, the lower paler, the upper slightly scaberulous; main-nerves 5 or 6 pairs, ascending obliquely, almost straight, slightly prominent on the lower surface; length 3·5 to 4·5 in.; breadth 1·5 to 2 in.; petiole ·5 or ·6 in. *Stipules* shallow cupular, with numerous erect long subulate pubescent teeth ·3 in. in length. *Cymes* axillary sessile, glomerulate, many-flowered, dense, shorter than the petioles, hispidulous-puberulous in all parts. *Flowers* ·15 in. long, on short bracteolate pedicels. *Calyx* with narrow tube and 4 long lanceolate spreading lobes. *Corolla* shorter than the calyx, tubular, with 4 spreading oblong short lobes. *Anthers* 4, oblong, sessile, brown. *Fruit* ovoid, slightly 2-grooved, crowned by the calyx-lobes, less than ·1 in. long, separating into two cartilaginous many-seeded cocci. *Seeds* numerous, angular, brown.

PERAK: *King's Collector* 8728.

A species allied to *H. macrophylla*, Wall., but herbaceous and with narrower leaves, the main-nerves not curved, much narrowed to the base; slightly longer flowers (·15 in. as against ·1 in.) Closely allied also to the Ceylon *H. Thwaitesii*, Hook. fil., but with more acutely angled stems, shorter petioles and smaller less numerous flowers. The calyx-teeth of this are also smaller and narrower and the capsules have numerous seeds.

12. *HEDYOTIS CONNATA*, Wall. Cat. 856. Herbaceous, glabrous, diffuse, the stems as thick as a crow-quill, terete, wiry, smooth, decumbent near the base and rooting at the nodes, the younger somewhat compressed, grooved and 4-angled when dry. *Leaves* membranous, narrowly oblong to elliptic-oblong, acute or shortly acuminate rather abruptly narrowed at the base to the short petiole; upper surface olivaceous, glabrous; the lower pale, glabrous except the rather bold puberulous midrib; main-nerves 4 or 5 pairs, rather straight, oblique, invisible on the upper surface and faint on the lower; length 1·75 to 2·75; breadth ·35 to ·75 in.; petiole about ·1 in., puberulous. *Stipules* campanulate, the mouth rounded, bearing about 10 spreading erect, filiform scabrid bristles often ·45 in. long. Hook. fil. Fl. Br. Ind. III. 62. *H. merguensis*, Hook. fil. in Gen. Plant. II. 57.

PERAK: *Scortechini*. LANKAWI: *Curtis*.—DISTRIB. Burma.

13. *HEDYOTIS AURICULARIA*, Linn. Sp. Pl. 101. Herbaceous, diffuse or erect; young branches thicker than a crow-quill, slightly compressed and 4-angled when dry, shortly and softly pubescent. *Leaves* lanceolate or narrowly elliptic-lanceolate, acute or shortly acuminate, the base rather abruptly cuneate; both surfaces olivaceous when dry, the upper sparsely scaberulous-pubescent, the lower paler and more pubescent; both surfaces sometimes glabrous and more or less smooth; main-nerves 4 to 6 pairs, rather straight, obliquely ascending, depressed above and prominent beneath; length 1·5 to 2·25 in.; breadth ·35 to ·85 in.;

petioles .2 to .35 in., pubescent. *Stipules* adnate to the petioles to form a campanulate cup with acuminate 2- or 3-bristled mouth. *Cymes* almost sessile, many-flowered, condensed. *Flowers* nearly sessile, less than .1 in. long. *Calyx* hairy, campanulate, with 4 spreading ovate or lanceolate acute lobes. *Corolla* longer than the calyx, salver-shaped, the lobes narrow. *Fruit* globular-turbinate, crowned by the spreading calyx-lobes, shortly hairy. *Seeds* numerous, dark brown. Prod. IV. 420; Roxb. Fl. Ind. I. 365; ed. Carey & Wall. I. 369; W. & A. Prod. Fl. Penins. Ind. 412; Hook. fil. Fl. Br. Ind. III. 58. *H. nervosa*, Wall. Cat. 857 (? not of Lam.) *H. procumbens*, Wall. Cat. 861. *H. lineata*, Wall. Cat. 6198 (not of Roxb.) *H. costata*, R. Br. in Wall. Cat. 849; G. Don. Gen. Syst. III. 526. *H. multicaulis*, Schldl. Pl. Hohen. No. 845. *H. venosa*, Korth. in Ned. Kruidk. Arch. II. 160. *Metabolus venosus*, Bl.; DC. Prod. IV. 435. *Spermacoce hispida*, Miq. Pl. Hohen. No. 44. Rheede Hort. Malab. X. t. 32.

PERAK: *Scortechini* 110, 113; Wray 3078, 3085; King's Collector 88. PAHANG: *Ridley* 1185, 2674. SINGAPORE: *Ridley* 2863. KEDAH: *Ridley* 5547. MALACCA: *Maingay* (K.D.) 891.—DISTRIB. British India; tropical Australia.

14. HEDYOTIS HAVILANDI, n. sp. King. Herbaceous, often rooting at the lower nodes, woody at the base, green when dry; stems thicker than a crow-quill, acutely 4-angled and broadly grooved, deciduously scurfy-hairy especially near the nodes, but afterwards glabrous. *Leaves* membranous, elliptic, tapering to each end, acute, the edges finely undulate when dry; both surfaces, but especially the upper, minutely hispid; main-nerves 3 or 4 pairs, curving upwards, faint on both surfaces (when dry), the midrib pale and prominent on the lower; length 1 to 1.5 in.; breadth .5 to .7 in.; petiole .3 to .5 in. *Stipules* triangular, rather shorter than the cymes, much acuminate and with several long lateral teeth, pilose externally. *Cymes* axillary, sessile, crowded, many-flowered, about .25 in. in diam. *Flowers* .1 in. long, on short hairy pedicels with a few bracteoles between them. *Calyx* pubescent, campanulate; the tube narrow, its mouth with linear-lanceolate acuminate spreading teeth as long as the tube. *Corolla* not much exceeding the calyx-lobes, tubular with 4 broad oblong lobes. *Anthers* oblong, on rather long filaments. *Capsule* narrowly ovoid, crowned by the spreading calyx-lobes, thin-walled, sparsely hispid or glabrous, dehiscent, with several brown seeds in each cell.

PERAK: *Scortechini*; King's Collector 10254; Wray 4062. PENANG: *Curtis*.—DISTRIB. Burma; Borneo, *Haviland and Hose*, 3450 C.

15. HEDYOTIS TENELLIFLORA, Blume Bijdr. 971. Herbaceous, erect, glabrous, a foot or more in height, little-branched. *Stems* and *branches*

about as thick as a crow-quill, when dry dark-coloured, the older subterete, the younger deeply 2-grooved and slightly 4-angled. *Leaves* often in whorls of 4 or 6, coriaceous, sessile, linear, sub-acute, the bases passing into the stipules. *Stipules* cupular, short, the mouth truncate, with about 6 erect flat stout bristles; length 1 to 1·5 in.; breadth ·1 to ·15 in. *Cymes* very short (under ·2 in. long), axillary, crowded. *Flowers* ·15 in. long, sessile, surrounded by numerous bracteoles bearing long erect bristles. *Calyx* compressed, obovoid-campanulate, pilose towards the apex; the mouth with 4 lanceolate, acute, spreading, deciduous lobes. *Corolla* slightly exceeding the calyx-lobes, sub-tubular; lobes of the mouth short with thickened apices. *Anthers* broadly ovoid, sessile. DC. Prod. IV. 419; Hook. fil. Fl. Br. Ind. III. 60. *H. angustifolia*, Cham. & Schlect. in Linnæa IV. 153. *H. approximata*, Wall. Cat. 852. ? *Spermaceoce tubularis*, Br. in Wall. Cat. 836. *Scleromitron tenelliflorum*, Korth. in Ned. Kruidk. Arch. II, 155. *S. tetraquetrum*, Miq. Fl. Ind. Bot. II. 186. *Oldenlandia angustifolia*, Benth. Fl. Hongk. 151.

PENANG: *Ridley* 7097. PROVINCE WELLESLEY: *Curtis* 2236. MALACCA: *Hervey*.

16. HEDYOTIS NITIDA, W. & A. Prod. Fl. Penins. Ind. 412. Diffuse, sometimes with woody roots; stems about as thick as a crow-quill, 2-grooved, sharply 4-angled, the angles often minutely hispid. *Leaves* coriaceous, sessile, narrowly lanceolate or linear, the edges much recurved, nerves none, but the midrib prominent beneath; the upper surface olivaceous when dry, shining and minutely pitted, quite glabrous; the lower dull pale brown; length ·6 to 1 in.; breadth ·1 to ·25 in. *Stipules* continuous with the bases of the leaves, deeply campanulate, pubescent outside, the mouth bearing 6 to 8 long erect shining bristles. *Inflorescence* axillary, sub-sessile, 2- to 4-flowered. *Flowers* ·2 in. long, minutely bracteolate, sessile or on very short pedicels. *Calyx* tubular-campanulate, shortly hispid; the mouth with 4 deep, ovate-acute, ciliate, sub-erect lobes. *Corolla* included in the calyx, pubescent, tubular, its mouth with 4 narrowly ovate sub-acute erect lobes. *Anthers* oblong, sessile. *Capsule* ovoid, crowned by the long erect stiff calyx-lobes, dehiscing by apical valves, sub-glabrous; seeds numerous, brown. Hook. fil. Fl. Br. Ind. III. 61. *H. Neesiana*, Arn. Pugill. 23. *H. glabella*, Br. in Wall. Cat. 886, Bedd. Ic. Pl. t. 36.

PERAK: *Scortechini*; *Wray* 3680. PENANG: *King*.—DISTRIB. British India; Ceylon:

This species, which closely resembles *H. hispida*, Retz., and *H. tenelliflora*, Bl., has not hitherto been recorded from the Malay Peninsula or Islands. The specimens from Penang and Perak have smaller leaves than the majority of those from British India and Ceylon, but otherwise they agree.

17. HEDYOTIS PINIFOLIA, Wall. Cat. 850; Hook. fil. Fl. Br. Ind. III. 60. Diffuse, sometimes with a woody root; stems as thick as a crow-quill or thicker, terete when old, angled and grooved when dry, glabrous. *Leaves* sessile, sub-coriaceous, linear, acute, the margins revolute, the bases adnate to the short truncate stipules, puberulous on the upper but glabrous on the lower surface, nerves obscure, midrib distinct; length .5 to 1.5 in.; breadth .05 to .1 in. *Stipules* cupular, glabrous, with a few small bristles on the mouth. *Cymes* axillary and terminal, sessile, 1- to 4-flowered. *Flowers* .1 in. long, on pedicels shorter than themselves. *Calyx* sparsely hispid, ovoid-campanulate, with 4 narrow spreading acute lobes nearly as long as the tube. *Corolla* with a cylindrical tube exceeding the calyx-lobes; its lobes 4, lanceolate, acute. *Stamens* exerted. *Capsule* sparsely pubescent, membranous, broadly ovoid, ridged, crowned by the calyx-teeth, dehiscing by apical valves, several seeded. G. Don Gen. Syst. III. 525; *Scleromitron rigidum*, Kurz in Journ. As. Soc. Beng. 1877 II. 136 (excl. syn. Miq.)

PERAK: *Ridley* 3070, 7203; *Scortechini* 1012. PROVINCE WELLESLEY: *King*. SINGAPORE: *Ridley* 8924, 8925; *Hullett* 564. JOHOR: *Ridley* 11141. PAHANG: *Ridley* 1623. KEDAH: *Curtis*. MALACCA: *Griffith* (K.D.) 2895/2.—DISTRIB. British India.

18. HEDYOTIS HISPIDA, Retz Obs. IV. 23. Herbaceous, slightly branched; stems thicker than a crow-quill, sub-terete when old, deeply two-grooved, compressed and 4-angled when young, sparsely and softly pubescent, especially near the nodes. *Leaves* thinly coriaceous, narrowly oblong-lanceolate, acute, the base somewhat narrowed; both surfaces slightly scaberulous, olivaceous-green when dry, and the edges recurved; main-nerves obscure, midrib prominent below; length .8 to 2 in.; breadth .25 to .5 in.; petiole .1 in. or less. *Stipules* adnate to the petiole to form a campanulate pubescent cup with 6 to 8 bristles on its mouth. *Cymes* few-flowered, sessile, axillary. *Flowers* .2 in. long, sessile. *Calyx* campanulate, hispid, its lobes linear, erect, as long as the tube. *Corolla* as long as the calyx-lobes, tubular; its lobes lanceolate, acuminate, hairy. *Capsule* .1 in. long, ovoid, coarsely pubescent, ribbed, crowned by the erect linear calyx-teeth. *Seeds* numerous, dark brown. Roxb. Fl. Ind. I. 364; Wall. Cat. 845; Hook. fil. Fl. Br. Ind. III. 61. *Scleromitron hispidum*, Korth. in Miq. Fl. Ind. Bot. II. 185. *Oldenlandia hispida*, Benth. Fl. Hongk. 150.

PERAK: *Scortechini* 47, 201. PENANG: *Deschamps*; *Curtis* 1847.—DISTRIB. British India.

13. OLDENLANDIA, Linn.

Slender erect or diffuse much-branched herbs. *Leaves* usually

small, stipules acute or bristly. *Flowers* small, often white, in axillary or terminal dichotomous often paniculate cymes, sometimes solitary. *Calyx* obovoid or turbinate; the mouth 4- rarely 5-toothed; the teeth in fruit erect, often distant and sometimes with interposed processes. *Corolla* funnel- or salver-shaped, with a long or short tube, or rotate: its lobes 4, rarely 5, obtuse, valvate. *Ovary* 2-celled; ovules numerous, the placentas attached to the septum; style filiform; stigmas 2, oblong. *Capsule* small, crowned by the calyx-teeth, usually membranous, sub-globular, often compressed, didymous or ridged, loculicidal at the apex, many-seeded, rarely indehiscent. *Seeds* globose or angled, not winged, smooth or pitted; embryo clavate, in fleshy albumen.—**DISTRIB.** Species about 80; tropical and sub-tropical, mostly Asiatic.

- Leaves in one or more whorls near the base of the stem, elliptic, blunt 1. *O. nudicaulis*.
- Leaves scattered along the whole length of the stem:—
- Flowers in terminal or axillary few-flowered cymes not much longer than the elliptic-oblong sub-acute leaves: ripe capsules about '15 in. in diam. 2. *O. paniculata*.
- Flowers in terminal or axillary dichotomous lax cymes, the branches and flower-pedicels long and filiform; leaves narrowly oblong-lanceolate, much narrowed to the base and apex: ripe capsules less than '1 in. in diam. 3. *O. dichotoma*.
- Flowers 2 to 4 on a slender axillary pedicels or solitary on long pedicels; capsule more than '1 in. broad; leaves linear 4. *O. corymbosa*.
- Flowers solitary in the leaf-axils:—
- Some of the flowers solitary, always on long slender pedicels; leaves linear 4. *O. corymbosa*.
- All the flowers solitary and on long slender pedicels, leaves linear 5. *O. Heynei*.
- All the flowers sessile:—
- Leaves narrow, many times longer than broad 6. *O. diffusa*.
- Leaves rotund-ovate to elliptic not much longer than broad 7. *O. trinervia*.

1. **OLDENLANDIA NUDICAULIS**, Roth Nov. Sp. 95. A small erect glabrous annual, 4 to 6 inches high, drying green; stem very slender, an inch or two long, minutely scurfy-puberulous, bearing several whorls of 3 or 4 thin, sparsely and minutely scaly, elliptic, rather blunt leaves abruptly narrowed at the base and inserted on the stipules by very short broad petioles, and with about 4 pairs of faint ascending main-nerves, from '7 to 1'5 in. long and from '35 to '65 in. broad. *Cymes* long, slender, laxly corymbose, simple or branched, minutely bracteolate, solitary or several together from the apex of the stem, 1'5 to 3'5 in. long (half of the length being peduncle). *Flowers* '15 in. long, on capillary

pedicels .2 to .5 in. long. *Calyx* cylindric or campanulate with small lanceolate acute spreading teeth. *Corolla* much exceeding the calyx, deeply cut into 4 oblong, blunt, nerved lobes. *Stamens* slightly shorter than the corolla; *anthers* linear, as long as the slender filament. *Capsule* turbinate, the top broad, the persistent calyx-teeth small. *Seeds* numerous. Hook. fil. Fl. Br. Ind. III. 70. *O. rotundifolia*, G. Don Syst. III. 530. *O. ovalifolia* and *O. spergulacea*, DC. Prod. IV. 427, 428. *Hedyotis scapigera*, R. Br. in Wall. Cat. 881. *H. nudicaulis*, W. & A. Prod. 416; Bedd. Ic. Pl. Ind. Or. t. 34. *H. ovalifolia* Cav. Ic. 573. *H. rotundifolia*, Ham. in Wall. Cat. 6190 (not of DC.) *H. spergulacea*, Kurz in Journal As. Soc. Beng. 1877, II. 134.

MALACCA: *Griffith* (K.D.) 2898. KEDAH: *Curtis* 2669.—DISTRIB. British India; Java; Philippines.

2. OLDENLANDIA PANICULATA, Linn. Sp. Pl. 1667. Herbaceous, annual, glabrous, drying a pale olivaceous colour, erect or diffuse, much branched; young branches acutely 4-angled, sometimes narrowly winged, about as thick as a crow-quill. *Leaves* membranous, elliptic or elliptic-oblong, sub-acute, narrowed gradually at the base to the short petiole, both surfaces dull when dry; the nerves indistinct; linear with the midrib distinct; length .4 to .75 in.; breadth .2 to .3 in.; petiole .1 to .2 in. *Stipules* short, cupular, truncate, without bristles or with only 1 or 2 in the middle. *Cymes* in the upper axils or terminal, on peduncles as long as or not more than twice as long as the leaves, lax, few-flowered, minutely bracteolate. *Flowers* under .1 in. long, on thin pedicels two or three times longer than themselves. *Calyx* campanulate, with 4 rather distinct narrow teeth. *Corolla* not much exceeding the calyx-teeth. *Capsule* slightly compressed, turbinate, more than .1 in. diam.; crowned by the small spreading calyx-teeth; seeds numerous, black. Burm. Fl. Ind. 38, t. 15, f. 1; DC. Prod. IV. 427; Hook. fil. Fl. Br. Ind. III. 69. *O. alata*, Roxb. Fl. Ind. I. 421 (not of *Koenig*). *Hedyotis racemosa*, W. & A. Prod. 414; Wight Ic. t. 312; Wall. Cat. 875 (in part). *H. paniculata*, Lam. Encyc. III. 79; Kurz in Journ. As. Soc. Beng. 1877 II. 134. *H. minima*, Heyne, Wall. Cat. 877.

MALACCA: *Griffith* (K.D.) 2902. PERAK: *Scortechini* 1107.—DISTRIB. British India; Malay and Philippine Islands; China; Polynesia.

3. OLDENLANDIA DICHOTOMA, Hook. fil. Fl. Br. Ind. III. 67. Annual, herbaceous, erect, branching; stems glabrous or very sparsely and minutely hispidulous, as thick as a crow-quill, obscurely 4-angled, pale brown when dry. *Leaves* membranous, narrowly oblong-lanceolate, tapering to both ends; upper surface olivaceous, somewhat scaberulous, sparsely and minutely hispidulous; the lower pale, glabrous, nerves invisible, midrib broad and distinct on the lower surface; length .75 to

1·25 in.; breadth ·1 to ·2 in.; petiole ·05 in. to 0. *Stipules* cupular, very short, with small obscure teeth not bristly. *Cymes* axillary and terminal, with many long slender dichotomous few-flowered, angular, sub-hispidulous branches; the lateral cymes 1 to 2 in. long, the terminal one 3 to 5 in., with leaf-like linear bracts varying from ·25 to ·5 in. in length. *Flowers* ·2 in. long, clavate in bud, solitary at the ends of the ultimate hair-like branchlets. *Calyx* campanulate; the lobes 4, lanceolate, sub-erect, sub-glabrous, often with smaller lobes interposed. *Corolla* twice as long as the calyx, funnel-shaped, the tube long and narrow; the limb wide, with 4 spreading lanceolate teeth, glabrous. *Capsules* less than ·1 in. in diam., sub-globular, crowned by the small distant erect calyx-teeth, glabrous, dehiscent. *Seeds* numerous, brown. *Hedyotis dichotoma*, Koen. ex Roth Nov. Sp. 93; Wall. Cat. 6204 (*in part*); W. & A. Prod. 416 (*excl. some synonyms*). *H. affinis*, Roem. & Sch. Syst. 194. *H. Heynei*, Bedd. Ic. Pl. In. Or. t. 33 (not of Brown). *H. brachiata*, Wall. Cat. 6201 (*in part*) not of Wight.

PENANG: *King's Collector* 1282; *Curtis* 494; *Deschamps*. PROVINCE WELLESLEY: *King*. MALACCA: *Ridley* 1717. JOHOR: *Ridley* 11146.

4. OLDENLANDIA CORYMBOSA, Linn. Sp. Pl. 119. Rather stouter and more branched than *O. dichotoma*, and the branches more boldly angled. *Leaves* usually rather shorter, many of them not exceeding ·5 in. in length. *Flowers* solitary, on pedicels not more than half as long as in *O. dichotoma*, or in pedunculate 3- to 4-flowered corymbs, otherwise as in *O. dichotoma*. Hiern Flora Trop. Afric. III. 62; Hook. fil. Fl. Br. Ind. III. 64; Trim. Fl. Cey. I. 314. *O. biflora*, Lam. Encyc. IV. 533 (*not of Linn.*); Roxb. Fl. Ind. I. 423. *O. ramosa*, Roxb. l. c. 424. *O. herbacea*, DC. Prod. IV. 425 (*not of Linn.*) *O. scabrida*, DC. l.c. *Hedyotis Burmaniana*, Br. in Wall. Cat. 868 *in part*; W. & A. Prod. Fl. Pen. Ind. 415. *H. biflora*, Roth Nov. Spec. 92; Kurz in Journ. As. Soc. Beng. 1877, II. 133. *H. ramosa*, Bl. Bijdr. 973; ? Wight Ic. t. 822. *H. intermedia*, W. & A. Prod. 415. *H. alsinæfolia*, Br. in Wall. Cat. 873. *H. graminicola*, Kurz in Timen's Journ. Bot. 1875, 326. *Gerontogea biflora*, Cham. & Schl. in Linnæa. IV. 155.—Rheede Hort. Mal. x. t. 38.

JOHOR: *Ridley* 2861, 11142. SINGAPORE: *King's Collector* 27; *Ridley*. PENANG: *Curtis* 494, 1849, 1988. PROVINCE WELLESLEY: *King*. ANDAMANS: *King's Collector*.—DISTRIB. British India; Malay Archipelago; tropical Africa and America.

5. OLDENLANDIA HEYNEI, G. Don Gen. Syst. III. 531. Stouter and taller than *O. dichotoma* and drying (especially as regards the under surfaces of the leaves) of a darker colour, and the stems more boldly 4-angular; the *flowers* solitary but on equally long pedicels as in *O. dichotoma*, the capsules slightly larger and wider at the base. Hook. fil.

Fl. Br. Ind. III. 65. *O. herbacea*, Roxb. Fl. Ind. I. 424. *O. linearis*, *O. linifolia* and *O. asperula*, DC. Prod. IV. 425. *Hedyotis Heynii*, W. & A. Prod. 416; Wall. Cat. 867 (*in part*).

PENANG: *Curtis* 1848, 3399; *King*; *Deschamps*. PROVINCE WELLESLEY: *King*. PERAK: *Ridley* 10313; *Wray* 1931. SINGAPORE: *Ridley* 10916.—DISTRIB. Malay Archipelago; Tropical Africa.

This passes into *O. dichotoma* as regards its inflorescence there being some specimens in which, by reason of the smallness of the leaves, the inflorescence resembles a lax panicle.

6. OLDENLANDIA DIFFUSA, Roxb. Hort. Beng. 11; Fl. Ind. I. 423. Annual, diffuse, much-branched, dark brown when dry; glabrous. *Stems* about as thick as a crow-quill when dry, compressed, obscurely 4-angled, striate. *Leaves* linear-oblong, tapering to each end, the bases continuous with the stipules, the edges recurved, rather pale on the undersurface and the midrib prominent; length .5 to 1.5 in.; breadth .05 to .1 in. *Stipules* cupular, the edges with a few short bristles towards the middle. *Flowers* .15 in. long, solitary, axillary, sub-sessile or on peduncles .05 to .1 in. long, reflexed. *Calyx* widely campanulate, with 4 erect triangular acute 1-nerved teeth. *Corolla* longer than the calyx, widely campanulate, the mouth with 4 erect rather short broad triangular teeth. *Anthers* shorter than the style, small, narrowly ovoid; filaments rather short. *Stigma* with 2 divergent lobes. *Capsule* depressed globular, crowned by the small calyx-teeth, slightly more than .1 in. in diam., many-seeded. DC. Prod. IV. 426; Hook. fil. Fl. Br. Ind. III. 64; Trim. Fl. Ceyl. II. 315. *O. brachypoda*, DC. l.c. 424; Wall. Cat. 874. *Hedyotis ramosissima*, Kurz in Journ. As. Soc. 1877 II. 133. *H. diffusa*, Willd. Sp. Pl. I. 566; Wall. Cat. 868 (*in part*). *H. extensa*, Wall. Cat. 869. *H. polygonoides*, Wall. Cat. 872.

In all the provinces except the Andamans; common.—DISTRIB. Tropical Asia; Japan.

7. OLDENLANDIA TRINERVIA, Retz Obs. IV. 23. Annual, herbaceous, glabrous or hairy, procumbent, greenish brown when dry. *Stems* very slender, grooved, 4-angled, sparsely hairy, often rooting at the nodes. *Leaves* ovate-rotund to rotund or elliptic, thickly membranous, midrib distinct below but the 1 or 2 pairs of nerves obscure, both surfaces glabrous or sub-glabrous; length .2 to .3 in.; breadth under .05 or over; petiole usually under .05 in. long. *Stipules* scarious, campanulate with a few bristles. *Flowers* .05 in. long, solitary, axillary, on short reflexed pedicels. *Calyx* campanulate, with 4 acute spreading teeth, sparsely pilose. *Corolla* slightly exceeding the calyx, with 4 broad, ovate, sub-acute lobes, glabrous. *Capsules* somewhat compressed, broadly ovate, truncate at the apex, crowned by the small calyx-lobes, dehiscing at

the apex; *seeds* numerous, angled, black. Hook. fl. Fl. Br. Ind. III. 66; Trim. Flora Ceylon III. 316. *O. repens*, Burm. Fl. Ind. t. 15, f. 2? *Hedyotis trinervia*, W. & A. Prod. 414; Dalz. & Gibs. Fl. Bomb. 115 Bedd. Ic. Pl. Ind. Or. t. 29. *H. rotundifolia*, DC. Prod. IV. 420. *H. serphyllifolia*, Poir. in DC. l.c. 421. *H. orbiculata*, Heyne, Wall. Cat. 6191.

SINGAPORE: *Ridley* 8047. PAHANG: *Ridley* 1492. PENANG: *Curtis* 1844.—DISTRIB. British India; Sumatra; Java; Borneo; Philippines; Ceylon; Tropical Africa.

14. OPHIORRHIZA, Linn.

Decumbent creeping or erect herbs (rarely under-shrubs), with slender terete branches. *Leaves* usually elliptic-lanceolate, often unequal; *stipules* caducous, very often small. *Flowers* rather small, white, pink or greenish, secund in dichotomously branched axillary or terminal cymes; bracts and bracteoles various or absent. *Calyx* short, usually cylindric or campanulate, becoming obreniform or obcordate in fruit, the lobes small and persistent. *Corolla* tubular or funnel-shaped, the tube inside glabrous or hairy; the lobes 5, short, valvate in bud, often winged on the back, and with a fold in the sinus between neighbouring lobes. *Stamens* 5, inserted on the tube; *anthers* linear. *Disk* large, fleshy, 2-lobed. *Ovary* 2-celled; style filiform; stigmas 2, linear or broad; *ovules* numerous, inserted on placentas ascending from the bases of the cells. *Capsules* coriaceous, compressed obreniform or obcordate, dehiscing at the apex by 2 broad gaping valves; placentas divaricating, many-seeded. *Seeds* minute, angled, the testa crustaceous; embryo clavate, in fleshy albumen.—DISTRIB. Species about 50, tropical Asiatic.

Leaves quite glabrous:—

- | | | | | | |
|-----------------------------------------------------------------------------|-----|-----|-----|-----|--------------------------|
| Stipules lanceolate; leaves elliptic or elliptic-oblong, 1 to 1.5 in. broad | ... | ... | ... | ... | 1. <i>O. discolor.</i> |
| Stipules reduced to rugulose bands; leaves elliptic, 1.5 to 4 in. broad | ... | ... | ... | ... | 2. <i>O. erubescens.</i> |

Leaves glabrous except their nerves:—

- | | | | | | |
|------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|---------------------------|
| Larger leaves 5 or 6 in. long and 1.5 to 2 in. broad, midrib nerves and reticulations puberulous | ... | ... | ... | ... | 3. <i>O. fasciculata.</i> |
| Larger leaves 2 to 3 in. long and .65 to 1 in. broad; nerves and midrib beneath with dense pale pubescence | ... | ... | ... | ... | 4. <i>O. hispidula.</i> |

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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|----------------------|
| Leaves glabrous on the upper surface, glabrous or puberulous and usually stained with red on the lower when dry, elliptic or oblong-elliptic, 2 to 5 in. long and 1 or 2 in. broad | ... | ... | ... | ... | 5. <i>O. Mungos.</i> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|----------------------|

Leaves slightly puberulous:—

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|---------------------------------------------------------|
| Stipules forming a broadly triangular very shallow cup, |
|---------------------------------------------------------|

- the mouth sub-truncate; leaves puberulous above on and near the edges and on midrib; '5 to '75 in. broad ... 6. *O. Harrisiana*
var. *argentea*.
- Stipules forming a short cup with its mouth obscurely toothed; leaves minutely puberulous on midrib and nerves beneath, '5 to 1 in. broad 7. *O. tenella*.
- Stipules lanceolate with long filiform points; larger leaves 3 or 4 in. long and '75 to 1'25 in. broad, glabrous but for a few scattered thick hairs 8. *O. rugosa*.
- Leaves hairy everywhere on both surfaces :—
- Larger leaves 2'5 to 4 in. long, both surfaces with white hispidulous hairs, narrowly elliptic, '75 to 1'25 in. broad... 9. *O. tomentosa*.
- Leaves elliptic or ovate-elliptic, 3'5 to 5 in. long and 1'75 to 2'5 in. broad, sparsely strigose above, hispidulous beneath 10. *O. Kunstleri*.

1. OPHIORHIZA DISCOLOR, R. Br. in Wall. Cat. 6232 A. *Stem* erect, woody in its lower part, dark-coloured, terete, glabrous. *Leaves* of the pairs unequal, but not greatly so, membranous, narrowly elliptic or elliptic-oblong, much acuminate and narrowed from below the base to the long rather slender petiole; both surfaces quite glabrous; the upper dark brown, slightly tinged with purple; the lower pale minutely reticulate and much tinged with purple; main-nerves 7 to 12 pairs, curved, spreading, faint on the upper surface and but little prominent on the lower; length 2'5 to 4'5 in.; breadth 1 to 1'5 in.; petioles '35 to 1 in. *Stipules* linear-lanceolate, '1 to '2 in. long, deciduous. *Cymes* solitary, terminal, an inch or two in length; few-branched, ebracteolate; the peduncle and branches minutely puberulous. *Flowers* '25 in. long, secund in a single row, on very short pedicels which lengthen in fruit. *Calyx* narrowly campanulate; the teeth short, broad, boldly 1-nerved. *Corolla* clavate in bud, '2 in. long; tube cylindric, slightly inflated in the upper half; the teeth shorter than the tube, obtuse, erect. *Capsule* narrowly obreniform, the sinus almost obsolete, glabrous, '3 in. across. G. Don Gen. Syst. Bot. III. 522; Hook. fil. Fl. Br. Ind. III. 79. *O. villosa*, Wall. Cat. 6230 (not of Roxb.)

JOHOR: Ridley. PENANG: Deschamps.

2. OPHIORHIZA ERUBESCENS, Wall. Cat. 6233. Glabrous except the puberulous inflorescence; stem 1 to 3 feet high, woody, as thick as a goose-quill, the bark whitish, striate, corky. *Leaves* of each pair subequal, thinly membranous, elliptic-lanceolate, elliptic-oblong or narrowly elliptic, somewhat oblique, acuminate, the base much narrowed; upper surface greenish when dry, the midrib prominent but the nerves faint; lower surface pale greenish-white, reticulate, the 10 to 14 pairs of rather straight spreading main-nerves rather flat and prominent like the midrib; length 4 to 9 in.; breadth 1'5 to 4 in.;

petioles .35 to 1.2 in.; *stipules* (dried specimens) reduced to rugulose transverse bands. *Cymes* terminal, solitary, pedunculate, in flower much shorter than, but in fruit half as long as, the leaves or even more; the branches divaricate, slender, many-flowered, in fruit often as much as 2.5 in. long. *Flowers* .35 in. long, secund, on short puberulous pedicels, very narrow in bud. *Calyx* cylindrical, .05 in. long; its teeth broadly triangular, sub-acute, 1-nerved. *Corolla* .3 in. long, narrowly cylindrical; the mouth with 5 short blunt reflexed teeth. *Anthers* 5, linear, cordate at the base. *Capsules* narrowly rhomboid, the upper edge marginate, glabrous, .3 in. across. Hook. fil. Fl. Br. Ind. III. 84 as a doubtful species.

PERAK: *Scortechini* 1313; *Wray* 3731, 4050; *King's Collector* 2187, 7119, 5853, 7186, 7119; *Curtis*.—DISTRIB. Burma.

3. OPHIORHIZA FASCICULATA, Don Prod. Fl. Nep. 136. Stem 10 to 14 in. high, erect, little-branched, woody, and nearly as thick as a goose-quill below, puberulous. *Leaves* of a pair very unequal in size, membranous, narrowly elliptic or oblong-elliptic, sub-acute, the base cuneate; upper surface very dark olivaceous when dry, glabrous, the nerves and midrib pale and prominent; lower surface pale yellowish-brown, puberulous on the midrib and 9 to 11 pairs of boldly curved spreading dark-coloured main-nerves; the reticulations also puberulous, their interspaces glabrous; length of the larger leaves 5 or 6 in.; breadth 1.5 to 2 in.; the smaller leaves of the pairs .8 to 2.5 in. long and .85 to 1.5 in. broad; petioles .2 to .8 in. long. *Stipules* .15 in. long, subulate with dilated bases. *Cymes* usually solitary, but sometimes 2 or 3 together, terminal, pedunculate, usually less than half as long as the leaves even when in fruit, puberulous everywhere, ebracteate; branches shorter than the peduncles. *Flowers* small (rather less than .25 in. long), on short puberulous pedicels. *Calyx* narrowly campanulate, densely puberulous, boldly ribbed; the teeth shorter than the tube, triangular, acute, erect. *Corolla* .2 in. long, cylindrical, inflated in the lower part and expanded at the mouth; the 5 lobes short, blunt. *Anthers* narrowly linear, on short filaments. *Capsules* obreniform, the sinus shallow, glabrous, .25 in. across. Hook. fil. Fl. Br. Ind. III. 83. *O. bracteolata*, R. Br. in. Wall. Cat. 6228.

PERAK: *King's Collector* 2205; *Wray* 1989.—DISTRIB. Himalaya and Khasia.

4. OPHIORHIZA HISPIDULA, Wall. Cat. 6234. Erect, little-branched, slender, pubescent, thicker than a crow-quill. *Leaves* of the pair unequal, membranous, ovate-lanceolate, sub-acute, cuneate (sometimes abruptly so) at the base; upper surface (when dry) olivaceous, glabrous, the midrib prominent but the nerves rather obscure; lower surface pale olivaceous, otherwise sub-glabrous but the bold midrib and 6 or 7 pairs

of spreading main-nerves covered with minute dense white pubescence; length $\cdot 75$ to 2 in.; breadth $\cdot 4$ to 1 in.; petioles $\cdot 15$ to $\cdot 6$ in. *Stipules* narrowly linear-lanceolate from broad bases, $\cdot 1$ to $\cdot 2$ in. long. *Cymes* terminal, solitary, pedunculate, shorter than the leaves, ebracteate, everywhere shortly pubescent; branches few, shorter than the peduncles. *Flowers* $\cdot 25$ in. long, few but crowded, sessile or on short pedicels. *Calyx* rather under $\cdot 1$ in. long, cylindric, with 5 narrow erect teeth shorter than the tube, puberulous outside like the corolla. *Corolla* cylindric, somewhat inflated in the lower half; the mouth with 5 narrowly oblong sub-acute erect short lobes. *Capsules* obreniform with a shallow sinus, shortly and coarsely pubescent, $\cdot 2$ in. across. *O. trichocarpa*, Hook. fil. Fl. Br. Ind. III. 78 (not of Blume).

PAHANG: *Ridley* 2199, 2200; *Yapp* 536.

5. OPHIORHIZA MUNGOS, Linn. Sp. Pl. 150. Glabrous in all its parts, or puberulous on the stems, under surfaces of the leaves, and on the inflorescence. *Stems* from a few inches to a foot and a half high, erect, little branched, thicker than a crow-quill, woody near the base. *Leaves* membranous, one of each pair slightly larger than the other, elliptic or oblong-elliptic, the apex shortly acuminate, the base narrowed and sometimes slightly oblique; upper surface always glabrous and shining, when young dark green, when dry dark-brown, the nerves indistinct; lower surface glabrous or puberulous, when fresh whitish beneath and the nerves red, when dry reddish, and the nerves dark; main-nerves 7 to 15 pairs, curved, spreading; length 2 to 5 in.; breadth $\cdot 7$ to $2\cdot 25$ in.; petioles $\cdot 3$ to 1 in. *Stipules* linear or subulate from broad bases, $\cdot 15$ to $\cdot 2$ in. long, fugacious. *Cymes* terminal, much shorter than the leaves, with spreading branches 1 to 3 in. in diam., ebracteolate, glabrous or puberulous, the peduncles $\cdot 35$ to $1\cdot 5$ in. long. *Flowers* on short pedicels, sub-secund, glabrous or puberulous, $\cdot 6$ in. long. *Calyx* rather more than $\cdot 1$ in. long, wide, cylindric with 5 acute triangular dorsally ridged erect teeth. *Corolla* four times as long as the calyx, cylindric, widening somewhat towards the 5 short broad blunt lobes of the mouth. *Capsule* narrowly obreniform, $\cdot 25$ in. across, glabrous or pubescent, prominently 5-ridged. *Seeds* numerous, small, brown. Gaertn. Fruct. I. t. 55; Roxb. Fl. Ind. I. 701; W. & A. Prod. Fl. Pen. Ind. 404; Hook. fil. Fl. Br. Ind. III. 77.

In all the provinces, common and variable in size and pubescence.—
DISTRIB. British India; Ceylon; Sumatra; Java.

6. OPHIORHIZA HARRISIANA, Heyne, var. ARGENTEA, Hook. fil. Fl. Br. Ind. III. 78. *Stems* woody below, 6 to 18 in. high, branching, terete, glabrous, dark-coloured when dry. *Leaves* unequal, membranous, narrowly oblong-lanceolate, much tapered to each end, the base narrow

and somewhat oblique; upper surface dark olivaceous-brown when dry, sparsely puberulous or glabrous, the main-nerves obscure; the lower pale (glaucous), pinkish, glabrous except for a few scattered hairs on the prominent midrib and 6 to 10 pairs of oblique slightly curved dark-coloured broad main-nerves; length 1.5 to 3.5 in.; breadth .65 to .85 in.; petioles .15 to .5 in. *Stipules* lanceolate or oblong, .25 in. long. *Cymes* terminal, solitary or several together on the apices of the branches and stem, shorter than the leaves, the branches shorter than the peduncle, puberulous. *Flowers* .35 in. long, sessile or on short pedicels, secund. *Calyx* .1 in. long, cylindric, with 5 erect triangular acute teeth much shorter than the tube. *Corolla* .3 in. long, puberulous externally like the calyx, cylindric, slightly widened near at the apex; lobes 5, short, broad, 1-nerved. *Capsules* obreniform with very shallow sinus, glabrous, .15 to .25 in. across. *O. argentea*, Wall. Cat. 6229.

PERAK: *Scortechini* 432 (in part) 634; *Wray* 1984, 3647; *Curtis* 3147; *Yapp* 539. PAHANG: *Ridley* 2202. SELANGOR: *Kelsall* 1989.—
DISTRIB. Khasia Hills.

7. OPHIORHIZA TENELLA, King n. sp. Erect or decumbent, 6 to 12 in. high. *Stem* slender, much branched, covered with minute yellowish pubescence. *Leaves* membranous, those in a pair sub-equal, elliptic-ovate to ovate-lanceolate, sub-acute, sometimes rounded but usually rather abruptly narrowed at the base; upper surface olivaceous when dry, glabrous except for a very few scattered short thick hairs; lower surface pale greenish-yellow, minutely puberulous on the broad midrib and 6 to 8 pairs of spreading rather straight main-nerves; length 1 to 2 in.; breadth .5 to 1 in.; petiole .1 to .25 in., puberulous. *Stipules* short, cupular, obscurely toothed, less than .1 in. deep. *Cymes* solitary, terminal, few-flowered, pedunculate, shorter than the leaves. *Flowers* .3 in. long, almost sessile. *Calyx* less than .1 in. long, cylindric with 5 lanceolate spreading 1-nerved lobes shorter than the tube, covered with short coarse hair. *Corolla* .25 in. long, funnel-shaped; the tube slightly dilated near the base; the 5 lobes ovate-lanceolate, sub-acute, spreading, sub-reflexed. *Capsule* narrowly obreniform, sub-glabrous, .25 in. across.

PERAK: *King's Collector* 499, 546. PAHANG: *Ridley* 2201.—DISTRIB. Burma.

8. OPHIORHIZA RUGOSA, Wall. Cat. 6235. Herbaceous, sub-erect, 4 to 6 in. high, the stem unbranched, thicker than a crow-quill, tomentose. *Leaves* unequal, membranous, oblong-oblancoate, or oblong, sub-acute, or shortly and bluntly acuminate, the base narrowed; upper surface dark olivaceous when dry, glabrous or with few scattered short thick hairs, the nerves and midrib inconspicuous; lower surface pale olivaceous, with coarse short pubescence on the midrib, reticulations and 12 to

14 pairs of thick curved spreading nerves; length 1 to 3·5 in.; breadth ·5 to 1·25 in.; petioles ·2 to ·4 in., pubescent. *Stipules* narrowly linear-lanceolate from a broad base, ·2 in. long. *Cymes* solitary, terminal or from the upper axils, pedunculate, shorter than the leaves; branches few, short, in dichotomous umbels an inch or less across; peduncles pubescent like the branches. *Flowers* less than ·05 in. long (? cleistogamic) in groups of 3 or 4 enveloped in oblong blunt, pubescent bracts longer than themselves. *Calyx* cylindric, 5-toothed. *Corolla* slightly exceeding the calyx, cylindric, 5-toothed. *Anthers* 5, oblong, short, included. *Capsules* oblong-reniform with shallow sinus, pubescent, ·2 in. across. *O. Harrisiana*, Heyne, var. *rugosa*, Hook. fl. Fl. Br. Ind. III. 78.

PERAK: at 3900 feet, Wray 1482.—DISTRIB. Nepal and Sikkim Himalaya.

9. OPHIORHIZA TOMENTOSA, Jack in Roxb. Fl. Ind. ed Carey & Wall. II. 546. Erect, 8 to 12 in. high; stem woody near the base, thinner than a goose-quill, sparsely clothed with flexuose hairs. *Leaves* membranous, the two of a pair unequal in size, narrowly elliptic to elliptic-oblong, acute, the base narrowed, slightly oblique; upper surface olivaceous-green when dry, with sparse curved white stiff hairs; the lower pale, with numerous white hispidulous hairs between the main-nerves, the hairs on the broad prominent midrib and 8 to 12 pairs of curved spreading main-nerves brown; length 1·75 to 3·75 in.; breadth ·75 to 1·25 in.; petioles ·2 to ·8 in., stout, pubescent. *Stipules* linear, curved, about 1 in. long, deciduous. *Cymes* terminal, solitary, pedunculate; shorter than the leaves, few-branched; peduncles 1 to 2 in. long, pubescent. *Flowers* ·25 in. long, on pubescent pedicels shorter than themselves. *Calyx* tubular, about ·05 in. long, obscurely toothed. *Corolla* salver-shaped; the tube narrow, the lobes blunt. *Capsules* obreniform, puberulous, rather less than ·2 in. across. Wall. Cat 6231; Hook. fl. Fl. Br. Ind. III. 79; Miq. Fl. Ind. Bat. II. 174.

PENANG: King; Curtis 907; King's Collector 1314. PERAK: King's Collector 4846; Curtis 3257.

10. OPHIORHIZA KUNSTLERI, King n. sp. Stem erect, woody at the base, not branched, about a foot high, dark-coloured, deciduously rusty-puberulous. *Leaves* membranous, sub-equal, elliptic or ovate-elliptic, shortly and abruptly acuminate, the base rounded or slightly cuneate; upper surface dark-brown, sparsely strigose, the midrib distinct but the main-nerves faint; lower pale yellowish-brown, hispidulous chiefly on the stout prominent midrib and 10 to 14 pairs of spreading slightly curved rather bold nerves; the edges minutely ciliate; length 3·5 to 5 in.; breadth 1·75 to 2·5 in.; petioles ·5 to 1·75 in., bearing a few scattered hairs. *Stipules* lanceolate, acuminate, ·2 in. long, hairy,

deciduous. *Cymes* solitary in the axils of the upper leaves or terminal, pedunculate, much shorter (peduncle included) than the leaves when in flower and rather more than half as long in fruit, everywhere rusty-pubescent, the branches few, obliquely umbellate. *Flowers* numerous, in two secund rows on the branches, rather more than .1 in. long, on short hirsute pedicels, and intermixed with lanceolate hirsute or ciliate bracteoles. *Calyx* campanulate, with truncate entire mouth. *Corolla* scarcely longer than the calyx, widely cylindric. *Anthers* 5, oblong, versatile, dorsified. *Capsule* obreniform, the sinus large, rusty-pubescent, .2 in. across.

PERAK: *King's Collector* 8247.

A species allied to *O. tomentosa*, Jack. var. *glabrata* and *O. trichocarpa*, Bl., but the leaves of this are larger and much broader and the hairs on them are larger and more yellow in colour.

15. LUCINAEAE, DC.

Erect shrubs or epiphytic climbers, glabrous or nearly so. *Leaves* usually coriaceous. *Flowers* in axillary or terminal, solitary or paniced, pedunculate heads. *Calyx-tube* turbinate; the limb annular or cupular, entire, persistent. *Corolla* funnel-shaped, white; the tube densely pilose inside; the limb coriaceous, with 4 or 5 oblong-lanceolate valvate lobes. *Stamens* 4 or 5, inserted in the tube on short villous filaments or sessile; *anthers* dorsifixed, linear-oblong, included. *Ovary* 2-celled; *style* filiform or thickened below the middle; *stigmas* 2, linear or spatulate; *ovules* numerous, on fleshy peltate placentas. *Fruits* baccate, surmounted by the truncate calyx-limb, sub-confluent. *Seeds* compressed; the testa smooth, coriaceous; embryo minute, in fleshy albumen.—DISTRIB. Species about 18, all Malayan.

- | | | | |
|------------------------------------------------------|-----|-----|----------------------------|
| Flower heads in a terminal panicle | ... | ... | 1. <i>L. paniculata</i> . |
| Flower heads solitary or in fascicles of three:— | | | |
| All parts quite glabrous; corolla .75 in. long | ... | ... | 2. <i>L. Ridleyi</i> . |
| Young branches and inflorescence pubescent:— | | | |
| Leaves membranous, much narrowed at the base; | | | |
| flowers 5-merous | ... | ... | 3. <i>L. membranacea</i> . |
| Leaves coriaceous, with broad rounded bases, flowers | | | |
| 4-merous | ... | ... | 4. <i>L. Morinda</i> . |

1. LUCINAEAE PANICULATA, King n. sp. Glabrous; young branches thinner than a goose-quill, glabrous, brown when dry. *Leaves* oblanceolate to elliptic, shortly and rather abruptly acuminate, the base narrowed to the rather stout petiole; both surfaces glabrous, brown when dry, the lower paler and with the reticulations visible; midrib strong on both surfaces; main-nerves about 10 pairs, spreading slightly ascending and little curved; length 6 to 10 in.; breadth 2.25 to 4.25 in.; petioles

·8 to 1·5 in.; stipules ovate-lanceolate, vaginate in the lower half, ·4 to ·8 in. long. *Heads* in a pedunculate terminal panicle 5 or 6 in. long, its branches about half an inch to one inch long, thick, each bearing at its apex a head of three or four sessile flowers confluent by their bases; the common peduncle of the panicle with a sheathing basal bract ·5 in. long. *Calyx* truncate. *Fruit* unknown.

PERAK: *Scortechini*; *King's Collector* 2164.

2. *LUCINAEA RIDLEYI*, King n. sp. Epiphytal; young branches thinner than a goose-quill, terete, glabrous, dark-brown when dry. *Leaves* thinly coriaceous, quite glabrous, obovoid-oblong to narrowly elliptic, acute or shortly and abruptly acuminate, much narrowed at the base; upper surface brown when dry, the lower paler minutely punctate, reticulate; main-nerve 6 to 8 pairs, spreading, faint, the intermediate almost as prominent, the midrib bold; length 4 to 6 in.; breadth 1·5 to 2·5 in.; petioles ·75 to 1 in. *Stipules* lanceolate, oblong, sub-acute, connate and cartilaginous at the base, ·5 to ·75 in. long. *Peduncle* solitary, terminal, about ·1 in. long, each bearing a dense head about 1 in. in diam. (when dry), consisting of 8 to 12 sessile flowers. *Calyx* sub-quadrangular, the limb truncate. *Corolla* ·75 in. long, thick, ovate-oblong in bud, the narrowly oblong lobes as long as the tube. *Fruit* ·4 to ·6 in. long, crowned by the wide truncate calyx-limb.

SINGAPORE: *Lobb*. PERAK: *Scortechini* 306, 639; *Wray* 446; *Ridley* 2923; *King's Collector* 2162, 5052, 7836.—DISTRIB. Borneo, *Beccari* 3505.

3. *LUCINAEA MEMBRANACEA*, King n. sp. An epiphytic woody shrub; young branches terete, thinner than a goose-quill, covered with a dense coat of minute rusty deciduous pubescence. *Leaves* membranous, oblong-elliptic or narrowly elliptic, acute or shortly acuminate, narrowed (rarely rounded) at the base, upper surface quite glabrous, brown when dry; the lower paler, puberulous on the midrib; main-nerve 8 or 9 pairs, faint, spreading; length 3·5 to 5 in.; breadth 1·25 to 2·25 in.; petioles ·1 to ·15 in.; stipules broadly ovate, carinate, pubescent, and vaginate near the base, ·5 to ·75 in. long. *Peduncles* unequal, terminal or in fascicles of 2 or 3, the longer 1 in. long, the shorter as little as ·2 in. long, all dilated at the apex and pubescent, and each bearing a head about ·75 in. in diam. consisting of 8 to 10 sessile flowers. *Calyx*-limb truncate. *Corolla* thick; the tube cylindrical, ·15 in. long, hairy inside in its upper half; the limb with 5 lanceolate reflexed glabrous lobes shorter than the tube, the tips of the lobes incurved; *anthers* 5, sessile, linear. *Style* exerted, hairy in the upper half. *Fruits* subglobular, confluent at the base, ·15 in. in diam.

PERAK: *Scortechini* 283; *Curtis* 2016; *Ridley* 5543; *Wray* 832, 177,

3998; *Scortechini* 47, 283, 603; *King's Collector* 762, 10152.—DISTRIB. Borneo.

Allied to *L. Morinda*, DC., but the leaves of that species are more coriaceous, have more main-nerves and broader bases. The flowers moreover of this are 5-merous and of that 4-merous.

4. *LUCINAEA MORINDA*, DC. Prod. IV. 368. Young branches thinner than a goose-quill, puberulous but ultimately glabrous. *Leaves* coriaceous, glabrous, lanceolate to elliptic-oblong, rarely somewhat obovate, brown when dry; apex acute or sub-acute, the base rounded or minutely cordate; main-nerves 8 to 12 pairs, faint, spreading, slightly curved; length 1.5 to 2.5 in.; breadth .9 to 1.25 in.; petiole .15 to .25 in., slender; *stipules* triangular. *Peduncles* solitary or in fascicles of three, usually terminal but sometimes axillary, pubescent, about 1 in. long. *Heads* .75 in. in diam., 8- to 10-flowered. *Calyx* with a short truncate limb. *Corolla* .2 in. long, sessile. *Berries* crowded, broadly turbinate, glabrous. Wall. Cat. 8437. *Morinda polysperma*, Jack. in Mal. Misc. I. 14; Roxb. Fl. Ind. ed. Carey & Wall. II. 204; Hook. fil. Fl. Br. Ind. III. 93.

MALACCA: *Griffith* (K.D.) 2954; *Ridley* 1598; *Maingay* (K.D.) 875. PENANG: *Wallich* 8437. PERAK: *Curtis* 1337. SELANGOR: *Ridley* 3819. PAHANG: *Ridley* 1093. PERAK: *Scortechini* 283; *Wray* 2405, 4211; *King's Collector* 4645, 5498, 8482. SINGAPORE: *Jack*.—DISTRIB. Malay Archipelago. Always littoral.

16. *LECANANTHUS*, Jack.

A small glabrous shrub. *Flowers* crowded in involucrate axillary, sessile or pedunculate, nodding heads. *Calyx-tube* ovoid or turbinate; the limb oblique, campanulate, with 2 to 4 short obtuse unequal lobes, or 2-lipped, persistent. *Corolla* funnel-shaped; the tube inflated below; the limb with 5 thick obtuse bearded lobes, valvate in bud. *Stamens* 5, inserted by short filaments in the throat of the corolla; *anthers* bifid below. *Disk* urn-shaped. *Ovary* 2-celled; style slender, with 2 linear or oblong stigmas; ovules numerous; placentas spongy, attached to the septum. *Fruit* membranous, 2-celled, pulpy, many-seeded, placentas thick. *Seeds* obtusely angled, the testa smooth, thick; embryo small, in fleshy albumen.—A single species.

LECANANTHUS ERUBESCENS Jack in Mal. Misc. II. 83. Glabrous everywhere except the calyx. *Stem* with 4 angles, two of them acute, 12 to 18 in. high. *Leaves* thickly membranous, ovate-elliptic to narrowly oblong, shortly acuminate, tapering below to the short petiole; main-nerves about 7 pairs, curved, ascending, faint, the veins distinct; length 3 to 8 in.; breadth 1.25 to 3 in. *Stipules* ovate-lanceolate, acuminate,

3 or 4 in. long. *Heads* sub-globular, .75 to 1 in. in diam. (when dry). *Flowers* sessile, pale red. *Calyx* coloured, pubescent, wider than the corolla, those of the outer flowers 2-lipped and imbricate. Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 319; Wall. Cat. 6224; DC. Prod. IV. 620; Miq. Fl. Ind. Bat. II. 153, 199; Ann. Mus. Lugd. Bat. IV. 132; Hook. fil. Fl. Br. Ind. III. 100. *Lecananthus* sp. Griff. Notul. IV. 272.

SINGAPORE: *Wallich, Lobb, Ridley* 384. SELANGOR: *Ridley*. PERAK: *King's Collector* 1949, 2135, 10153; *Scortechini* 1275; *Wray* 1936, 2649. PANGKOR: *Curtis* 1640. PENANG: *Curtis* 1643. MALACCA: *Griffith* (K.D.) 2784; *Maingay* (K.D.) 912.—DISTRIB. Borneo; Sumatra.

17. COPTOPHYLLUM, Korthals.

Small erect simple shrubs with oblanceolate sparsely hairy leaves and ciliate stipules. *Flowers* pentamerous, crowded in bracteate capitules the outer bracts large and forming an involucre. *Calyx-tube* ovoid, its limb with 5 oblong ciliate lobes. *Corolla-tube* subinfundibuliform, its throat naked; the limb with 5 rather blunt lobes. *Stamens* 5, inserted below the middle of the corolla; *anthers* short, included. *Disk* annular, glandular. *Ovary* 2-celled, with numerous ovules on hemispheric placentas; *style* with 2 truncate arms. *Capsule* membranous, 2-celled. *Seeds* sub-rhomboid, scrobiculate; albumen fleshy; embryo clavate.—Two or three species; Malayan.

COPTOPHYLLUM CAPITATUM, Miq. Fl. Ind. Bat. II. 348. Herbaceous; stems compressed, thinner than a goose-quill, covered with short coarse rusty pubescence. *Leaves* membranous, oblanceolate, with a short blunt abrupt apiculus, the base much narrowed; upper surface dark-brown, sparsely and coarsely strigose, the lower paler brown, coarsely puberulous on the midrib nerves and transverse reticulations, otherwise glabrous; main-nerves 9 or 10 pairs, curved, ascending; length 5.5 to 7.5 in.; breadth 1.5 to 2.5 in.; petiole .5 to 1.25 in. *Stipules* .4 in. long, lanceolate with broad bases, the apices very acuminate, glabrous but the edges ciliate. *Peduncles* solitary, axillary, slender, compressed, sparsely hispid, 2 to 3 in. long, bearing at their apices single involucrete capitules. Involucre of 4 or more broadly ovate, sub-acute boldly 3-nerved bracts 4 in. long, the nerves and edges hispid. *Flowers* .2 in. long, glabrous, numerous, crowded, mixed with linear or spatulate fimbriate bracteoles about as long as themselves; pedicels short. *Calyx* with cylindrical campanulate tube; the mouth with 5 linear fimbriate-ciliate lobes longer than the tube. *Capsule* narrowly ovoid, crowned by the persistent calyxlobes and within these by a mamillate disc, 2-celled, the placentas with rather numerous large shining brown pitted seeds.

JOHOR: *Ridley* 4179. SELANGOR: *Ridley* 8539. PERAK: *King's Collector* 10334.—DISTRIB. Sumatra.

Ridley's specimen collected in Johor (Herb. *Ridley* 4179) has stipules with blunt lobes and the bracts of the involucre are more numerous. It may be a new species.

18. MUSSAENDA, Linn.

Erect or scandent shrubs or undershrubs, rarely herbs. *Leaves* opposite or in whorls of three, membranous. *Stipules* solitary or in pairs between the petioles, free or connate, usually deciduous. *Flowers* in terminal cymes, the bracts and bracteoles deciduous. *Calyx-tube* oblong or turbinate; the limb with 5 mostly deciduous lobes, one of them however sometimes large petiolate petaloid (white or coloured), and persistent. *Corolla* funnel-shaped; the tube elongate, often sericeous outside, the throat always villous, the limb with 5 valvate lobes. *Stamens* 5, inserted on the throat or below it on short filaments; *anthers* linear. *Ovary* 2-celled, style filiform; *stigmas* 2, linear; *ovules* numerous, on peltate fleshy placentas. *Fruit* baccate, crowned by the scar of the deciduous calyx. *Seeds* minute, the testa pitted; embryo small, in dense fleshy albumen.—DISTRIB. Species about 40, in the tropics of Asia and of Africa, and in Polynesia.

- None of the calyx-lobes petaloid 1. *M. mutabilis*.
 - One of the calyx-lobes sometimes petaloid:—
 - Lobes of the calyx persistent in the fruit:—
 - Leaves conspicuously hairy on both surfaces:—
 - Corolla not much longer than the calyx:—
 - Whole plant densely covered with long soft hair 2. *M. Wrayi*.
 - Lobes of the calyx not persistent in the fruit:—
 - Leaves conspicuously hairy on both surfaces:—
 - Corolla much longer than the calyx:—
 - An erect shrub; leaves slightly narrowed to the base; petioles less than ½ in. long ... 3. *M. macrophylla*.
 - Scandent; leaves much narrowed to the base; petioles often as much as 1 in. long ... 4. *M. villosa*.
 - Leaves glabrous or nearly so:—
 - Leaves oblong or lanceolate, much longer than broad:—
 - Leaves with broad rounded or cordate bases ... 5. *M. cordifolia*.
 - Leaves much narrowed to the base:—
 - Main-nerves 9 or 10 pairs 6. *M. polyneura*.
 - Main-nerves 5 or 6 pairs 7. *M. glabra*.
 - Leaves obovate-oblong to elliptic-oblong, about twice as long as broad:—
 - Calyx and corolla glabrous or nearly so ... 8. *M. oblonga*.
 - Calyx and corolla pubescent 9. *M. Teysmanniana*.
- Imperfectly known species 10. *M. membranacea*.

1. *MUSSAENDA MUTABILIS*, Hook. fil. Ic. Plant 1718. A climber, 15 to 40 feet long; young branches thinner than a goose-quill, terete, glabrous. *Leaves* membranous, on rather long petioles, broadly elliptic to elliptic-rotund from near the base; apiculate or shortly triangular acuminate at the apex, both surfaces glabrous; main-nerves 7 to 9 pairs, curving upwards, thin but prominent on the lower surface when dry; the reticulations open and transverse; length 5 to 7 in.; breadth 3 to 4.5 in.; petiole .75 to 1.25 in. *Stipules* forming an irregularly toothed pubescent ring of teeth of an inch or less in depth. *Cymes* terminal, much shorter than the leaves even in fruit, 2-branched, the stipules shorter than those of the stem. *Flowers* 1.5 to 2 in. long, from 8 to 12; bracteoles few, like the calyx-lobes but smaller. *Calyx-lobes* equal, lanceolate sometimes linear-lanceolate, acuminate, sparsely strigose externally, tomentose within, less than half as long as the corolla-tube, deciduous in the fruit. *Corolla* orange red, the limb about 2 in. across when fresh, the lobes elliptic-oblong, acute, with short coarse hairs on both surfaces; the tube cylindrical, 1 in. wide, very slightly expanded towards the apex, adpressed-pilose externally, pubescent internally. *Fruit* cylindrical sub-clavate, glabrous, faintly ridged, the apex blunt, narrowed at the base to the short pedicels; length .5 to .7 in.; diameter about .3 in. *Mussaenda Kintaensis*, Brace MSS. in Herb. Calc. *Acranthera Maingayi*, Hook. fil. Fl. Br. Ind. III. 192. *A. mutabilis*, Hems. Journ. Bot. 1877, 204. *Mussaenda Maingayi*, Stapf Trans. Linn. Soc. IV. 172.

PERAK: *King's Collector* 91, 855, 1856, 3276, 4255, 4999; *Wray* 1846; *Scortechini* 770; *Curtis* 2023. PENANG: *Ridley* 2187. JOHOR: *King* 559. MALACCA: *Derry* 1214. SINGAPORE: *Ridley* 1643.

VAR. *hirsuta*; under surfaces of leaves and young stems pubescent; all parts of the inflorescence villose-pubescent; stipules apiculate and twice as long as in the type.

PERAK: *King's Collector* 225. MALACCA: *Derry* 253. SINGAPORE: *Ridley* 1643.

2. *MUSSAENDA WRAYI*, King n. sp. A climber or occasionally a spreading shrub; young stems thinner than a goose-quill, covered like the leaves inflorescence and flowers with stiff more or less rusty hairs. *Leaves* membranous, elliptic or obovate-elliptic, much narrowed to the base, the apex shortly acuminate; main-nerves 9 to 14 pairs, curving upwards, thin but prominent on the lower surface; length .4 to .8 in.; breadth 1.75 to 4 in.; petiole .35 to .75 in.; stipules free, lanceolate-acuminate, about .25 in. long. *Cymes* solitary, terminal, condensed in flower, spreading in fruit, shorter than the leaves, the bracts lanceolate. *Calyx* densely pilose, infundibuliform, .5 to .7 in. long; the mouth with 5 deep lanceolate usually equal teeth, occasionally one of the teeth petaloid,

white, veined with green, narrowly elliptic or oblanceolate, acute, tapered to a short petiole, 3-nerved and with prominent reticulations, sparsely strigose, under 2 in. in length and less than half as broad. *Corolla* slightly longer than calyx, red, very pilose; the tube cylindrical; the limb .4 or .5 in. across, with 5 broad short blunt lobes. *Fruit* oblong-ovoid, sparsely pilose, about .5 in. long and .3 in. in diam., crowned by the long persistent calyx-lobes.

PERAK: *Wray* 40, 1788, 2583; *King's Collector* 685, 1960, 10943, 5353? *Scortechini*; *Curtis* 1024. PENANG: *Curtis* 2730, 3304.

3. MUSSAENDA MACROPHYLLA, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 228. A shrub; young branches thinner than a goose-quill, rusty-pilose. *Leaves* thickly membranous, elliptic-oblong, slightly narrowed at the base, the apex shortly acuminate; upper surface sparsely strigose, the midrib rusty-pilose, the lower rusty-pilose especially on the midrib and nerves; main-nerves 9 to 11 pairs, slightly curved, ascending, prominent on the lower less so on the upper surface when dry; length 3 to 5 in.; breadth 1.5 to 2 in.; petiole .2 in.; stipules triangular, densely pilose, about .25 in. long. *Cymes* solitary, terminal, shorter than the leaves and condensed when in flower, many-flowered. *Calyx* about .5 in. long, narrowly infundibuliform, cut half way down into equal lanceolate teeth, pilose outside especially on the tube; enlarged lobe ovate, acuminate, 2 or 3 in. long, sparsely pubescent, with greenish ascending nerves; its petiole slender, about 1 in. long. *Corolla* yellow, twice as long as the calyx, densely pilose outside; the tube cylindrical, widening in its upper half; the limb .3 or .4 in. in diam. with broad blunt lobes. *Fruit* unknown. Wall. Pl. As. Rar. II. 77, t. 180; Bot. Reg. XXXII. t. 24; DC. Prod. IV. 370. Wall. Cat. 6255. *M. hispida*, Don Prod. 139; DC. Prod. l.c. *M. frondosa*, Wall. Cat. 6250 A.

PERAK: *King's Collector* 6016. MALACCA: *Maingay* (K.D.) 835/2, 941.—DISTRIB. British India; Philippine Islands.

I follow the Flora of British India in referring this plant to *M. macrophylla*, Wall., but I have some doubt as to the accuracy of this view. The plant here described approaches, *M. villosa* very closely, and it is difficult to distinguish the two by words although specimens of the two look very different.

4. MUSSAENDA VILLOSA, Wall. Cat. 6254. A climber; young branches much thinner than a goose-quill, deciduously rusty-pilose. *Leaves* membranous, oblong, elliptic-ovate or -acute, much narrowed to the base, the apex shortly acuminate or acute, both surfaces (but especially the lower) sparsely pilose; main-nerves 9 to 12 pairs, thin but prominent on the lower surface (when dry), slightly curved, ascending; length 3 to 5 in.; breadth 1.25 to 2.25 in.; petiole .25 to 1 in., pilose; stipules lanceolate, caudate-acuminate, pilose, .4 in. long. *Cymes* ter-

minat and axillary, condensed when in flower, the branches very pilose; bracts narrowly oblong, .3 in. long. *Calyx* .3 to .4 in. long, pilose, the tube narrowly campanulate, shorter than the linear-lanceolate acuminate teeth; the odd lobe occasionally petaloid, ovate-rotund, bluntly acuminate, slightly narrowed to the long petiole, 5-nerved, glabrous above, pubescent below on the nerves, shorter than the leaves. *Corolla* yellow, .75 in. long, more than three times as long as the calyx, narrowly cylindrical in its lower half, slightly wider in the upper half; the limb only about .25 in. in diam., its lobes short, broad; the mouth closed by a mass of thick short hairs. *Fruit* oblong-clavate, with lax deciduous white hairs, about .5 in. long and .25 in. in diam. Hook. fil. Fl. Br. Ind. III. 191 (among doubtful species).

PERAK: *Scortechini* 240, 243; *Yapp* 213, 341; *Schomburgk* 17; *Curtis* 1024. PENANG: *King* 600; *King's Collector* 1755; *Curtis* 289, 1934. LANKAWI: *Curtis* 2871. PAHANG: *Ridley* 2188. KEDAH: *Curtis* 2521.

This species was (no doubt from want of good specimens) treated in the Flora of British India as a doubtful one. Since the Flora was written better specimens have been obtained.

VAR. *Herveyana*, King; *leaves* broadly ovate or elliptic, shortly and abruptly acuminate, smaller than in the typical form and densely clothed on the lower (less so on the upper) surface with soft white hairs; the young branches and inflorescence with smaller hairs.

MALACCA: *Hervey*.

5. MUSSAENDA CORDIFOLIA, Wall. Cat. 6260. A climber 20 to 60 feet long; young branches thinner than a goose-quill, terete, glabrous. *Leaves* thinly coriaceous, oblong, acute or shortly and bluntly acuminate, only slightly narrowed to the rounded, often slightly cordate base (occasionally narrowed to the base); both surfaces quite glabrous, the lower with distinct transverse reticulations; main-nerves about 8 pairs, curved, ascending, thin, slightly depressed on the upper surface and prominent on the lower; length 5 to 6.5 in.; breadth 1.75 to 2.5 in.; petiole .2 to .25 in.; rusty adpressed-pilose; stipules free, lanceolate, much acuminate, deciduously hirsute at the base. *Cymes* terminal and axillary, on long slender peduncles, many-flowered, rather lax, sparsely adpressed rusty-pubescent; bracts few, about .15 in. long. *Calyx* .2 in. long, cylindrical-campanulate, the lobes linear-lanceolate, shorter than the tube, spreading, one occasionally enlarged (2 to 2.5 in. long) and petaloid, ovate-oblong, creamy white, glabrous, with 5 or 6 pairs of ascending puberulous nerves, its petiole slender, .5 to .75 in. long. *Corolla* nearly 1 in. long, adpressed-pubescent outside, the tube narrowly cylindrical, slightly widening upwards, the limb only .2 in. wide, its lobes ovate

acute, spreading, pubescent on both surfaces. *Fruit* broadly sub-ovoid, glabrous, crowned by the small cicatrix of the deciduous calyx-lobes, .35 in. long and about .25 in. in diam. *M. glabra*, Wall. Cat. 6251 sheets B. and C. *M. glabra*, Hook. fil. (not of Vahl) Fl. Br. Ind. III. 91 var. 4 and part of vars. 2 and 3.

PENANG: *King* 603; *Curtis* 116; *Deschamps*. PERAK: *King's Collector* 4859, 5216; *Scortechini* 458; *Maingay* (K.D.) 834. MALACCA: *Griffith* (K.D.) 2778 (in part).—DISTRIB. Mergui *Griffith* Herb. prop. 160.

The Wallichian No. 6260 consists of a single gathering from Penang and it was issued under this name. The same species forms, however, part of the Wallichian material distributed under the name *M. glabra*, the remarks under which may be read in the present connection.

6. MUSSAENDA POLYNEURA, King n. sp. Resembling *M. glabra*, Vahl, but having leaves with 9 or 10 pairs of little-curved ascending main-nerves with deciduous adpressed rufous hairs; the inflorescence and flowers, including the enlarged calyx-lobe, rusty pubescent. *M. glabra*, Wall. Cat. 6251 A. Hook. fil. Fl. Br. Ind. III. var. 4 in part.

MALACCA: *Griffith* (K.D.) 2776. PERAK: *King's Collector* 5775; *Wray* 1424.

This is one of the three species included under Wall. Cat. 6251 A.

7. MUSSAENDA GLABRA, Vahl Symb. Bot. III. 38. A climber; young shoots much thinner than a goose-quill, angled, with dark-coloured glabrous lenticellate bark. *Leaves* oblong-lanceolate, sometimes elliptic, the base narrowed and the apex shortly acuminate, glabrous except for some pubescence on the midrib and nerves; main-nerves 5 or 6 pairs curving upwards, thin but prominent on the lower surface when dry; length 2.5 to 3.5 in., breadth .5 in. to 1.6 in., rarely 2 in.; petiole about .2 in.; stipules free, broad, bifid, the lobes acuminate, .2 to .3 in. long, puberulous. *Cymes* solitary on the apices of the terminal and lateral branches, longer than the leaves, their branches at first sometimes crowded but in fruit always lax, many-flowered, softly puberulous; bracts few, lanceolate, .2 in. long. *Calyx* narrowly campanulate, .2 in. long, the mouth with short spreading linear-lanceolate pubescent teeth; the tube sub-glabrous; occasionally one lobe petaloid (white), glabrous, ovate-acute, rounded at the base or narrowed to the long petiole with about 5 nerves radiating from the base, smaller than the leaves. *Corolla* yellow, pubescent, about four times longer than the calyx, narrowly cylindrical but somewhat dilated in its upper fourth; the limb only .2 in. across, its lobes spreading, triangular. *Fruit* oblong, slightly narrowed at the base and apex, the latter crowned by the scar of the deciduous calyx-lobes,

·5 in. long and ·3 in. in diam. when dry. DC. Prod. IV. 370; Wall. Cat. 6251 sheet A only and in part; Kurz. For. Fl. Burm. II. 56; Hook. fil. Fl. Br. Ind. III. 90 (*in part*).

MALACCA: *Maingay* (K.D.) 834; *Griffith* (K.D.) 2779. SINGAPORE: *Ridley* 116. MALACCA: *Derry* 31.—DISTRIB. British India.

VAR. *puberula*, upper surface of leaves glabrous except the puberulous midrib and nerves; lower surface puberulous or pubescent on the reticulations and sometimes on the interspaces also. *M. glabra* Vahl, VAR. 2: Hook. fil. l.c. 91.

SINGAPORE: *Walker* 65; *Anderson* 77; *Schomburgk* 43; *Ridley* 116a, 846a, 3651.

Under the No. 6251 and the name *M. glabra*, Wallich issued three gatherings bearing the letters A, B, and C. The gathering B was received from Herb. Finlayson, and the locality of its collection is unknown. Gathering C was received from Penang. Both these are the same as the plant issued as *M. cordifolia* and as No. 6260. The remaining gathering (A), as preserved in the Wallichian Herbarium in possession of the Linnean Society of London consist of three twigs, for one of which with almost glabrous flowers the name *M. glabra* is arbitrarily retained. Of the other two one has been referred by Sir Joseph Hooker to *M. Wallichii*, G. Don, and the third belongs to the species which I have named *M. polyneura*.

8. MUSSAENDA OBLONGA, King n. sp. A shrub 6 to 8 feet high; young branches as thick as a goose-quill, angled, somewhat compressed, pale, striate, sparsely lenticellate, glabrous. *Leaves* membranous, elliptic or obovate-oblong or obovate-lanceolate, much narrowed to the base, the apex shortly and rather abruptly caudate-acuminate; both surfaces glabrous, the lower pale (when dry); main-nerves 6 to 9 pairs, curved-ascending, slightly conspicuous; length 5·5 to 9·5 in.; breadth 1·75 to 3·5 in.; petiole ·4 to ·8 in., puberulous or glabrous; stipules triangular, linear-acuminate, glabrous, ·25 to ·4 in. long. *Cymes* solitary, terminal, shortly pedunculate, much shorter than the leaves even when in fruit, umbellate, lax, wide-spreading; the branches somewhat compressed, glabrous; bracts linear-lanceolate, ·2 in. long. *Calyx* ·3 to ·4 in. long, glabrous; the tube cylindric, slightly expanded above the base, its mouth with linear erect teeth shorter than or as long as the tube. *Corolla* pale yellow, twice as long as the calyx; the tube cylindric; the limb ·4 in. in diam., its lobes narrowly lanceolate. *Fruit* globular-ovoid, sometimes sub-obovoid, the apex broad, crowned by the cicatrix of the deciduous calyx. *M. longifolia*, Wall. Cat. 6258, (not of Lam.) *M. Wallichii*, G. Don, Hook. fil. Fl. Br. Ind. III. 88 (not of Don).

PERAK: *King's Collector* 1935, 3542; *Curtis* 3303.

9. MUSSAENDA TEYSMANNIANA, Miq. Fl. Ind. Bat. II. 213. A climber; young branches somewhat thinner than a goose-quill, terete, deciduously adpressed rusty-pilose, and with elongated lenticels. *Leaves*

membranous, broadly elliptic to obovate-oblong, shortly acuminate, more or less narrowed at the base; both surfaces of the young leaves (but especially the paler lower one) with minute adpressed rusty hair, the older glabrous except on the midrib and 7 or 8 pairs of slightly curved ascending rather short main-nerves; the connecting nerves wide and transverse; length 5 to 7 in.; breadth 2 to 3 in.; petiole .25 to .5 in. long, deciduously villous; stipules free, lanceolate, with broad bases and long linear apices, pilose, .15 to .2 in. long. *Cymes* terminal, lax, longer than the leaves, spreading, much branched, umbellately many-flowered; the branches minutely pubescent, the bracts at their divisions short and cup-like, those near the base of the flowers much longer (.1 to .2 in.) oblong, free. *Calyx* .15 to .3 in. long, sparsely pilose; the tube sub-cylindric shorter than the 5 narrowly lanceolate acuminate spreading teeth, one of the lobes occasionally petaloid and larger than the leaves, elliptic to elliptic-rotund, shortly apiculate, much narrowed to the long hairy petiole, puberulous on both surfaces, pubescent on the 5 radiating nerves. *Corolla* about three times as long as the calyx, its tube narrowly cylindric, slightly widened in its upper third and minutely strigose; the limb .25 in. across (when dry); its lobes broad, sub-acute. *Fruit* (unripe) cylindric, sub-clavate, crowned by the scars of the deciduous calyx-lobes.

PERAK; *King's Collector* 731, 855, 1910, 3276, 10345.—DISTRIB. Bali, *Teysmann*.

Imperfectly known species.

10. *MUSSAENDA MEMBRANACEA*, King n. sp. A climber; young branches thinner than a goose-quill, angled, dark-coloured, glabrous. *Leaves* membranous, broadly elliptic, sometimes slightly obovate, the apex shortly, broadly, and abruptly acuminate, the base gradually narrowed; both surfaces glabrous; main-nerves 5 to 7 pairs, little-curved, faint, spreading; length 2.75 to 4 in.; breadth 1.5 to 2 in.; petiole .6 to .8 in., stipules united to form a short glabrous cap. *Cymes* solitary, on a peduncle longer than the leaves, few-flowered, dichotomous, spreading, sub-glabrous, the bracts minute, subulate.

SINGAPORE: *Ridley* 1639.

This is only known by leaf-specimens. It is a very distinct species differing in form and texture of its leaves from any other *Mussaenda* in the Provinces. Its nearest ally seems to be *M. glabra*, Wall., and it much resembles a Tonquin species (hitherto unnamed) collected by Balansa (Herb. 624).

19. *TRISCIADIA*, Hook. fil.

A glabrous woody climber. *Leaves* coriaceous, few-nerved; stipules short, broad, connate below, 2-toothed, caducous, leaving an annular

scar. *Flowers* in paniced or ternate compound terminal umbels; bracts and bracteoles 0 (or if any caducous). *Calyx-tube* campanulate; limb coriaceous, tubular, minutely 5-toothed, ciliate, deciduous. *Corolla* coriaceous, salver-shaped; its tube short, glabrous everywhere; lobes of the limb as long as the tube, narrowly oblong, blunt, reflexed valvate in bud, their tips incurved. *Anthers* 5, linear, dorsifixed by short filaments on the throat of the corolla, versatile, exerted. *Ovary* 2-celled; style filiform; stigmas 2, linear-lanceolate; ovules 2 or more in each cell sunk in a fleshy placenta adnate to the septum. *Fruit* large, baccate, globular with leathery pericarp; seeds large compressed.—DISTRIB. A single Malayan species.

TRISCIADIA TRUNCATA, Hook. fil. in Benth. & Hook. fil. Gen. Plantar.

II. 69. Young branches thinner than a goose-quill, pale-brown when dry. *Leaves* broadly elliptic to sub-rotund, obtuse or bluntly cuspidate, both surfaces olivaceous-brown when dry, the upper shining; the lower paler, dull; main-nerves 4 to 6 pairs, slightly curved, ascending, prominent on the lower surface; length 2.5 to 4 in.; petioles .3 to .5 in., stipules forming a tube only .1 in. deep. *Umbels* 2.5 to 4 in. long, and about as much across. *Flowers* .5 in. long, their pedicels about .1 in. long. *Calyx* .1 in. long, truncate, the limb minutely toothed. *Corolla* .4 in. long, coriaceous, tubular, slightly expanded at the mouth and divided into 5 narrowly oblong, blunt, reflexed lobes about as long as the tube. *Fruit* globular, crowned by the large flat calyx-scar, about 1 in. in diam. *Webera truncata*, Roxb. Fl. Ind. ed. Carey and Wall. II. 538. *Stylocoryne truncata*, Wall. Cat. 8403. *Gupia truncata*, DC. Prod. IV. 394. *Pseudixora truncata*, Miq. Fl. Ind. Bat. II. 210.

PENANG: Wallich. PERAK: Wray 2104, 3271; *Scortechini*; Ridley 8374; King's Collector 5508, 6431, 6545.—DISTRIB. Andaman Islands; Sumatra; Java, Forbes 2504.

20. AULACODISCUS, Hook. fil.

Small glabrous trees. *Leaves* coriaceous; the stipules narrowly triangular, long-acuminate, caducous. *Flowers* small, polygamous, in axillary pedunculate many-flowered paniculate or umbellate cymes. *Calyx-tube* broadly hemispheric; the limb short and truncate-sinuate. *Corolla* coriaceous, rotate, the throat hairy; the limb with triangular-lanceolate, valvate, incurved lobes. *Stamens* 8 or 16, the alternate row imperfect; filaments flexuous; *anthers* dorsifixed, small, didymous. *Disk* large and prominent, 8- to 16-lobed. *Ovary* 6- to 16-celled; *ovules* numerous, on prominent placentas in the inner angles of the cells. *Berry* small, globose, areolate at the apex, usually 8- to 16-celled. *Seeds* numerous, minute, sub-globose; the testa thick, crustaceous, pitted;

embryo pyriform, in fleshy albumen.—DISTRIB. Two species, both Malayan.

A genus closely allied to *Urophyllum*.

Flowers in long-peduncled cymes with leafy bracts at the bases of branches; calyx a shallow cup; leaves acute
 1. *A. premnoides*.
 Flowers in shortly peduncled panicles without leafy bracts; calyx a deep cup; leaves acuminate ... 2. *A. Maingayi*.

1. *AULACODISCUS PREMNOIDES*, Hook. fil. in Gen. Plantar. II. 71. Young branches dark-coloured, 4-angled, glabrous. *Leaves* thinly coriaceous, oblong, shortly acuminate, the base slightly narrowed, both surfaces olivaceous-brown when dry, glabrous; the upper shining, the lower paler, dull and transversely reticulate; main-nerves 14 to 16 pairs, spreading to slightly curved; length 5·5 to 7 in.; breadth 1·25 to 1·65 in.; petiole ·2 to ·35 in. *Cymes* about 1·25 in. long and 1·5 in. in diam., pedunculate, axillary, trichotomously umbellate, rusty-puberulous; the common peduncle 1 in. long, the secondary half as long, each bearing at its base a leafy ovate-rotund petiolate bract ·3 to ·4 in. long. *Flowers* about ·1 in. long, their pedicels longer. *Calyx* shallow, cupular, indistinctly toothed. *Corolla* much depressed in bud, the mouth with 8 inflexed lobes, hairy outside. Perfect *stamens* 8, included, broadly ovate, on short filaments. *Disc* large, convex, hairy, deeply 8-grooved. Hook. fil. Fl. Br. Ind. III. 97 *in part*. *Azanthus enneandra*, Wight in Calc. Journ. Nat. Hist. VIII. 144.

MALACCA: *Griffith* (K.D.) 2938.

2. *AULACODISCUS MAINGAYI*, King & Gamble n. sp. A tree; young branches as thick as a goose- or swan-quill, dark-coloured, obtusely 4-angled. *Leaves* thinly coriaceous, pale-brown when dry, oblong or oblong-elliptic, acute, slightly narrowed at the base; both surfaces shining, olivaceous-brown, the lower slightly paler; main-nerves 12 to 14 pairs, curved, spreading, thin but prominent beneath; length 6 to 8 in.; breadth 2 to 2·5 in.; petiole ·25 to ·5 in. *Panicles* pedunculate, cymose, with no leafy bracts at the bases of the branches, many-flowered, 1 to 1·5 in. in diam., slightly puberulous and with a few small bracteoles, the peduncles less than ·5 in. long. *Flowers* ·1 in. long, their pedicels longer. *Calyx* deeply cupular; sub-glabrous; its mouth truncate, entire. *Corolla* twice as long as the calyx, with 8 deep lanceolate reflexed lobes. *Style* long, reflexed over the disc.; *stigma* large. *Fruit* ·25 in. in diam. *Aulacodiscus premnoides*, Hook. fil. in Fl. Br. Ind. III. 97 *in part*.

MALACCA: *Maingay* (K.D.) 938. SELANGOR: *Curtis* 2343. PERAK: *Scortechini* 2004; *King's Collector* 1086.—DISTRIB. Sumatra.

This is one of the two plants referred to *A. premnoides* by Sir Joseph Hooker in F.B.I. l.c. It appears to us to differ sufficiently from the other one (*Griffith* K.D.

2938) to deserve specific rank. It agrees with a Sumatra plant in Herb. Calcutta bearing the MSS. name *A. peltastigma*, Miq. But we can find no description of the species.

21. UROPHYLLUM, Wall.

Small trees or shrubs with terete slender branches. *Leaves* petiolate, usually elongate and acuminate. *Stipules* elongate small, rarely large. *Flowers* small (sometimes unisexual) in small axillary, sessile or pedunculate cymes or fascicles; their pedicels usually short, bracteolate at the base. *Calyx-tube* short, sub-globose or obconic, the limb cupular, persistent, usually 5-lobed (rarely 4- to 7-lobed). *Corolla* coriaceous, with a short tube and villous throat; the limb with 5 (rarely 4 to 7) erect or spreading triangular valvate lobes. *Stamens* 5 (rarely 4 to 7), inserted by short filaments in the throat. *Anthers* linear, acute, dorsifixed. *Disc* tumid, sulcate. *Ovary* 5 (rarely 4- to 7-celled); *style* short, often tumid at the base; *stigma* ovoid or clavate entire or notched. *Ovules* numerous, on axillary placentas. *Fruit* a small 4- to 5-celled many-seeded berry. *Seeds* minute, sub-globose; the testa pitted, crustaceous; the embryo clavate, in fleshy albumen.—**DISTRIB.** about 35 species; tropical Asiatic and African and one in Japan.

Leaves more or less hairy :—

The whole of the under surface of the leaves more or less pubescent :—

Leaves elliptic-oblong, 6 to 10 in. long :—

- | | | | |
|-------------------------------------------------|-----|----|--------------------------|
| Cymes with large permanent bracts | ... | 1. | <i>U. villosum</i> . |
| Cymes ebracteate or with small deciduous bracts | ... | 2. | <i>U. macrophyllum</i> . |

Leaves oblong-lanceolate, 2.5 to 5 in. long :—

- | | | | | | |
|---------------------------------------------------------------------------|-----|-----|-----|----|-------------------------|
| Pubescence of leaves, young branches and fruit cinereous | ... | ... | ... | 3. | <i>U. hirsutum</i> . |
| Pubescence of leaves and young branches warm-ferrugineous, fruit glabrous | ... | ... | ... | 4. | <i>U. ferrugineum</i> . |

Under surfaces of the leaves pubescent only on the midrib and nerves :—

Leaves 8 to 10 in. long :—

- | | | | |
|------------------------------------------------------------------------------------------|-----|----|-----------------------------------------------------|
| Flowers on bracteolate pedunculate, trichotomously umbellate cymes several inches across | ... | 2. | <i>U. macrophyllum</i> ,
var. <i>corymbosa</i> . |
|------------------------------------------------------------------------------------------|-----|----|-----------------------------------------------------|

Leaves 3 to 5 in. long :—

- | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|----|---------------------------|
| Flowers in dense many-flowered sessile cymes or in few-flowered shortly pedunculate umbels; fruit sparingly hairy or sub-glabrous; leaves not bullate | ... | ... | ... | 5. | <i>U. streptopodium</i> . |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|----|---------------------------|

Leaves everywhere glabrous :—

Flowers 5-merous :—

- | | |
|---------------------------------------------------------|--|
| Umbels simple; flowers glabrous, on slender pedicels :— | |
| Umbels 10- to 12-flowered; leaves caudate-acu- | |

- minate, shining when dry, the main-nerves very prominent 6. *U. glabrum*.
 Umbels 4- to 6-flowered; leaves shortly acuminate, dull when dry; nerves not prominent ... 5. *U. streptopodium*.
 Flowers 4-merous:—
 Umbels compound, trichotomous; flowers pedicelled, with hirsute permanent bracteoles; corolla puberulous outside, hirsute inside ... 7. *U. trifurcum*.
 Cymes 8- to 10-flowered; flowers sessile puberulous 8. *U. potatorum*.

1. *UROPHYLLUM VILLOSUM*, Jack & Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 185. A shrub to 10 feet high; young branches nearly as thick as a goose-quill, covered with adpressed yellowish hair. *Leaves* coriaceous, pale, yellowish-green when dry, oblong-elliptic, caudate-acuminate, the base slightly narrowed or rounded; upper surface glabrous; the lower boldly reticulate and bearing many pale sub-adpressed hairs especially on the nerves and veins; midrib prominent, tomentose; main-nerves 10 or 11 pairs, much curved, ascending, bold on the lower surface; length 7 to 10 in.; breadth 2.75 to 3.25 in.; petiole .3 in., tomentose. *Stipules* narrowly oblong-lanceolate, blunt, tomentose below, .8 in. long. *Cymes* 4 to 8 in. long, on pedicels of the same length, about .8 in. in diam., condensed; bracts numerous, narrowly oblong, blunt, pilose, persistent. *Flowers* densely crowded, their pedicels short, pubescent. *Calyx* campanulate, .25 in. long, with 5 triangular blunt spreading lobes, pubescent on both surfaces. *Corolla* longer than the calyx, cylindric-campanulate, thick, deeply divided into 5 oblong concave lobes, the throat densely pilose; *stamens* linear, glabrous. *Fruit* sub-globular, truncate at the apex and crowned by the short triangular calyx-teeth, sparsely villous, 3 in. in diam. when dry. Wall. Cat. 8314; DC. Prod. IV. 441; Hook. fil. Fl. Br. Ind. III. 99.

PENANG: *Wallich*; *King*; *Maingay* (K.D.) 884; *Curtis* 178, 7201. PERAK: *Wray* 2634; *Scortechini* 1983; *King's Collector* 526, 2563; *Ridley* 9711. SINGAPORE: *Lobb* 322.

2. *UROPHYLLUM MACROPHYLLUM*, Korth. Young branches slender obtuse 4-angled, at first densely and minutely pubescent, sometimes becoming ultimately almost glabrous. *Leaves* membranous, elliptic-oblong, sometimes obovate-elliptic, shortly and rather abruptly acuminate, the base cuneate; upper surface olivaceous-green when dry, glabrous except the depressed-pubescent midrib; the lower pale-olivaceous, the midrib and 9 to 11 pairs of curved ascending main-nerves prominent and pale pubescent, the interspaces and rather distinct transverse veins also pubescent; length 6 to 10 in.; breadth 1.75 to 3 in.; petiole .4 to .6 in.; stipules lanceolate, adpressed-pubescent, .4 to .6 in. long

Cymes 8- to 10-flowered, ebracteate or bracts small and fugacious, when in flower not much exceeding the petioles in length; the peduncles much shorter (longer in var. *corymbosa*) than the pubescent pedicels. *Flowers* .15 in. long, their pedicels .3 to .4 in. long. *Calyx* a shallow truncate adpressed-hairy cup, its mouth with 5 short triangular teeth. *Corolla* longer than the calyx, glabrous. *Fruit* globular, glabrescent, crowned by the calyx-lobes, .15 in. in diam. Koord. & Valet. Bijdr. 8, 68. *Axanthes longifolia*, Wight in Calc. Journ. Nat. Hist. VII. 145 t. 2, f. 1. *U. strigosum*, Kurz Fl. Burm. II. 53 (not of Korthals). *U. longifolium*, Hook. fil. Fl. Br. Ind. III. 99.

PENANG: *Curtis* 2753. SELANGOR: *Ridley* 7440, 8576. PERAK: *Wray* 2201, 3511; *Scortechini* 267, 715; *King's Collector* 2838, 2948, 2964.

VAR. *corymbosa*; cymes 1 or 2 in the axils of the leaves, often as much as 3.5 in. long (including the long peduncle), trichotomously corymbose; stipules longer than the petioles, broadly oblong lanceolate, sometimes auricled at the base, pubescent. *Urophyllum corymbosum*, Korth. Ned. Kruidk. Arch. II. 194; Koord. & Valet. Bijdr. 8, 73.

PERAK: *Scortechini*. *King's Collector*, 2263, 2298, 2409, 5723. JOHOR: *King*.—DISTRIB. Sumatra, Java.

3. *UROPHYLLUM HIRSUTUM*, Hook. fil. Fl. Br. Ind., II. 98. Young branches slender, softly cinereous-tomentose like the stipules, petioles, and inflorescence. *Leaves* membranous, oblong-lanceolate or narrowly elliptic, acuminate, the base rounded or sometimes narrowed; upper surface glabrous, rarely sub-glabrous; the lower with pale soft spreading hairs especially on the midrib and nerves; main-nerves 8 to 10 pairs, curved, ascending; length 3 to 5 in.; breadth 1 to 2 in.; petiole .15 to .25 in.; *stipules* much longer than the petioles, linear-lanceolate. *Cymes* small, capitate, sessile, few-flowered, with a few ovate-lanceolate bracts. *Calyx* hairy, on a short stalk; the tube very short; the limb with 5 broad triangular spreading lobes. *Corolla* hairy. *Fruit* depressed-globose, the apex truncate, crowned by the small remains of the calyx, sparsely pubescent, .15 to .2 in. in diam. when dry. *Axanthes hirsuta*, Wight in Calc. Journ. Nat. Hist. VII. 148. *Wendlandia bifaria*, Wall. Cat. 6278.

MALACCA: *Maingay* (K.D.) 873; *Griffith* (K.D.) 2939; *Wallich*, *Goodenough*. PENANG: *Ridley* 10251. SELANGOR: *Ridley* 7442. NEGRI SEMBILAN: *Ridley* 10100. SINGAPORE: *Ridley* 3906, 4913, 8428. JOHOR: *Ridley* 4912, 11173, 11174. PERAK: *Scortechini* 84; *Wray* 152, 1305, 2488; *King's Collector* 199, 10494. PAHANG: *Ridley* 2204, 2206.

This species varies considerably as to the amount of hair on the leaves and as to the number of the main-nerves. I refer to it with some hesitation *Ridley* 11176 from Johor, No. 8577 from Selangor, *Scortechini* 267 from Perak.

4. *UROPHYLLUM FERRUGINEUM*, King and Gamble n. sp. A slender small tree. Young stems softy, minutely, and rather sparsely rusty-tomentose. *Leaves* membranous, narrowly oblong-lanceolate, caudate-acuminate, the base slightly narrowed or rounded; upper surface glabrous, the midrib distinct, depressed, the main-nerves faint when dry; lower paler, sparsely rusty-sericeous between the nerves; the main-nerves themselves about 7 pairs, curved, ascending, distinct and, like the midrib, densely rusty-sericeous; length 2·5 to 3·5 in.; breadth ·5 to 1 in.; petioles ·15 to ·4 in., tomentose; stipules more than twice as long as the petioles, narrowly oblong-lanceolate, rusty-sericeous. *Cymes* not much exceeding the petioles, almost sessile, few-flowered, with a few small lanceolate bracts at their bases. *Flowers* on pubescent pedicels equal to or longer than themselves. *Calyx* shortly campanulate, with 5 broad short pointed teeth, almost glabrous. *Corolla* white, glabrous, larger than the calyx, the tube shortly cylindrical; the teeth 5, rather large, triangular, acute. *Fruit* depressed globular, truncate at the apex and bearing the small calyx-teeth, glabrous, ·2 in. in diam.

PERAK: *Ridley* 2930, 9736; *Curtis* 2017; *Wray* 2065, 3933; *King's Collector* 780, 4112; *Scortechini* 205. KEDAH: *Ridley*.

A species near *U. streptopodium*, Wall., but readily distinguished by its soft silky hair. This is closely allied to a Bornean species collected by Beccari, P.B. 1840, and by *Ridley*, 2781, which has however longer pedicelled flowers and hairy fruit.

5. *UROPHYLLUM STREPTOPodium*, Wall. Cat. 8317; Hook. fl. Fl. Br. Ind. III. 99. A shrub or small tree; young branches less than half as thick as a goose-quill, yellowish-brown, at first minutely adpressed-pubescent, ultimately often glabrous. *Leaves* thinly coriaceous, elliptic-oblong to oblanceolate, shortly acuminate, much narrowed from near the middle to the base, both surfaces greenish-yellow to pale olivaceous-brown when dry, the upper glabrous; the lower paler, transversely reticulate, minutely scaly, glabrous, or finely pubescent on the midrib and 5 to 8 pairs of curved, ascending main-nerves and also sometimes on the transverse veins; length 2·5 to 6 in.; breadth ·8 to 2 in.; petioles ·25 to ·5 in., adpressed-pubescent or glabrous. *Stipules* narrowly oblong-lanceolate, acute or blunt, sparsely adpressed-pubescent or sub-glabrous, slightly longer (some twice as long) as the petioles. *Cymes* axillary, from as long to twice as long as the petioles, many-flowered dense and sessile, or umbellate on short bracteolate peduncles and few-flowered. *Flowers* about ·15 in. long, on pubescent pedicels lengthening in fruit to ·1 to ·2 in. *Calyx* sub-glabrous, cupular-campanulate, the mouth with 5 (occasionally 6) small, more or less acute triangular lobes. *Corolla* one and a half to nearly three times as long as the calyx, campanulate, with 5 deep oblong blunt, sub-erect or reflexed lobes, often hairy on the

inner surface. *Fruit* sub-globular, depressed, the apex truncate and crowned by the minute remains of the calyx, glabrous or sparsely hairy, .1 to .2 in. in diam. *U. parviflorum*, Wall. Cat. 8320; *U. glabrum*, Wall. Cat. 8316 *in part.* *Urophyllum*, Wall. Cat. 8315? *U. Blumeanum*, Hook. fil. Fl. Br. Ind. III. 99. *U. umbellulatum*, Miq. Fl. Ind. Bat. Suppl. 542; Hook. fil. Fl. Br. Ind. III. *Geniostomum acuminatum*, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 316; Wall. Cat. 9067. *Timonius acuminatus*, Wall. Cat. 6218. *Axanthes Blumeanus*, Wight in Calc. Journ. Nat. Hist. IV. 145.

In all the provinces; a common and variable plant passing into *U. glabrum* and doubtfully distinct therefrom.

6. *UROPHYLLUM GLABRUM*, Wall. in Roxb. Fl. Ind., ed. Carey and Wall. II. 186. A shrub; or small tree 15 to 20 feet high; young branches half as thick as a goose-quill, obtusely 4-angled and grooved, puberulous, becoming glabrous. *Leaves* thinly coriaceous, elliptic, oblong-elliptic, or oblong, shortly acuminate, slightly narrowed or rounded at the base; both surfaces pale yellowish- or olivaceous-brown when dry, glabrous and reticulate, the midrib bold, depressed on the upper surface but prominent on the lower, like the 7 to 12 pairs of curved, spreading, main-nerve; length 4 to 9 in.; breadth 1.5 to 3 in.; petioles .3 to .5 or sometimes 1 in. long, puberulous or glabrous; *stipules* linear-oblong, blunt; adpressed-pubescent, somewhat longer than the petioles. *Umbels* axillary, 10- to 12-flowered, bracteolate, on peduncles varying from .25 to .5 in. or even 1 in. in length, rarely sub-sessile. *Flowers* .15 in. long, on slender pedicels .2 to .3 in. long. *Calyx* widely cupular, truncate or minutely toothed, glabrous. *Corolla* glabrous, longer than the calyx, its mouth with 5 deeply triangular lobes. *Anthers* ovate, surrounded by long hairs. *Fruit* depressed-globular, crowned by the wavy calyx, .2 in. in diam. Wall. Cat. 8316 (excl. B); DC. Prod. IV. 441; Kurz Fl. Burm. II. 53. Hook. fil. Fl. Br. Ind. II. 98. Koord. & Valet Bijdr. 8, 66. *Urophyllum*, Wall. Cat. 8318, 8319, 8322. *U. arboreum*, Korth. in Ned. Krindk. Arch. II. 194. *U. repandulum*, Miq. Fl. Ind. Bat. II. 353. *Axanthes arborea*, Blume Bijdr. 1603. *Wallichia arborea*, Reinw. ex Blume in Flora 1825, 107. *Urophyllum Griffithianum*, Hook. fil. Fl. Br. Ind. III. 98. *Axanthes Griffithiana*, Wight in Calc. Journ. Nat. Hist. VII. 147.

In all the provinces; very common.

7. *UROPHYLLUM TRIFURCUM*, H. H. W. Pearson MSS. Young branches terete, dark-coloured, glabrous, half as thick as a goose-quill. *Leaves* coriaceous, oblong-elliptic, shortly acuminate, the base rounded or slightly narrowed; both surfaces glabrous except the depressed pubescent midrib and nerves on the upper, the lower reticulate, shining; main-

nerves 10 to 12 pairs, curved, spreading, very prominent beneath; length .6 to .8 in.; breadth 2.5 to 3.25 in.; petioles .5 to .75 in. stout. *Flowers* in pedunculate trichotomous axillary compound umbels, the common peduncle 1 to 1.25 in. long, rusty-puberulous; the secondary umbels on short peduncles 6- to 8-flowered, with broadly ovate hirsute deciduous bracteoles at their bases. *Flowers* .25 in. long, on rusty-pubescent pedicels shorter than themselves. *Calyx* cupular; its mouth truncate, undulate. *Corolla* as long as the calyx; its 4 lobes broad, blunt, puberulous outside, hirsute inside. *Fruit* unknown.

JOHOR: *Ridley* 4084, 7441; *Scortechini*. SELANGOR: *Ridley* 7441, 7435, 8540. PAHANG: *Ridley* 11180.

8. *UROPHYLLUM POTATORUM*, King n. sp. A small tree; all parts except the flowers glabrous; young branches thinner than a goose-quill, terete, pale-brown when dry. *Leaves* coriaceous, elliptic-oblong, caudate-acuminate, the base cuneate, both surfaces brown tinged with olivaceous when dry, dull; main-nerves 5 to 9 pairs prominent like the midrib on the lower surface and depressed on the upper, veins faint on both; length 4 to 8 in.; breadth 1.25 to 1.75 in.; petiole .2 to .25 in. stout; *stipules* ovate, much acuminate. *Cymes* axillary, longer than the petioles, 8- to 10-flowered. *Flowers* crowded, puberulous externally. *Calyx* sessile, cylindric, the limb obscurely toothed, .2 in. long. *Corolla* longer than the calyx; the 4 lobes oblong, blunt, reflexed. *Fruit* unknown.

MALACCA: on Mount Ophir. *Hullett* 104; *Wray* 756. PERAK: *King's Collector* 3211.

The flowers in the only three specimens which I have seen are in bad condition, but they appear to be those of *Urophyllum*. According to Mr. Wray's field note, the flower is whitish-green and the fruit is orange or yellow when ripe. The leaves of the plant are used by the Malays to make a decoction which they drink as a beverage that appears to have some of the physiological effects of tea.

NOTE.—In addition to the foregoing species from the Malay Peninsula we take this opportunity of describing the following very distinct species which has hitherto been collected only in the Andaman Islands.

UROPHYLLUM ANDAMANICUM, King & Gamble n. sp. Young branches brown, thinner than a goose-quill, glabrous but for a very few scattered hairs near the nodes. *Leaves* oblanceolate, shortly and rather abruptly acuminate, narrowed from above the middle to the short petiole; upper surface pale olivaceous when dry, glabrous; the lower paler, glabrous, except the rusty adpressed-pilose midrib and nerves, transversely reticulate; main-nerves 10 to 12 pairs, ascending, very slightly curved; length 5 to 7.5 in.; breadth 1.5 to 2.25 in.; petiole .25 to .35 in. *Stipules* lanceolate, much acuminate, densely rusty-pilose on the lower surface. *Cymes* 1 to 3 in a leaf-axile, on slender *peduncles* much longer than the petioles, densely umbellate, many-flowered, the flowers on coarsely rusty-pubescent pedicels, mostly longer than themselves. *Flowers* .15 in. long. *Calyx* deeply cupular, pubescent outside like the pedicels; the mouth truncate and usually entire, sometimes minutely toothed. *Corolla* twice as long as the calyx, glabrous except the densely pilose

throat; the lobes deep, broadly lanceolate, acute. *Fruit* sub-globular, truncate, the top bearing the wide-cupular calyx-limb, puberulous, '15 in. in diam.

ANDAMAN ISLANDS: *King, Prain.*

22. ADENOSACME, Wall.

Shrubs with terete brittle branches. *Leaves* membranous, with many pinnate nerves; *stipules* lanceolate, sometimes toothed. *Flowers* in axillary or terminal paniculate, spreading cymes, bracts often glandular. *Calyx-tube* globose or hemispheric, with 4 to 6 persistent lobes. *Corolla* tubular; its lobes 4 to 6, triangular or oblong, valvate in bud, their edges everted. *Stamens* 4 to 6, inserted by short filaments on the tube. *Ovary* 2- or 5-6-celled; *style* slender or thickened above; *stigmas* 2 or 5-6, linear; *ovules* very numerous, on fleshy peltate placentas. *Fruit* a globose berry, with coriaceous or fleshy epicarp, crowned by the remains of the calyx, 2- to 5-6-celled, indehiscent or dehiscing loculicidally at the apex; seeds many on sub-globose placentas. *Seeds* small, angled, dotted; embryo minute in fleshy albumen.—DISTRIB. Species about 6; Indian and Malayan.

Flowers '15 in. long, numerous, in much-branched
paniculate cymes 2 to 6 in. long 1. *A. longifolia.*

Flowers '6 in. long, few, in small pedunculate cymes
not exceeding 1 inch in length 2. *A. Scortechinii.*

1. ADENOSACME LONGIFOLIA, Wall. Cat. 6280. Two or three feet high; stems as thick as a goose- or swan-quill, straw-coloured, shining, glabrous. *Leaves* elliptic-lanceolate, elliptic-ob lanceolate or elliptic, apex rather shortly acuminate, the base much narrowed from above or below the middle to the usually elongate petiole, upper surface dark olivaceous when dry, glabrous, puberulous or pubescent; lower surface always paler and usually more pubescent than the upper; main-nerves 10 to 24 pairs, curved, spreading, thin but distinct on both surfaces; length 6 to 12 in.; breadth 1'5 to 4'5. *Stipules* oblong, blunt, about '3 in. long. *Cymes* paniculate, from 2 to 6 in. across, never more than half as long as the leaves and usually much shorter, solitary, many-flowered, branching from the base or on short peduncles, the branches slender, angled, glabrous or puberulous, the smaller ones zig-zagged and very thin. *Flowers* '15 in. long, shorter than their pedicels, solitary or in fascicles of 2 or 3. *Calyx* almost globular, sparsely pubescent outside; the 5 or 6 lobes spreading, their edges with a few thick elongate glands. *Corolla* not much exceeding the calyx, densely hirsute outside, glabrous inside; the lobes erect, oblong, blunt. *Stamens* subsessile. *Capsule* turbinate, transversely elongated, '2 in. in diam., faintly 2-lobed, with many vertical lines, the epicarp brittle, sub-glabrous, pure white. *Miq. Fl. Ind. Bat.*

II. 217; Kurz For. Fl. Burm. II. 160; Hook. fil. Fl. Br. Ind. III. 95. *A. Malayana*, Wall. Cat. 6282. *Bertiera javanica*, and *B. fasciculata*, Blume Bijdr. 987; DC. Prod. IV. 392. *Mycetia javanica*, Reinw. *Rondeletia longifolia*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 137; Don Prodr. Fl. Nep. 138. *Wendlandia longifolia*, DC. l.c. 412. *W. Malayana*, G. Don Gen. Syst. III. 519.

In all the provinces, more or less common.

Varying considerably as to the length of the leaves and petioles and as to the breadth of the former. The flowers are 2- or 3-morphic in the matter of style and stamens.

2. ADENOSACME SCORTECHINII, King & Gamble n. sp. A shrub 6 to 8 feet high; branches as thick as the little finger, the youngest much thinner; bark corky, at first pubescent and brown, but afterwards exfoliating, and very pale and deeply grooved. *Leaves* obovate-elliptic or broadly oblanceolate, shortly and abruptly acuminate, much narrowed to the base; upper surface brown and glabrous, the lower paler, puberulous on the midrib, main-nerves and rather distinct transverse veins; main-nerves 16 to 18 pairs, sub-horizontal, prominent beneath; length 8 to 13 in.; breadth 3 to 5 in.; petiole .5 to 1.25 in., pubescent; *stipules* shorter than the petioles, triangular, acute. *Cymes* several from the axils of fallen leaves, under 1 in. in length including the short peduncle, minutely rusty-tomentose, with a pair of lanceolate bracts .15 in. long at the apex of the peduncle and a few minute bracteoles on the branchlets. *Flowers* about .6 in. long. *Calyx* campanulate, .15 in. long; the teeth 5, narrowly lanceolate, longer than the tube. *Corolla* four times as long as the calyx, tubular, inflated at the base and contracted below the limb; lobes of limb 5, lanceolate. *Anthers* 5, sessile at the base of the tube, linear, acute. *Style* shorter than the corolla-tube, filiform, divided into 5 linear puberulous stigmatic arms; *ovary* 2-celled, with numerous ovules from 2 placentas attached to the septum. *Capsule* unknown.

PERAK: *Scortechini*; King's Collector 2223; Wray 1474. SELANGOR: Ridley 7400.

23. BRACHYTOME, Hook. fil.

Glabrous shrubs with petiolate membranous leaves; *stipules* triangular, acuminate, persistent. *Flowers* small, polygamo-dioecious, in small slender cymose panicles from the axils of undeveloped leaves, bracts minute. *Calyx* with an ovoid or oblong tube (short in the male) and a cupular, 5-toothed persistent limb. *Corolla* glabrous, widely funnel-shaped, the limb with 5 short lobes, twisted in bud. *Anthers* sub-sessile on the throat of the corolla, included, linear-oblong, imperfect in the female flowers. *Disc* small and annular in the male

flower; cupular and larger in the female. *Ovary* 2-celled; *style* filiform (short in the male); *stigmas* 2, short, oblong, obtuse, grooved; *ovules* very numerous, borne on the surface of peltate tumid placentas. *Berry* small, globular or ovoid, 2-celled, many-seeded. *Seeds* cuneate, compressed, with thin reticulate testa, and fleshy albumen; embryo small, sub-cylindric.—*DISTRIB.* Two species; one Eastern Himalaya and one Malayan.

BRACHYTOME SCORTECHINII, King & Gamble n. sp. A shrub 6 to 12 feet high; young branches twice as thick as a crow-quill, somewhat compressed. *Leaves* thinly membranous, narrowly elliptic, tapering about equally to each end, the apex acuminate, both surfaces pale olivaceous when dry, the lower tinged with brown; main-nerves 10 to 14 pairs, spreading, curving slightly upwards, prominent on the lower surface; length 4 to 8 in.; breadth 1.5 to 2.5 in.; petiole .2 to .25 in.; *stipules* shorter than the petioles, broadly triangular, keeled, acuminate. *Cymes* 1 to 1.5 in. long, with few, spreading, lax branches. *Flowers* .35 in. long. *Calyx* about the same length as the corolla; its tube ovoid, constricted below the short, obscurely 5-toothed limb. *Berry* globular, .3 in. in diam., smooth, crowned by the short calyx-limb.

PERAK: at elevations of 3,000 to 4,000 feet; *Scortechini* 14, 237, 1215; *King's Collector* 2136, 2930; *Wray* 950, 2812, 2999.

This resembles *B. Wallichii*, Hook. fl., the only other species of the genus as yet described; but that has leaves of thicker texture, more numerous flowers, and ellipsoid fruit.

24. *STYLOCORYNA*, Cav.

Trees or shrubs, with pubescent or glabrous usually membranous leaves and ovate-triangular, usually deciduous stipules. *Flowers* in terminal corymbose bracteolate cymes, 5-merous. *Calyx-tube* ovoid or campanulate; the limb short or long, always 5-cleft. *Corolla* funnel-shaped, its tube varying in length, the throat glabrous; the limb 5-lobed, narrow, reflexed or spreading. *Stamens* 5, on the mouth of the corolla, sessile or on short filaments; the *anthers* narrow, exerted. *Ovary* 2-celled; *style* stout; *stigma* long, usually thicker than the style; fusiform or clavate; *ovules* numerous, rarely 2 in each cell, often immersed in the peltate placentas. *Fruit* globose, baccate, without pulp, 2-celled; cells 2- or many-seeded. *Seeds* angled; albumen fleshy or horny; embryo small; cotyledons small, leafy.—*DISTRIB.* Probably about 15 species; tropical Asiatic.

The above definition is limited so as to include only the pentamerous many-seeded species which in Hooker's Flora of British India are included in the genus *Webera* of Schreber (founded in 1791). Some recent authors refer these species to *Tarenna* a genus established by Gaertner in 1788 for *T. Zeylanica* (Gaertner, Fruct.

I. 139, t. 28). Gaertner however, defines and figures *Tarenna* as tetramerous. We therefore for these pentamerous species revive the genus *Stylocoryna* (established in 1797 by Cavanilles; Cav. *Ic. IV. 46, t. 368*) which that author describes as pentamerous and many-seeded. For the genus *Webera* of Schreber we reserve in the present work certain tetramerous uni-ovulate plants which in external characters resemble *Ixora* and *Pavetta*. In Engler's Pflanzen-familien *Webera*, Schreb., is reduced to *Chomelia*, a genus founded by Linnæus in 1737. This name *Webera* was subsequently adopted by two botanists, Jacquin and Velloso, for two distinct genera. There is thus much confusion connected with it.

Leaves much longer than broad, tapering about equally to apex and base; cymes contracted :—

Main nerves of leaves faint on both surfaces :—

Leaves oblong-lanceolate quite glabrous; calyx puberulous, its lobes long, linear 1. *S. angustifolia*.

Leaves narrowly elliptic-oblong; lower surfaces minutely adpressed-hairy; the upper glabrous except the midrib; calyx pubescent, its lobes very short, acute 2. *S. adpressa*.

Main nerves prominent on the lower surface :—

Leaves hispid on the upper surface, softly pubescent on the lower; calyx densely covered with long stiff pale hairs; its lobes long, linear... 3. *S. Maingayi*.

Leaves about twice (rarely three times) as long as broad; cymes spreading; main-nerves 10 to 12 (rarely so few as 6) pairs, bold and prominent on the lower surface :—

Leaves obovate, glabrous except for tufts of hair in the nerve axils beneath 4. *S. costata*.

Leaves elliptic-oblong to elliptic-lanceolate or elliptic :—

Both surfaces of the leaves glabrous except for a few hairs on the midrib 5. *S. fragrans*.

Upper surface of the leaves hispidulous, the lower softly pubescent 6. *S. mollis*.

1. *STYLOCORYNA ANGUSTIFOLIA*, King n. sp. A shrub 4 to 6 feet high, glabrous except the inflorescence; young branches striate, thinner than a goose-quill. *Leaves* coriaceous, narrowly oblong-oblong-lanceolate, much but rather bluntly acuminate, gradually narrowed from the middle to the petiole, the edges (when dry) much recurved; both surfaces blackish when dry, shining, the midrib deeply depressed on the upper, bold and prominent on the lower surface; main-nerves 5 or 6 pairs, oblique, ascending, indistinct on both surfaces; length 2·5 to 3·5 in.; breadth ·75 to 1 in.; petiole ·2 to ·35 in. *Stipules* broad, transversely oblong, abruptly acuminate, ·25 in. long. *Cymes* less than 1 in. in diam., solitary, terminal, shortly pedunculate, not (even including the peduncles) half so long as the leaves, the branches few, ascending, compressed, puberulous with lanceolate spreading bracteoles; 3- to 5-flowered.

Flowers .35 in. long, puberulous externally, on short pedicels bracteolate at the base. *Calyx* puberulous, campanulate, with short tube and 5 long narrowly linear-lanceolate spreading lobes. *Corolla* not much exceeding the calyx, with a short tube and 5 imbricate oblong acute lobes united only at the sericeous bases, minutely pubescent on the outer surface, glabrous on the inner. *Anthers* 5, linear, united into a tube round the long cylindrical style, the filaments free, dorsifixed. *Ovary* sunk in the calyx tube and attached to it, 2-celled, the placentas infolded, several seeded. *Fruit* unnown.

PERAK: *King's Collector* 8265. Only once collected. A very distinct species.

2. *STYLOCORYNA ADDRESSA*, King n. sp. A shrub; young branches thinner than a goose-quill, obtusely 4-angled, covered with short rusty deciduous tomentum. *Leaves* thinly coriaceous, narrowly elliptic-oblong, often slightly oblanceolate, shortly and sharply acuminate, the base much narrowed; both surfaces dark olivaceous when dry, the upper glabrous and minutely reticulate; lower surface and especially the midrib with short sparse stiff adpressed pale hairs; main-nerves 6 to 10 pairs, curved, spreading, faint on the upper surface, distinct on the lower; the midrib stout, channelled above; length 4 to 8 in.; breadth .75 to 1.75 in.; petioles .25 to .4 in. *Stipules* ovate, acute, .15 in. long, deciduous. *Cymes* solitary, terminal, about 1 in. long (including the short peduncle), dichotomous, few-flowered; the branches divergent, densely tomentose. *Flower-pedicels* short, bi-bracteolate at the base. *Flower* about .6 in. long. *Calyx* urceolate .1 in. long, with 5 short acute teeth. *Corolla-tube* .35 in. long, minutely pubescent without like the calyx, twice as long as the oblong, blunt lobes of the limb. *Anthers* linear, subsessile. *Fruit* pisiform, the apex with the small scar of the calyx, glabrous; seeds two in each cell, many-angled.

In all the provinces; common.

VAR. *papillulosa*. *Leaves* 3.5 to 4 in. long, coriaceous, lower surface with numerous minute dark-brown papillæ, the pubescence rusty.

SINGAPORE: *Ridley* 3885, 4960. JOHOR: *Ridley* 2879. PAHANG: *Ridley* 1087.

The only specimens of this which I have as yet seen are rather imperfect. It is quite possible that it will have to be treated as a species when fuller material is obtained.

3. *STYLOCORYNA MAINGAYI*, King. A shrub; young branches thinner than a goose-quill, densely tawny or rusty-tomentose. *Leaves* thickly membranous, elliptic-lanceolate to elliptic-ovate, shortly caudate-acuminate, the base cuneate; upper surface sparsely hispid-pubescent; the lower softly pubescent; main-nerves 8 or 9 pairs, spreading, curved,

depressed like the midrib on the upper surface when dry and prominent on the lower; length 3 to 6·5 in.; breadth 1·5 to 3 in.; petiole ·25 to ·35 in. *Stipules* lanceolate with long filiformly acuminate apices, rusty-pubescent, ·5 in. long. *Cymes* in condensed sub-globular panicles 1·5 to 3 in. in diam.; the branches short, covered like the calyces externally with long pale soft hairs and bearing many long filiform pubescent bracteoles. *Flowers* ·7 in. long (excluding the style) on slender short pedicels. *Calyx* flask-shaped, ·15 in. long, the mouth with 5 long linear, recurved stiffly pubescent lobes. *Corolla* with cylindric pubescent tube more than twice as long as the blunt oblong lobes of the limb. *Ovary* 2-celled, each cell with several triangular ovules, disk thick cushion like. *Fruit* the size of a large pea, glabrous, the calyx-scar small. *Seeds* several, angled. *Webera Maingayi*, Hook. fil. Fl. Br. Ind. III. 103.

MALACCA: *Griffith* (K.D.) 3081; *Maingay* (K.D.) 932; *Ridley* 323. PERAK: *King's Collector* 1021, 2526, 4610, 5902, 10754. NEGRI SEMBILAN: *Ridley* 10102. JOHOR: *Ridley* 11169.

Resembling *Pavetta naucleiflora*, Wall., in externals, and varying somewhat as to the amount of the pubescence. *Griffith* No. 3082 (K.D.) seems to be a form of this with the upper surfaces of the leaves almost glabrous and the lower with minute scanty pubescence.

4. *STYLOCCRYNA COSTATA*, Miq. Fl. Ind. Bat. Suppl. 218. A tree; young branches as thick as a goose-quill, bluntly 4-angled, rusty-pubescent. *Leaves* thickly membranous, obovate, the apex broad, obtuse, or with an abrupt small apiculus, the base much narrowed; upper surface dark-brown and shining when dry, glabrous; the lower paler, dull, glabrous except for tufts of coarse rusty hair in the axils of the 10 to 12 bold spreading slightly curved main-nerve; length 6 to 8 in.; breadth 3·5 to 4·5 in.; petiole ·6 to ·8 in.; stipules of the stem-leaves not seen, those at the base of the cyme short, broad, blunt. *Cymes* crowded at the apices of the branches, each individual pedunculate, corymbose, densely many-flowered, everywhere minutely and densely pubescent like the flowers and their pedicels, 1 to 1·5 in. in diam., bracteoles minute. *Flowers* ·65 in. long; the calyx about ·15 in. long, campanulate, bluntly 5-lobed. *Corolla-tube* narrowly cylindric, twice as long as the blunt oblong lobes of the limb. *Fruit* the size of a small pea, glabrous, many-seeded. *Webera costata*, Hook. fil. in Fl. Br. Ind. III. 103.

MALACCA: *Griffith* (K.D.) 2791; *Maingay* (K.D.) 945. SELANGOR: *Curtis* 2345.—DISTRIB. Sumatra.

Closely allied to *S. fragrans*, but arboreous and with obovate leaves.

5. *STYLOCORYNA FRAGRANS*, Blume Bijdr. 982. A shrub or small tree; young branches 4-angled, sparsely and deciduously strigose, thinner than a goose-quill. *Leaves* thinly coriaceous, elliptic (often narrowly so),

elliptic-oblong, or oblanceolate, acute or shortly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, (the lower paler), glabrous except for a few stout hairs on the midrib and sometimes also on the 6 to 12 pairs of curved ascending slightly prominent main-nerves; length 3 to 7 in.; breadth 1.25 to 2.5 in.; petiole .2 to .5 in.; stipules ovate-lanceolate, acuminate, shorter than the petioles, deciduous; those of the inflorescence permanent, the uppermost often linear. *Cymes* terminal, corymbose, many-flowered, shortly pedunculate, 2 to 4 in. in diam., often several together, the short branches, flower-pedicels, and calyces hispidulous, puberulous, or sub-glabrous. *Flowers* 1 in. long. *Calyx* campanulate-urceolate, only .15 in. long; its lobes sub-erect, oblong, blunt. *Corolla* densely adpressed-pubescent outside; the tube cylindric, .7 in. long, the limb clavate in bud, its 5 lobes short, oblong or sub-spathulate, blunt, .2 in. long. *Style* much exerted. *Fruit* pisiform, glabrous, the scar of the calyx small. DC. Prod. IV. 377. *S. laxiflora*, Blume Bijdr. 983; DC. Prod. IV. 377. *S. lucida*, Miq. Fl. Ind. Bat. Suppl. 541. *Rondeletia lucida*, Wall. Cat. 8453. *Ceriscus fragrans*, Nees in Flora, 1825, 116. *Wahlenbergia fragrans*, Blume Cat. Hort. Bot. Brit. 13. *Webera fragrans*, Hook. fil. Fl. Br. Ind. III. 103. *Tarenna fragrans*, Koord. & Valet. Bijdr. 8, p. 77.

In all the provinces; common.—DISTRIB. Malay Archipelago.

6. *STYLOCORYNA MOLLIS*, Wall. Cat. 8454. A small tree; young branches thinner than a goose-quill, 4-angled, rusty pilose. *Leaves* thickly membranous, oblong-oblanceolate or oblong-obovate, or elliptic, acute or shortly acuminate, much narrowed at the base; upper surface dark-brown when dry, sparsely and minutely hispidulous; lower surface paler brown rusty- or tawny-pubescent especially on the midrib and 10 to 12 pairs of stout curved spreading main-nerves; length 4.5 to 6.5 in.; breadth 1.75 to 2.75, petioles .3 to .5 in.; stipules ovate-lanceolate, acuminate hooked, about as long as or longer than the petioles, deciduous, those of the inflorescence larger (.75 in. long) and persistent. *Cymes* terminal, corymbose, pedunculate, shorter than the leaves, many-flowered, spreading, 1.5 to 3 in. in diam., sometimes in fascicles of 2 or 3; branches, flower-pedicels and calyces rusty-hispid. *Flowers* .5 or .6 in. long (excluding the style). *Calyx* .1 in. long, campanulate, the limb with 5 broad oblong blunt lobes as long as the tube. *Corolla* cylindric, slightly tapering to the base, minutely adpressed-pubescent, more than twice as long as the 5 oblong blunt lobes. *Style* much exerted. *Fruit* the size of a small pea, glabrous, many-seeded. *Webera mollis*, Hook. fil. Fl. Br. Ind. III. 104.

SINGAPORE: *Wallich*; *Ridley* 4915, 5678; *Cantlay* 76. PENANG: *Main-gay* (K.D.) 894; *Curtis* 745, 9362; *King's Collector* 1336. JOHOR: *Ridley*

4171. PERAK: Wray 1276, 2994; King's Collector 2955, 5725, 6589.—
DISTRIB. Sumatra.

25. RANDIA, Linn.

Shrubs or trees, unarmed or with axillary or supra-axillary spines. Leaves usually coriaceous, sometimes one of a pair larger than the other or absent; stipules short, free or connate. Flowers in axillary or (where one leaf of a pair has aborted) leaf-opposed cymes, or solitary or in fascicles or corymbs, rarely terminal, usually white or yellowish. Calyx-tube ovoid, obovoid, or turbinate, smooth or ribbed; the limb often tubular, truncate or variously lobed. Corolla funnel- or salver-shaped or campanulate, the throat glabrous or hairy; limb with usually not more than 5 short or long lobes twisted in bud. Stamens 5; anthers narrow with short filaments or sessile. Disk annular or cushion-like. Ovary 2- rarely 4-celled; style usually stout sub-fusiform; stigma usually fusiform or clavate, entire or bifid; ovules usually numerous, sunk in placentas attached to the septum. Fruit more or less baccate, ovate, ellipsoid or globose, 2-celled, many-seeded. Seeds usually immersed in pulp; testa thin, albumen horny, cotyledons orbicular.—DISTRIB. Species about 90, all tropical.

Flowers under .5 in. long, in small fascicles or cymes less than 1 in. in diam., or solitary; corolla with a very short tube, almost rotate; leaves of the pairs equal in size:—

Armed erect shrubs with stout straight spines.

Flowers .4 in. long, solitary or in fascicles of 2 or 3 ... 1. *R. dumetorum*.

Unarmed:—

Erect or scandent; flowers .5 in. long, tube short, lobes long, calyx 4-toothed; corolla 4-lobed, its tube hairy within; anthers linear, sessile; ovary with 4 placentas; fruit not ridged; main-nerves of leaves 10 to 12 pairs 2. *R. binata*.

Scandent; flowers .3 to .35 in. long; calyx 5- or 6-toothed; corolla 5- or 6-toothed, its tube glabrous within; anthers broadly ovate, apiculate with filaments as long as themselves; ovary with 2 placentas; fruit with 10 to 12 vertical ridges; main-nerves of leaves 7 or 8 pairs ... 3. *R. impressinervis*.

Flowers under 1 in. long, in short much-branched many-flowered cymes from the axils of fallen leaves; corolla salver-shaped; leaves of the pairs equal in size; fruit like a pepper-corn (unknown in No. 6):—

Scandent, glabrous:—

Unarmed:—

Leaves on short petioles or sub-sessile, their bases slightly oblique and auricled, main-nerves 6 to 8.

- pairs; flowers '4 or '5 in. long; calyx truncate, entire or minutely 5-toothed 4. *R. auriculata*.
- Leaves on petioles '5 or '6 in. long, narrowed and slightly oblique at the base but not auricled; main-nerves 5 to 7 pairs; flowers nearly 1 in. long; calyx minutely 5-toothed 5. *R. Forbesii*.
- Armed:—
- Leaves on petioles '3 to '5 in. long, cuneate at the base; main-nerves 7 to 11 pairs, very bold beneath; flowers '75 in. long; calyx with 5 triangular teeth 6. *R. Curtisii*.
- Trees or large shrubs; leaves on petioles '2 to '3 in. long, not obovate, cuneate but not oblique at the base; main-nerves 7 to 9 pairs; flowers '4 in. long; anthers as long as the corolla-lobes, exserted. 7. *R. densiflora*.
- Flowers '75 to 1 in. long, cylindric, coriaceous; leaves of the pairs unequal in size, obovate or oblanceolate, with 10 to 14 pairs of main-nerves; cymes very condensed, many-flowered; fruit large, (1 in. or more in diam.) more or less compressed:—
- Leaves tomentose beneath; cymes rusty-tomentose everywhere 8. *R. anisophylla*.
- Leaves glabrous except the midrib and main-nerves beneath; cymes puberulous everywhere ... 9. *R. Scortechinii*.
- Flowers about 1 in. long, axillary, solitary or in pairs, shrubs with straight spines and glabrous thinly coriaceous equal leaves with 6 or 7 pairs of main-nerves; calyx tubular '35 in. long with 5 minute triangular teeth; fruit nearly 2 in. in diam. 10. *R. perakensis*.
- Flowers 1'5 to 3 in. long, salver-shaped:—
- Leaves pubescent on the nerves beneath:—
- Shrubs with slender straight spines; calyx '35 in. long, its lobes 5, long, subulate, persisting on the fruit 11. *R. fasciculata*.
- Leaves glabrous:—
- Shrubs erect or sub-scandent with stout recurved spines; calyx '25 in. long, its lobes lanceolate acuminate, not persisting in the fruit 12. *R. longiflora*.
- Unarmed; leaves thickly coriaceous, 4 to 6 in. long, and 1'75 to 2'25 in. broad; calyx about '9 in. long, corolla-tube about 1 in. long, both coriaceous, throat glabrous, limb 1'5 in. in diam.; anthers included, not apiculate, lobes of stigma short, broad 13. *R. Clarkei*.
- Unarmed; leaves thinly coriaceous, 3'5 to 4'5 in. long and 1'5 to 2'5 in. broad; calyx about 4 in. long; corolla about 1 in. long, its throat pubescent; limb 1 to 1'25 in. across; anthers with a dark-coloured apical appendage; lobes of stigma spatulate, reflexed 14. *R. penangiana*.

- Flowers 2 to 8 in. long, the corolla with a short cylindrical tube and inflated funnel-shaped limb; fruit ovoid-globular 15. *R. exaltata*.
- Flowers 4 to 5 in. long, funnel-shaped, 4 in. wide at the mouth; fruit narrowly ellipsoid crowned by the long narrow calyx-teeth 16. *R. macrophylla*.
- Imperfectly known species 17. *R. Kunstleri*.

1. *RANDIA DUMETORUM*, Lam. Ill. t. 156, f. 4. A shrub or small tree, unarmed or with straight horizontal opposite axillary or slightly supra-axillary spines on the thin sub-quadrangular pale puberulous young branches. *Leaves* membranous, oblong, oblong-ob lanceolate or obovate-lanceolate, acute or sub-acute, narrowed to the base, both surfaces glabrous, only the midrib always hairy and sometimes also the 6 or 7 pairs of spreading faint main-nerves; length 1.5 to 3.5 in.; breadth .6 to 1.25 in.; petioles .1 in. or less long; stipules ovate, acuminate. *Flowers* .4 in. long, 1 to 3 together on a short minutely bracteolate peduncle, sub-sessile. *Calyx* cylindrical-campanulate, strigose outside; the mouth with 5 broad erect lobes varying from ovate to spatulate, often acute at the apex. *Corolla* with a short wide tube constricted and hirsute below the wide broadly 5-lobed limb. *Anthers* linear, sub-sessile, included within the villos throat. *Style* thick, stigma with 2 thick, short lobes hardly exerted. *Fruit* globose or ovoid, obscurely ribbed, .75 to 1.5 in. long, glabrous or pubescent, smooth, or obscurely ribbed, yellowish; the pericarp thick. *Seeds* numerous, small, oval, compressed, embedded in pulp. W. & A. Prod. 397; Wight Ic. 580; Brand. For. Flora 273; Miq. Fl. Ind. Bat. II. 226; Koord. & Valet. Bijdr. VIII. 96; Hook. fil. Fl. Br. Ind. III. 110. *R. nutans*, *longispina*, DC. and W. & A., Kurz For. Fl. Burm. II. 45; Wight Ic. 581, 582, 583; Miq. l. c. 227. *R. Rottleri*, W. & A. l. c. *R. stipulosa*, Miq. Fl. Ind. Bat. II. 228. *R. spinosa*, Blume Bijdr. 981. *R. malabarica*, Wall. Cat. 8255E. *Gardenia nutans*, Roxb. Hort. Beng. 15; Wall. Cat. 8290. *G. spinosa*, Linn. fil. *G. longispina* and *floribunda*, Roxb. *G. dumetorum*, Retz. Roxb. Corom. pl. t. 136; Wall. Cat. 8259. *G. glabra* and *G. propinqua*, Br. in Wall. Cat. 8258, 8260. *Posoqueria dumetorum*, *P. nutans*, *P. longispina*, and *P. floribunda*, Roxb. Fl. Ind. I. 713 to 719.

LANGKAWI: Curtis 2799. KEDAH: Curtis 2585. PERAK: Wray 2599; King's Collector 3168, 6495; Scortechini 95, 98, 175, 1017, 1933.—DISTRIBUTION: Java; Sumatra; British India.

VAR. *pubescens*, King & Gamble. *Leaves* more or less densely pubescent on both surfaces; spines sometimes .65 in. long; fruit obpyriform.

KEDAH: Curtis 2585. LANGKAWI: Curtis 2799.

2. *RANDIA BINATA*, King & Gamble n. sp. A shrub occasionally scandent, glabrous, unarmed; young branches thicker than a crow-quill,

angled, pale-brown or cinereous when dry. *Leaves* coriaceous, oblong-elliptic, gradually but rather bluntly acuminate, rounded and somewhat unequal-sided or narrowed; both surfaces dull-brown when dry, opaque, the midrib very prominent on the lower surface; main-nerves 10 to 12 pairs, curved, spreading, more prominent on the lower than on the upper surface; length 6 to 9 in.; breadth 2 to 2.75 in.; petioles .1 in. or less; stipules triangular, keeled, acute, about as long as the petioles, sometimes forming a connate 4-toothed tube. *Flowers* about .5 in. long; their pedicels about .3 in., collected in fascicles on tubercle-like, very shortly branched, minutely bracteolate cymes in the axils of fallen leaves. *Calyx* narrowly campanulate, constricted about the middle; the mouth truncate but with 4 minute sharp teeth. *Corolla* slightly longer than the calyx, salver-shaped; the tube cylindric, hairy within, shorter than the 4 oblong obtuse spreading lobes of the limb. *Anthers* linear, sessile, exserted. *Stigma* exserted, with 2 ovate-oblong spreading thick lobes. *Ovary* 2-celled, with numerous ovules on 4 placentas. *Fruit* the size and shape of a pepper-corn, smooth; seeds numerous, triangular, somewhat compressed; the testa pitted, shining, pale-brown.

PERAK: *Wray* 2134; *King's Collector* 4007, 5620, 5631, 7504.

3. *RANDIA IMPRESSINERVIS*, King & Gamble n. sp. A climber; young branches twice as thick as a crow-quill, dark-brown, minutely pubescent. *Leaves* subsessile, coriaceous, elliptic-oblong or elliptic, shortly acuminate, somewhat narrowed to the rounded or acute base; both surfaces brown, the upper tinged with olivaceous and shining, the lower paler, dull; main-nerves 7 or 8 pairs, spreading, curved, and interarching at some distance from the edge, depressed on the upper surface and raised on the lower, the veins rather prominent on the lower; length 3.25 to 4.5 in.; breadth 1 to 1.75 in.; petioles under .1 in.; stipules about .15 in. long, broadly triangular at the base with a long acuminate apex, pubescent. *Flowers* .3 to .35 in. long, on pubescent pedicels from .5 to .15 in. long, in short cymes from the axils of fallen leaves, sub-globular and less than 1 in. in diam.; the bractes very short, and with small bracteoles. *Calyx* pubescent outside, campanulate; the limb as long as the tube, truncate but with 5 or 6 minute teeth. *Corolla*-tube .125 in. long, glabrous within, the limb longer than the tube with 5 or 6 oblong blunt spreading lobes. *Anthers* broadly ovate, apiculate, exserted, on filaments as long as themselves. *Stigma* exserted, clavate, separating into 2 broad lobes; *ovary* 2-celled with many ovules on 2 placentas. *Fruit* like a small peppercorn, with 10 to 12 vertical ridges, glabrous; *seeds* compressed, triangular, grooved.

PERAK: *Wray* 2158; *Scortechini* 254; *King's Collector* 3336, 4894 10399, 10821.—DISTRIB. Borneo, *Haviland* 1895, 2969.

4. *RANDIA AURICULATA*, K. Schumann in Engl. Pflanzenfam. Teil. IV. Abt. 4, p. 75. Scandent, sometimes shrubby, glabrous, unarmed; young branches thinner than a goose-quill, compressed, dark-brown. *Leaves* coriaceous, brown when dry, elliptic, elliptic-oblong or oblong, subacute or obtuse; the base slightly oblique, somewhat auricled; upper surface shining, the lower dull and usually paler; main-nerves 6 to 8 pairs, spreading, slightly curved, thin but prominent on the lower surface; length 4 to 6·5 in.; breadth 1·5 to 3·5 in.; petioles ·05 to ·15 in.; stipules triangular acuminate, slightly longer than the petiole, deciduous. *Cymes* from the axils of fallen leaves or terminal, pedunculate, trichotomous, from 2 to 4 in. across, many-flowered, puberulous, and with many small triangular persistent bracteoles; the peduncles compressed, from 1 to 1·5 in. long. *Flowers* from ·4 to ·5 in. long, sub-sessile, almost coriaceous, mostly with a pair of connate minute bracteoles at the base. *Calyx* funnel-shaped, the mouth wide, sub-truncate or minutely 5-toothed. *Corolla* tubular, deeply divided into 6 oblong reflexed lobes twisted in bud; the throat densely pubescent. *Anthers* ·2 in. long, linear, with acute tips. *Style* ·3 in. long, with 2 free ribbed arms. *Fruit* the size of a peppercorn, its apex crowned at first by the deciduous short calyx, glabrous, 2-celled, with many minute seeds. *Anomanthodia auriculata*, Hook. fil. in Bth. and Hook fil. Gen. Plant. II. 87; Fl. Br. Ind. III. 108. *Webera auriculata*, Wall. in Roxb. Fl. Ind. ed. Carey. & Wall. II. 537. *Stylocoryna auriculata*, Wall. Cat. 8402. *Cupia auriculata*, DC. Prod. IV. 394. *Pseudixora? auriculata*, Miq. Fl. Ind. Bat. II. 210. *Psychotria? auriculata*, Wall. Cat. 8338. *Randia corymbosa*, Benth. MSS. (name only) Koord. & Valet. Bijdr. VIII. 88.

In all the provinces common.—DISTRIB. Malayan Archipelago.

In inflorescence this closely resembles *R. densiflora*.

5. *RANDIA FORBESII*, King & Gamble n. sp. A large climber 60 to 80 feet long, all parts except the branches of the cyme and the outside of the calyx glabrous; young branches twice as thick as a crow-quill, dark when dry; unarmed. *Leaves* coriaceous, elliptic to ovate, acute or shortly acuminate, narrow and slightly oblique but not auriculate at the base; both surfaces brown when dry, the lower paler; main-nerves 5 to 7 pairs, spreading, prominent on the lower surface, depressed on the upper; length 4·5 to 7 in.; breadth 2 to 3 in.; petioles ·5 to ·6 in., rather slender; stipules triangular-subulate, ·2 in. long. *Cymes* from the axils of fallen leaves, pedunculate, about half as long as the leaves, many-flowered; the branches spreading and puberulous, 3 or 4 in. in diam.; bracteoles minute, ovate, acute, lanceolate, persistent; peduncle ·75 to 1 in. long. *Flowers* nearly 1 in. long, on short pedicels often bracteolate at the base. *Calyx* tubular, slightly widened at

the minutely and acutely 5-toothed mouth, puberulous outside, .25 in. long. *Corolla* salver-shaped, about 3 times as long as the calyx; the tube narrow; the limb with 5 rather blunt oblong lobes twisted in bud. *Stamens* 5 linear, notched at the apex, included in the tube and slightly longer than its lobes. *Style* half as long as the corolla, slender, the stigmatic lobes thick, reflexed. *Fruit* like a pepper-corn, glabrous, surmounted by the scar of the deciduous calyx, many-seeded.

PENANG: *Curtis* 818. SINGAPORE: *Ridley* 3664, 5662. PERAK: *Scortechini* 1308; *King's Collector* 8273, 10001.—DISTRIB. Lampongs, Sumatra, *Forbes* 1659; Andaman Islands, *King's Collector*.

6. *RANDIA CURTISII*, King & Gamble n. sp. A large climber, all parts except the calyx and flower-pedicels glabrous; young branches thinner than a goose-quill, pale-brown when dry, armed; the spines in pairs, recurved. *Leaves* varying much in size, coriaceous, oblong-elliptic, acute or shortly acuminate, the base cuneate, upper surface brown when dry, the lower pale olivaceous; main-nerve 6 to 11 pairs, rather straight, curving upwards and inter-arching rather far from the edge, very bold on the lower surface, somewhat depressed on the upper, as is the midrib; reticulations wide, obsolete on the upper surface, rather prominent on the lower; length 4.5 to 7 in.; breadth 1.5 to 2.25 in.; petioles .3 to .5 in.; stipules triangular, acuminate, shorter than the petioles, deciduous. *Cymes* from the axils of fallen leaves or terminal, shortly pedunculate, spreading, from 1 to 2 in. long, branching from the base; branches spreading and bearing many boat-shaped minute ovate-acute glabrous bracts; the large cymes 1.5 to 2 in. in diam. and many-flowered, the smaller little-branched and few-flowered. *Flowers* .75 to 1 in. long, on pubescent pedicels .1 to .4 in. long. *Calyx* narrowly tubular-campanulate, adpressed-pubescent outside; the mouth with 5 triangular acute teeth. *Corolla* white, salver-shaped, glabrous outside, tube narrow; limb with 5 oblong-elliptic, blunt or acute spreading lobes; throat and tube inside pubescent. *Anthers* exerted, linear, about as long as the corolla-lobes. *Style* stout; stigma clavate, 2-lobed.

PENANG: *Curtis* 3590. PERAK: *Wray* 2611; *King's Collector* 3305, 4882, 6507, 6814, 8480.

7. *RANDIA DENSIFLORA*, Benth. *Flora Hongkong* 155. A glabrous tree, often as high as 60 feet; young branches thinner than a goose-quill, pale-brown, 4-angled. *Leaves* coriaceous, elliptic-oblong to oblong-lanceolate, acute or subacute, rarely acuminate, the base cuneate; both surfaces brown when dry, tinged with olivaceous, the lower usually paler; main-nerve 8 or 9 pairs, rather straight, ascending, thin but prominent on the lower surface, slightly depressed on the upper; length

4 to 6 in. ; breadth 1·75 to 2·75 in. ; petioles ·25 to ·3 in. ; stipules triangular, acuminate, shorter than the petioles, caducous. *Cymes* from the axils of fallen leaves, many-flowered, almost sessile, much branched from near the base, 2 to 4 in. in diam., the branches puberulous, spreading and bearing many acute persistent bracteoles. *Flowers* ·4 in. long, on pedicels equalling or exceeding the calyx. *Calyx* tubular-campanulate, about ·1 in. long, the mouth with 5 minute acute teeth. *Corolla* with a short tube hairy on the throat inside; the limb with 5 oblong blunt minutely cuspidate reflexed lobes equalling in length the 5 linear exerted *anthers*; filaments dorsifixed. *Style* much exerted, stigma fusiform. *Fruit* like a pepper-corn. Hook. fil. Fl. Br. Ind. III. 112. Koord. & Valet. Bijdr. VIII. 93. *Webera densiflora*, Wall. in Roxb. Fl. Ind. III. ed. Carey & Wall. II. 536. *W. oppositiflora*, Roxb. Fl. Ind. I. 698; Kurz For. Fl. Burm. II. 47. *Stylocoryna densiflora*, Wall. Cat. 8404 excl. A. Miq. in Ann. Mus. Lugd. Bat. IV. 128, t. 5 A. *S. dimorphophylla*, Teysm. & Binn. Pl. Nov. Hort. Bog. 4. *Cupia densiflora* and *C. oppositiflora*, DC. Prod. IV. 394. *Gnopachis axilliflora* and *G. oblongata*, Miq. Fl. Ind. Bot. II. 221. *Urophyllum coriaceum*, Miq. l.c. Suppl. 542. *Iwora Thozetia*, F. Mull. Fragm. II. 132. *Psychotria*, sp. Wall. Cat. 8332. *Rubiacea*, Wall. Cat. 8455, 8456, 8465.

Common in all the provinces.—DISTRIB. Malayan Archipelago; Hongkong; North Australia.

VAR. *parvifolia*, King & Gamble. *Leaves* narrowly oblong-elliptic, 3 to 5 in. long and 1·25 to 2·75 in. broad; petioles ·15 to ·2 in.

PENANG: Curtis 796; Ridley 10243. PERAK: *Scortechini* 811, King's Collector 1585.

8. *RANDIA ANISOPHYLLA*, Jack in Roxb. Fl. Ind. ed. Carey and Wall. II. 561. A small unarmed tree; young branches at first rusty-tomentose but soon sub-glabrous, pale, and striate, as thick as a goose-quill. *Leaves* of each pair unequal, coriaceous, obovate-elliptic, shortly cuspidate, much narrowed from the middle to the base; upper surface dark-brown when dry, glabrous except the shortly tomentose depressed midrib and nerves; lower surface paler, tomentose on the midrib, pubescent especially on the transverse veins and on the 10 to 14 pairs of bold spreading main-nerves; length of the longer of each pair 8 to 10 in., of the smaller 3 to 6 in.; breadth of the longer 3 to 5 in., of the smaller 1·5 to 3 in.; petioles ·3 to 1 in., tomentose, stipules lanceolate, acuminate, tomentose, as long as petioles. *Cymes* pedunculate, rusty-tomentose everywhere, crowded, spreading, 1·5 to 2 in. in diam. with numerous lanceolate acuminate bracteoles ·2 to ·25 in. long; the peduncles about as long as the leaf-petioles. *Flowers* coriaceous, ·75 in. long, on short pedicels or sub-sessile. *Calyx* tubular-campanulate, with 5 acute lobes or

teeth. *Corolla* longer than the calyx, tubular, its lobes oblong. *Anthers* linear, sub-sessile near the base of the tube. *Style* fusiform. *Fruit* 1 to 1.5 in. long, bluntly ellipsoid, somewhat compressed, minutely tomentose, crowned by the rather large tubular calyx. Hook. fil. Fl. Br. Ind. III. 114; DC. Prod. IV. 381. *Gardenia anisophylla*, Jack, Miq. Fl. Ind. Bat. II. 230. *G. ? anisophylla*, Wall. Cat. 8399 A.

PENANG: *Jack & Porter*; *Wallich* 8284 D.; *Curtis* 164; *Hullett* 162. MALACCA: *Derry* 27. SINGAPORE: *King's Collector* 1234.—DISTRIB. Sumatra, *Forbes* 2954, 3088.

A Bornean species, represented in Herb. Kew. by Beccari's 760 and Haviland's 3420, is allied to this, but its calyx has long teeth and much woolly hair. It is evidently undescribed and might be named *R. Beccarii*.

9. *RANDIA SCORTECHINII*, King & Gamble n. sp. An armed tree 20 to 60 feet high; young branches usually thicker than a goose-quill, glabrous, the bark pale when dry. *Leaves* of the pairs not very unequal, membranous, obovate-elliptic to oblanceolate-elliptic, obtuse or abruptly acute or minutely cuspidate, much narrowed from above the middle into the glabrous petiole; both surfaces brown when dry, rarely tinged with green and both glabrous except for a few scattered hairs on the nerves on the lower; main-nerves 14 to 18 pairs, little-curved, spreading, prominent on the lower surface, rather faint as the upper, veins on the lower prominent, transverse, wavy; length of the larger leaf of the pair 8 to 16 in.; breadth 4 to 6 in.; length of the smaller leaf 5 to 8 in.; breadth 3 or 4 in.; petioles .75 to 1.5 in.; stipules ovate, connate by their bases. *Cymes* pedunculate, leaf-opposed (from the fall of the subtending leaf), many-flowered, much-branched, spreading, 2 to 2.5 in. in diam., everywhere puberulous; bracteoles numerous, broadly triangular, persistent; peduncles .75 to 1 in. long. *Flowers* about 1 in. long, puberulous everywhere. *Calyx* tubular, the mouth truncate but usually with 5 small teeth. *Corolla* cylindrical, .75 in. long, with 5 short lobes. *Anthers* linear, nearly half as long as the corolla, dorsifixed and inserted near its base. *Ovary* two-celled, each cell multi-ovulate. *Style* short, stigma clavate, sulcate. *Fruit* sub-globular, somewhat compressed, densely puberulous, about 1 in. in diam., crowned by the short calyx-tube.

PERAK: *Scortechini* 574, 170; *Wray* 3031, 187, 3212, 1381; *King's Collector* 3455, 3696, 7205, 4485, 6786, 10131. SINGAPORE and PENANG: *Curtis* 164.—DISTRIB. Borneo, *Beccari* 2599; *Haviland* 84, 697, 2161.

10. *RANDIA PERAKENSIS*, King & Gamble n. sp. A small armed glabrous tree 12 to 18 feet high; young branches thinner than a quill, pale cinereous, glabrous, often armed with stout flower-bearing spines 1 to 1.25 in. long. *Leaves* thinly coriaceous, narrowly elliptic, tapering to each end, the apex bluntly acuminate; both surfaces

brown, the lower paler; upper surface dark-brown when dry, the nerves invisible; the lower pale-brown, the main-nerves 6 or 7 pairs, very distinct, curved, interarching at some distance from the edge, the reticulations rather distinct; length 3 to 5 in.; breadth 1·4 to 2 in.; petioles ·1 to ·2 in.; stipules triangular, acuminate. *Flowers* 1 in. long, on very short pedicels, solitary or in pairs from short branches which ultimately become spines. *Calyx* tubular, ·35 in. long, contracted at the base, the mouth with 5 narrowly triangular short teeth. *Corolla* salver-shaped; the tube ·45 in. long and nearly ·2 in. wide, the limb ·75 in. across with 5 or 6 oblong blunt lobes. *Anthers* linear, subsessile at the base of the tube, about ·3 in. long. *Style* short, stout, shorter than the cylindrical stigma. *Fruit* globular, smooth, surmounted by the short scar of the calyx, 1·75 in. in diam.; pericarp very thick; *seeds* ellipsoid, compressed, ·25 in. long.

PERAK: *King's Collector* 7450, 8356.

11. *RANDIA FASCICULATA*, DC. Prod. IV. 386. A much-branched armed shrub; young branches thicker than a crow-quill, rough from small tubercles and softly and minutely pubescent. *Leaves* membranous, lanceolate, ovate or oblong-lanceolate, shortly acuminate (often bluntly so), rounded or cuneate at the base; both surfaces olivaceous, the upper usually glabrous or nearly so, the lower paler, minutely pubescent usually on the midrib and nerves only but sometimes on the spaces between; main-nerves 4 to 6 pairs, slightly curved, ascending, distinct on the lower surface, almost obsolete on the upper; length ·75 to 3 in.; breadth ·5 to 1·5 in.; petioles ·05 to ·2 in., pubescent; stipules broadly triangular, much acuminate, about as long as the petioles; spines axillary, slender, straight, ascending, slightly longer than the petioles, (sometimes absent). *Flowers* 1·5 to 2 in. long, axillary (under 1 in. in var. *parviflora*) solitary or in fascicles of 2 or 3, bracteoles lanceolate, acuminate, hairy. *Calyx* ·35 in. long; the tube narrowly funnel-shaped, villous, the mouth with 5 narrow subulate teeth as long as the tube. *Corolla* salver-shaped, the tube nearly 1 in. long, about ·05 in. in diam., glabrous outside, pubescent inside; limb nearly 1 in. across with 5 deep elliptic to oblong-elliptic, obtuse or sub-acute lobes. *Anthers* half-exserted from the throat, linear, not apiculate, ·3 in. long. *Style* slender; stigma exserted, with 2 short broad ovate blunt lobes. *Fruit* pisiform, 2-celled, 4-seeded, sparsely pubescent, crowned by the long-toothed calyx-tube. Brandis For. Flora 273; Hook. fil. Fl. Br. Ind. III. 109 *R. rigida*, DC. l.c. *R. malabarica*, Wall. Cat. 8255 A. B. C. D. *Gardenia fasciculata*, Roxb. Hort. Beng. 15. *G. rigida* and *G. parviflora*, Wall. Cat. 8257 A. B. *Posoqueria fasciculata*, Roxb. Fl. Ind. 1717. *P. rigida*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 570. *Webera fasciculata*, Kurz For. Flora Burm. II. 49.

KEDAH: *Curtis* 2549. PENANG: *Curtis* 718, 1498. PROV. WELLESLEY: *Curtis* 7106. PERAK: *Scortechini* 1802; *Wray* 3467.

VAR. *parviflora*; tube of corolla only about .75 in. long, very narrow; the limb .75 in. in diam.

LANGKAWI: *Curtis* 3383.

Roxburgh's unpublished figures of *Posoqueria fasciculata* and *Gardenia rigida* are practically alike. The only differences are that the leaves of the former are depicted as ovate-lanceolate and 2.25 to 3 in. long; the limb of the corolla as yellow, its tube as .75 in. long and white; the calyx under .2 in. long with teeth one quarter of its length; while *Randia rigida* is shown as having ovate leaves only 1.5 in. long; corolla-limb white and the tube 1 in. long, also white; the calyx .3 in. long with filiform teeth half as long as the tube. The former he attributes to Nepal, the latter to Singapore. The two are evidently forms of the same widely distributed species.

12. *RANDIA LONGIFLORA*, Lam. Dict. II. 227; Ill. t. 156, f. 3. A glabrous shrub, sometimes scandent, usually armed; young branches twice as thick as a crow-quill, or thicker, pale-brown, shining, usually bearing stout curved axillary spines .3 in. or more in length. *Leaves* coriaceous, oblong, oblong-lanceolate or obovate-elliptic, acute or shortly cuspidate, the base cuneate; both surfaces pale-olivaceous green when dry, dull; main-nerve 5 or 6 pairs, rather straight, ascending, faint on both surfaces but especially on the upper; length 1.5 to 3.75 in.; breadth .75 to 1.75 in. (larger in var.); petioles .1 to .15 in.; stipules about as long as the petioles, broadly triangular, with abrupt acuminate apices. *Cymes* terminal or axillary, umbellate, as long as or longer than the leaves (shorter in var.), few-flowered, on peduncles .25 to .4 in. long; bracteoles few, ovate, acute. *Flowers* 1.5 (rarely 2 in.) long, white; their pedicels from .25 to .4 in., bracteolate about the middle. *Calyx* narrowly infundibuliform, .25 in. long (.5 in. in var.) the mouth with 5 lanceolate acuminate teeth. *Corolla* salver-shaped, tube .75 to 1.5 long and less than 1 in. wide; the throat pubescent; the limb 1 in. or more across with 5 oblong blunt spreading or reflexed lobes. *Anthers* linear, reflexed, exserted, much shorter than the corolla-lobes. *Style* filiform; stigma broadly clavate, exserted, separating into 2 spatulate lobes. *Fruit* globose-ovoid, glabrous, .35 to .5 in. long, its stalk somewhat longer; calyx-scar truncate, conspicuous; seeds rugose, embedded in pulp. DC. Prod. IV. 386; Hook. fil. Fl. Br. Ind. III. 111 (in part). *R. scandens*, DC. l.c. 387. *Posoqueria longiflora*, Roxb. Fl. Ind. I. 718. *Webera scandens*, Roxb. l.c. I. 698. *W. longiflora*, Kurz, For, Flora Burm. II. 48. *Canthium recurvum*, Wall. Cat. 8284 (all the sheets except D.) in Herb. Linn. Soc.

MALACCA: *Griffith* (K.D.) 2802, 2803, 2805, 2807. *Maingay* (K.D.)

900. SINGAPORE: *Lobb*; *Schomburg* 59; *Ridley* 2415, 9487. PERAK: *Wray* 2507; *King's Collector* 308, 5231; *Hullett* 93.—DISTRIB. Borneo.

Except that it has spines the plant here described agrees in all respects with Roxburgh's *Webera scandens* of which he has left a coloured drawing in the Calcutta Herbarium. Roxburgh's figure and description of his *Posoqeria longiflora* also agree with this, except in being arboreous. Lamark's figure of *R. longiflora* agrees with Roxburgh's except in having smaller leaves.

VAR. *major*, King & Gamble; young branches sometimes nearly as thick as a goose-quill, leaves 4 to 6 in. long and 1.75 to 3 in. broad; cymes shorter than the leaves; calyx .5 in long.

PUNGAH: *Curtis*.—DISTRIB. Burma, *Helper* (K.D.) 2906; *McClelland*; Andaman Islands, *King's Collector*.

13. *RANDIA CLARKEI*, King & Gamble n. sp. Quite glabrous: young branches thinner than a goose-quill, pale-brown when dry. *Leaves* thickly coriaceous, oblong-elliptic, subacute, the base rounded or slightly cuneate, both surfaces dark-brown when dry, the lower slightly olivaceous, the midrib on both thick and the 4 or 5 pairs of slightly curved ascending main-nerves faint; length 4 to 6.5 in., breadth 1.75 to 2.5 in.; petioles .5 to .6 in., thick. *Cymes* in the axils of fallen leaves or terminal, 3- or 4-flowered, the bracts broadly ovate, acute, persistent. *Flowers* 2.5 to 3 in. long, coriaceous. *Calyx* narrowly funnel-shaped, tapering much towards the base, about .9 in long; the mouth with 5 small acute triangular teeth. *Corolla* salver-shaped, the tube 1 in. long and .15 in. in diam.; its throat glabrous; the limb 1.5 in. across, deeply divided into 5 ovate-lanceolate, spreading lobes. *Anthers* sessile, included in the tube, linear, .3 in. long. *Style* as long as the corolla-tube; stigma exserted, short, thick, separating into 2 broad lobes. *Canthium recurvum*, Wall. Cat. 8284 D. in Herb. Kew. (not D. in Herb. Linn. Soc.)

MALACCA: *Maingay* (K.D.) 840.

The type sheet of this species was included by Wallich in his *Canthium recurvum*, of which it stands in the Kew set as sheet D. It differs from the other sheets which belong to *Randia longiflora* in its greatly longer calyx and also larger more coriaceous corolla, which has a wider tube, glabrous in the throat as elsewhere, included anthers, and a much shorter stigma which opens out into 2 short broad lobes. The leaves of this are also larger and thicker than those of *R. longiflora*.

14. *RANDIA PENANGIANA*, King & Gamble n. sp. A large glabrous armed climber; young branches twice as thick as a crow-quill, dark coloured when dry, armed with stout axillary recurved spines .3 in. long. *Leaves* thickly membranous, elliptic, sometimes slightly obovate, shortly and bluntly acuminate, the base cuneate, both surfaces brown when dry, the lower somewhat the paler and tinged olivaceous; main-nerves 5 to 7 pairs, rather straight, oblique, faint on both surfaces;

length 3 to 4·5 in.; breadth 1·5 to 2·5 in. petiole ·2 to ·3 in. slender; stipules shorter than the petioles, broadly triangular at the base, much acuminate upwards. *Cymes* terminal or from the axils of fallen leaves, on pedicels about ·2 in. long; the branches short and bearing persistent ovate-acute bracteoles. *Flowers* few, about 2 in. long, on pedicels about 2 in. long. *Calyx* ·4 in. long, tubular, tapering to the base, the mouth with 5 triangular acute short teeth. *Corolla* salver-shaped; the tube 1 in. long and about ·1 in. in diam.; the limb about 1 to 1·25 in. across, deeply divided into 5 broadly elliptic subacute lobes. *Anthers* linear, with a black apical process from the connective, included in the slightly pubescent throat, sessile, dorsifixed, about ·2 in. long. *Style* filiform; stigma somewhat exserted, thick, clavate, opening out into 2 thick spatulate reflexed fleshy lobes. *Fruit* depressed-globular, glabrous, ·5 to ·65 in. in diam. when dry.

PENANG: *Curtis* 927. SINGAPORE: *Hullett*, 114.

The following, of which we have seen no specimens in flower, also probably belong to this species; *viz*: Malacca: *Derry* 1056. Perak: *Scortechini* 1538; *King's Collector* 10171. One of Mr. Curtis's specimens is described as a tree, another as a climber. The leaves are thinner and broader than those of *R. floribunda*, Lam., and the flowers are (especially as regards the limb of the corolla) larger. The calyx although of the same shape is also larger. This species still more nearly resembles *R. Clarkei*, King & Gamble (of which the type is Wall. Cat. 8284 D.) but it has smaller, much less coriaceous leaves, which are broader in proportion to their width. This has also smaller flowers with a very much smaller calyx. From both it differs by its conspicuously apiculate anthers.

15. *RANDIA EXALTATA*, Griff. Notul. IV. 262. A tree 30 to 50 feet high, unarmed; young branches deciduously pubescent, ultimately glabrous, dark-coloured and striate when dry, thinner than a goose-quill. *Leaves* coriaceous, glabrous, oblong-lanceolate, acuminate at base and apex; upper surface dark-brown when dry, not reticulate, the nerves and midrib depressed; lower surface paler, reticulate; main-nerves 8 to 10 pairs, curved, ascending, thin, dark in colour and distinct beneath when dry; length 3·5 to 4·5 in.; breadth 1 to 1·35 in.; petioles ·2 in.; stipules triangular, acuminate, about as long as the petioles and like them rusty-pubescent. *Cymes* in the axils of leaves or of fallen leaves, when in flower half as long as the leaves, adpressed rusty-pubescent; branches few, bearing small persistent acute bracts and 4 to 6 large shortly pedicellate flowers. *Calyx* ·15 in. long, funnel-shaped; densely adpressed-pubescent outside, the mouth truncate but minutely 5-toothed. *Corolla* white, somewhat purplish, 2 in. or more long, rather sparsely adpressed-pubescent outside; the tube narrowly cylindrical, only about ·3 in. long, villous at the throat; the limb widely funnel-shaped, scurfily hairy inside; the mouth with 5 broad subacute lobes ·3 or ·35

in. long. *Anthers* linear, '4 in. long, sessile, dorsifixed above the throat. *Style* filiform 1 in. long, surmounted by the fusiform 2-lobed stigma. *Berry* globular-ovoid, smooth, woody, 2-5 in. in diam., on a thick peduncle '5 in. long. *Seeds* embedded in pulp, compressed, angled, nearly '5 in. broad. Hook. fil. Fl. Br. Ind. III.; Kurz For. Fl. Burma. II. 46 (in part), Koord. & Valet. Bijdr. VIII. 90. *Gardenia pulcherrima*, Kurz in Journ. As Soc. 1877 II. 155; For. Flora Burm. II. 43 (in part). *Gardenia Schoemanni*, Teyss. & Binn. in Ned. Kruidk. Arch. III. 403; in Nat. Tijds. II. 201; Miq. Fl. Ind. Bat. II. 232.

PENANG: *Curtis* 793.—DISTRIB. Andaman Islands; Burma (*Griffith* K.D. 2826).

The Andaman plant included under *R. exaltata* by Kurz differs from Griffith's in having obovate leaves and a smaller corolla with a long tube.

16. *RANDIA MACROPHYLLA*, Benth. & Hook. fil. Gen. Plant. ex Hook. fil. Fl. Br. Ind. III. 114. An erect unarmed shrub 3 or 4 feet high; young branches thinner than a goose-quill, dark-coloured when dry, scaberulous-puberulous. *Leaves* large, coriaceous, almost sessile, narrowly elliptic-oblong, sometimes shortly acuminate, gradually narrowed to the acute base; upper surface olivaceous-brown when dry, glabrous except sometimes for a few hairs on the midrib; lower darker, usually glabrous, but sometimes sparsely pubescent on midrib and nerves; main-nerves 10 to 14 pairs, slightly curved, ascending, depressed on the upper, prominent on the lower surface; length 8 to 12 in.; breadth 1.75 to 2.75 in.; petioles '1 to '15 in. pubescent, stipules '4 to '5 in. long, triangular, with a broad base and long subulate-acuminate apex. *Flowers* 1 or 2 in a leaf-axil, subsessile, 4.5 to 6 in. long, with many subulate hairy bracts at the base. *Calyx-tube* funnel-shaped, about '35 to '5 in long; the mouth with 5 linear spreading teeth much longer than the tube. *Corolla* 4 to 5 in. long, infundibuliform, 3 or 4 inches wide at the mouth, white or with purple spots, puberulous or subglabrous outside; the limb with 5 ovate sub-acute lobes about 1 in. long. *Anthers* linear, about '8 in. long, included in the glabrous throat. *Style* slender; stigma clavate, nearly as long as and parallel to the anthers. *Fruit* ellipsoid, sparsely and deciduously rusty-strigose, 2.5 in. long, crowned by the long, persistent calyx-lobes. *Rothmannia macrophylla*, R. Br. in Wall. Cat. 8304.

PENANG: *Wallich*, *Curtis* 966. MALACCA: *Griffith* (K.D.) 2822; *Maingay* (K.D.) 944; *Cuming* 2365; *Hervey*, *Derry* 43, 79. SINGAPORE: *Lobb* 65; *Dr. T. Anderson* 107; *H. J. Murton* 1; *Hullett* 117. PERAK: *Wray* 1380, 1632, 3232, 4214; *Scortechini* 1479; *King's Collector* 769, 10356. PENANG: *Curtis* 966; DINDINGS: *Curtis*. SELANGOR: *Gooderoy* 10484.—DISTRIB. Sumatra.

17. *RANDIA KUNSTLERI*, King & Gamble n. sp. A stout glabrous armed climber; young branches thinner than a goose-quill, pale-brown, 4-angled, shining; spines in pairs, slightly curved, slender, much deflexed, about $\frac{1}{2}$ in. long. *Leaves* coriaceous, broadly ovate to elliptic-rotund, obtuse or bluntly and shortly cuspidate; both surfaces pale hepatic-brown when dry; main-nerves 4 or 5 pairs, curved, ascending; rather prominent on both surfaces when dry; length 4 to $5\frac{1}{2}$ in.; breadth $2\frac{1}{2}$ to $3\frac{1}{2}$ in.; petioles $\frac{1}{3}$ to $\frac{1}{2}$ in.; stipules longer than the petioles, oblong, sub-acute. *Flowers* solitary or in scanty cymes, on short pedicels. *Calyx* tubular, the limb truncate but obscurely toothed. *Fruit* deflexed, on a short pedicel, depressed-globular, slightly contracted towards the base, crowned by the short tubular truncate calyx-limb, about $1\frac{1}{4}$ in. in diam. when dry and somewhat less in length; pulpy; pericarp leathery, smooth, shining. *Seeds* numerous, horizontal, compressed; albumen horny, scanty; radicle longer than the orbicular cotyledons. Wall. Cat. 8284 C. (in Herb. Kew, not in Linn. Soc.)

PERAK: *King's Collector* 2683, 4335; *Scortechini* 485. SUMATRA: *Curtis* 3543.

Scortechini's specimens of this in our hands are not in flower. From the field note on one of them we quote the description of the flower as follows. "*Calyx-tube* $\frac{1}{2}$ in. long, two-thirds being produced beyond the ovary, cylindric, slightly constricted in the middle; the limb with 5 shallow teeth, glabrous outside and inside except for an interrupted ring of yellowish thick hairs at the mouth inside. *Corolla-tube* $\frac{1}{2}$ in. long; the lobes as long, greenish yellow, glabrous except at the throat where are attached the slightly exerted linear *anthers*. *Ovary* 2-celled; each cell with many ovules in several series; stigma oblong, shortly 2-fid. *Berry* 1 in. in diam., not ribbed, crowned by the persistent calyx-tube."

26. GARDENIA, Linn.

Shrubs or trees, often armed. *Leaves* opposite, rarely ternate; stipules often connate. *Flowers* often large, terminal or axillary, solitary, fascicled, rarely cymose, sometimes dimorphic and polygamous. *Calyx-tube* campanulate or tubular; the limb variable, tubular or dilated, sometimes spathaceous, often persistent on the fruit. *Corolla* various, longer than the calyx-limb; 5- to 12-lobed; the lobes twisted in bud. *Stamens* as many as the corolla-lobes. *Anthers* linear, included, sessile or sub-sessile on the tube, as many as the corolla-lobes, and alternate with them. *Ovary* 1-celled; style stout; stigma clavate, fusiform or bifid; ovules numerous, 2-seriate on the 2 to 6 placentas. *Fruit* often large, ovoid, ellipsoid or globose, baccate, with a coriaceous epicarp and woody endocarp which sometimes splits vertically at the sutures. *Seeds* numerous, imbedded in the placental pulp, compressed; testa

thin; albumen horny; embryo minute.—DISTRIB. About 60 species, tropical and sub-tropical.

Calyx narrowly campanulate, its lobes long, linear, spreading:—

- | | | |
|-------------------------------------------------------------------------------------------------|----|------------------------|
| Corolla-lobes under .5 in. in length, oblong; fruit sub-globular, .5 to .75 in. in diam. | 1. | <i>G. tentaculata.</i> |
| Corolla-lobes 2.25 to 4 in. long; fruit ovate-oblong, 2.5 in. long | 2. | <i>G. stenopetala.</i> |

Calyx campanulate, boldly 5-keeled; the mouth expanded, sub-truncate or with 5 large deep keeled lobes; corolla-tube .5 to 1 in. long; fruit ribbed 3. *G. carinata.*

Calyx tubular, smooth; fruit smooth:—

Calyx much shorter than the corolla:—

Calyx .5 in. long, the mouth with 5 triangular acuminate keeled teeth; corolla 1.5 in. long, widely campanulate suddenly contracted into a cylindrical tube .25 in. long, the lobes of the limb deep, oblong, obtuse 4. *G. Godefroyana.*

Calyx .4 to .65 in. long; the mouth truncate, sometimes split on one side; corolla-tube 1.75 to 2.5 in. long 5. *G. tubifera.*

Calyx .75 to 1.5 in. long, inflated-tubular, the mouth oblique with a few irregular lobes; corolla-tube 2.5 to 3 in. long 6. *G. speciosa.*

Calyx 3 to 4 in. in length; nearly as long as the tube of the corolla 7. *G. Griffithii.*

1. GARDENIA TENTACULATA, Hook. fil. in Fl. Br. Ind. III. 119. An unarmed shrub or small tree; young branches thinner than a goose-quill, sparsely puberulous, dark when dry. *Leaves* membranous, narrowly oblanceolate or lanceolate-oblong, acuminate or caudate-acuminate, much narrowed to the short petiole; both surfaces dark-brown when dry, glabrous, the midrib and 14 to 18 pairs of thin spreading nerves sometimes puberulous on the lower; length 4 to 8 or even 10 in.; breadth 1.5 to 3 in.; petiole .25 to .4 in.; stipules tubular below the 2-lobed mouth, slightly longer than the petioles. *Flowers* in fascicles of 4 to 6 (sometimes fewer), from the axils of fallen leaves, about .75 in. long, on stalks from .3 to .5 in. long. *Calyx* .5 in. long, narrowly campanulate, with dilated limb deeply divided into 5 narrow flexuose linear-lanceolate spreading lobes. *Corolla* slightly exceeding the calyx, tubular, glabrous except a pubescent band at the base of the interior of the tube; the mouth with 5 oblong obtuse lobes. *Anthers* 5, linear, sessile, at the base of the corolla-tube, .6 in. long. *Fruit* sub-globular, faintly ridged, glabrous, .5 to .75 in. in diam., crowned by the tentacle-like calyx-lobes. *Seeds* compressed, reticulate.

JOHOR: *Ridley* 11140; *Kelsall* 4082a. MALACCA: *Hervey*; *Maingay* (K.D.) 839; *Griffith* (K.D.) 2810; *Lobb*. PERAK: *Scortechini* 63; *King's Collector* 2691, 7851, 8377; *Wray* 2036. PENANG: *King's Collector* 1639, 2691. PAHANG: *Ridley* 2195.—DISTRIB. BORNEO, *Motley* 934; *Beccari*; *Haviland* 2967.

2. *GARDENIA STENOPETALA*, King & Gamble n. sp. A shrub 4 to 8 feet high; young branches as thick as a goose-quill or nearly so, very dark-coloured when dry, covered with deciduous dark pubescence and minute white scales. *Leaves* large, thinly coriaceous, oblong-ob lanceolate or elliptic, shortly acuminate, much narrowed to the short petiole; both surfaces olivaceous-brown when dry and both (but especially the lower) bearing sparse adpressed partly deciduous hairs, the midrib and nerves more densely pubescent; transverse veins on the lower rather distinct, distant; main-nerves 12 to 14 pairs, curved, ascending or spreading, rather bold on the lower surface when dry; length 7 to 14 in.; breadth 2 to 4 in.; petioles .3 to .5 in.; stipules shorter than the petioles, broadly triangular at the base, the apices long-acuminate. *Cymes* from the axils of fallen leaves, 2-branched and 4- to 6-flowered; their peduncles under .3 in. long, with narrowly linear, lanceolate bracts. *Flowers* 2.5 to 5 in. long; their pedicels .3 in., narrowly bracteate and rusty-pilose like the cyme-peduncles and calyx. *Calyx* narrowly campanulate, .4 to .6 in. long, the limb with 5 linear spreading lobes somewhat longer than the tube. *Corolla* with a puberulous cylindric tube about .5 to .75 in. long containing the 5 linear anthers at its base; lobes of the limb 5, narrow, 2.5 to 4.5 in. long and from .15 to .2 in. wide, with valvate inflexed edges, bearing some scattered hairs; *anthers* sessile, .3 in. long. *Style* filiform; stigma fusiform, shortly bifid. *Fruit* ovate-oblong, 2.5 in. long and 1.5 in. in diam., crowned by the persistent hairy calyx; pericarp thin, brittle, smooth; *seeds* ellipsoid, compressed, .3 in. long.

PERAK: *Scortechini* 1446; *King's Collector* 4156, 4265; *Curtis* 1306, 3144.

3. *GARDENIA CARINATA*, Wall. in Roxb. Fl. Ind. ed. Carey and Wall. II. 560. A shrub; young branches as thick as a goose-quill, whitish, glabrous, the cicatrices of fallen leaves prominent. *Leaves* membranous, obovate to oblanceolate, very shortly acuminate or cuspidate, much narrowed to the base; both surfaces brown when dry, the upper shining, glabrous except the midrib; the lower tinged olivaceous, puberulous especially on the stout midrib and 16 to 18 pairs of rather straight spreading stout nerves; length 4 to 7 in.; breadth 2 to 3 in. (sometimes much longer). *Flowers* 1.5 to 2 in. long, axillary, solitary or in pairs on short bracteolate puberulous pedicels. *Calyx*

1 to 1.25 in. long, campanulate, boldly 5-keeled, tapering to the pedicel, the mouth expanded sub-truncate or with 5 large deep-keeled lobes. *Corolla* salver-shaped; the tube .5 to 1 in. long, adpressed-puberulous, ridged; limb 1.25 to 2 in. across, with 6 to 9 broad lobes. *Stigma* broadly clavate. *Fruit* ellipsoid, 5- to 8-ribbed, 1.5 to 1.75 in. long including the large persistent calyx. Wall. Cat. 8271; Hook. fil. Fl. Br. Ind. III. 117. DC. Prod. IV. 380; Miq. Fl. Ind. Bat. II. 229.

PERAK: *Scortechini* 2301. PENANG: *Wallich*, *C. Curtis* 525. MALACCA: *Maingay* 1486, (K.D.) 837; *Ridley* 953, 906. *Hervey*. PROVINCE WELLESLEY: *Ridley* 6974. SINGAPORE: *H. J. Murton*.

4. GARDENIA GODEFROYANA, O. Kuntze in Revis. Gen. Pl. I. 283. Young branches half as thick as a goose-quill, rusty-puberulous, bearing at the nodes the persistent bases of the stipules. *Leaves* thinly coriaceous, dark-coloured when dry, both surfaces glabrous except for a few hairs near the edge and on the midrib, narrowly elliptic, the apex abruptly sub-acute, gradually narrowed to the base; main-nerves 8 to 10 pairs, indistinct on both surfaces; length 1.75 to 2.25 in.; breadth .65 to 1 in.; petiole .15 in.; stipules conjoined into a wide tube longer than the petioles, obliquely cut on one side, the apex acute rusty-pubescent externally. *Flowers* solitary or in pairs, 2 in. long. *Calyx* .5 in. long, infundibuliform; the mouth wide and with 5 short triangular keeled acuminate teeth with ciliate edges. *Corolla* about 1.5 in. long, widely campanulate, abruptly contracted into a cylindrical tube .25 in. long, the limb 1.75 in. wide, divided into 5 deep oblong blunt spreading lobes. *Fruit* ellipsoid, crowned by the thick calyx-scar about an inch long and more than half an inch in diameter. *Seeds* numerous, compressed, surrounded by pulp.

PENANG: *Ridley* 1316.—DISTRIB. Saigon, *Pierre*; Cambodia, *Kuntze*; Cochin-China, *Godefroy-Leboeuf*.

5. GARDENIA TUBIFERA, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 562. An unarmed shrub or tree, young branches nearly as thick as a goose-quill, the bark very pale, glabrous, shining. *Leaves* thinly coriaceous, oblanceolate, the apex broad and shortly cuspidate, the base much narrowed; both surfaces pale olivaceous-brown, shining, usually glabrous, but sometimes the nerves and midrib beneath puberulous or scurfy; main-nerves 10 to 12 pairs, sub-horizontal, thin but distinct especially below; length 3 to 6 in.; breadth 1.5 to 2 in.; petiole .2 to .4 in., narrowly winged in its upper part; stipules tubular, sub-scarious, truncate, obscurely toothed, sometimes persistent, 2 in. long. *Flowers* solitary, axillary or terminal, glabrous, sub-sessile, 3 to 4 in. long. *Calyx* tubular, tapering slightly to the base, truncate, sometimes split at one side, smooth or ribbed, from .4 to .65 in. long.

Corolla thick, many times longer than the calyx; the tube 1·75 to 2·5 in. long, narrowly cylindrical, slightly over 1 in. in diam., pubescent at the throat, otherwise glabrous; the limb 2 to 2·5 in. across, spreading, deeply divided into 6 to 9 obovate or obovate-oblong lobes. *Anthers* inserted in the throat, half-exserted, linear, 3 in. long. *Style* thick; stigma exserted, with 2 thick short lobes. *Fruit* globose or ovoid-globose, obscurely ridged or smooth, 1 to 1·5 in. in diam., crowned by the tubular calyx; endocarp thick, hard; seeds rather large. Wall. Cat. 8266; DC. Prodr. IV. 381; Hook. f. in Flor. Br. Ind. III. 117; Miq. Fl. Ind. Bat. II. 230; Schumann in Bot. Tidsskrift Kobn. XXIV. 333; Koord. & Valet. Bijdr. VIII. 99. *G. resinifera*, Korth. in Ned. Kruidk. Arch. II. 191; Kurz in Journ. As. Soc. Beng. 1876, II. 134 (*non* Roth). *G. glutinosa*, Teysm. & Binnend. in Herb. Lugd. Bat.

Three forms of this, founded on variations in the calyx, may be recognised as under:—

Form 1. Calyx obconical, smooth, 4 to 5 in long, truncate.

PERAK: *Scortechini* 1775; *King's Collector* 5260, 5581. JOHOR: *Kelsall* 4088. SINGAPORE: *Wallich*. PENANG: *Maingay* (K.D.) 838. MALACCA: *Maingay* (K.D.) 838; *Griffith* (K.D.) 2816; *DISTRIB.* Sumatra, *Forbes* 3222; Borneo, *Motley* 341; *Beccari* 3250; Koh Chang in Siam; Java, *Teymann*.

Form 2. Calyx-tube ribbed, 4 to 5 in. long.

PERAK: *Wray* 2522; *King's Collector* 6285. PENANG: *King's Collector* 1474; *C. Curtis* 686. SINGAPORE: *Cantley* 215; *Ridley* 2588, also *Lobb* 125.

Form 3. Calyx tubular, smooth, 5 to 6·5 in. long, split on one side.

JOHOR: *King's Collector* 11139. PAHANG: *Ridley* 375, 1388(?) The Johor specimen is well-marked, the other more doubtful.—*DISTRIB.* Borneo, *Curtis* 111.

6. *GARDENIA SPECIOSA*, Hook. fil. Fl. Br. Ind. III. 117. A glabrous tree 40 to 60 feet high; young branches much thicker than a goose-quill, pale, marked by the annular scars of the stipules. *Leaves* coriaceous, obovate- or oblanceolate-elliptic, shortly and abruptly acuminate, or cuspidate, the base much narrowed; both surfaces pale olivaceous-brown, glabrous except for some slight pubescence on the midrib and nerves; main-nerves 12 to 14 pairs, slightly curved, depressed on the upper but prominent on the lower surface as is the midrib; length 4 to 6 in.; breadth 1·5 to 3 in.; petiole 5 to 1 in.; stipules tubular-sheathing, the mouth irregularly toothed. *Flowers* 4 to 6 in. long, coriaceous, solitary or in pairs, axillary, sessile. *Calyx*

·75 to 1·5 in. long, inflated-tubular, the mouth oblique, irregularly few-lobed. *Corolla-tube* cylindric, 3 to 3·5 in. long and about ·15 in. in diam. when dry; limb 2·5 to 3 in. across with 6 to 9 deep obovate-elliptic, blunt lobes. *Anthers* inserted in the villous throat, linear, ·4 in. long, half-exserted. *Fruit* globular, not ridged, 1·5 in. in diam., surmounted by the persistent tubular calyx-tube ·75 to 1 in. long. *Randia speciosa*, Hook. Ic. Pl. t. 824.

SINGAPORE: *Lobb*. PERAK: *Wray* 4265; *King's Collector* 4516, 5880, 8736, 10180.

7. GARDENIA GRIFFITHII, Hook. fil. Fl. Br. Ind. III. 118. A large shrub or small tree; young branches as thick as a goose-quill with pale bark marked by the annular cicatrices of the stipules, glabrous. *Leaves* thickly coriaceous, obovate-elliptic, cuspidate, much narrowed to the short petiole; upper surface olivaceous-brown, glabrous, shining, with the reticulations transverse and depressed; lower surface brown, puberulous especially on the stout midrib and 12 to 15 pairs of oblique slightly curved distinct main-nerves; length 5 to 9 in.; breadth 2·5 to 4 in.; petioles ·3 to ·4 in., stout, winged; stipules ·35 to ·4 in. long, with expanded irregularly toothed mouths. *Flowers* solitary, terminal or axillary, sessile, 4 to 4·5 in. long. *Calyx* nearly as long as the corolla-tube, coriaceous, tubular, expanding upwards, the mouth irregularly toothed, undulate, oblique, ·75 in. in diam., glabrous. *Corolla* salver-shaped, the tube cylindric, much narrower than the calyx; limb 3 in. across, with many lobes, imbricate in æstivation. *Fruit* woody, globular, when dry with slender vertical striæ, glabrous, 2 in. in diam., crowned by the very long, persistent calyx.

MALACCA: *Griffith* (K.D.) 2821; *Ridley* 223; *Derry* 1045. SINGAPORE: *Ridley* 6673; *Hullett* 611, 896.

VAR. *Maingayi*, Hook. fil. l.c. Mouth of the calyx irregularly cut into triangular coriaceous teeth.

MALACCA: *Maingay* (K.D.) 841.

27. PETUNGA, DC.

Glabrous shrubs or small trees with slender often 4-angled branches. *Leaves* petioled, narrowed to base and apex; stipules triangular or ovate-oblong. *Flowers* small, white, bi-bracteolate, in axillary spikes. *Calyx-tube* campanulate, with a persistent 4-lobed limb. *Corolla* funnel-shaped, its throat villous, the limb with 4 spreading lobes; lobes twisted in bud. *Anthers* 4, sub-sessile, linear, the connective thickened at the apex. *Ovary* 2-celled, but often incompletely so; style cylindric, with stoutly linear hairy stigmatic branches; ovules 2 to 8, pendulous from the apex of each cell. *Fruit* small, 2-celled. *Seeds*

imbricate; testa thick, grooved, rugulose; cotyledons linear.—DISTRIB. 4 or 5 species in Malaya and Northern India.

Rachis and bracteoles of the raceme, the calyx corolla and fruit externally and the midrib and main-nerves of the leaves beneath pubescent ... 1. *P. longifolia*.
Rachis and inflorescence glabrous, except the bracteoles and edges of the calyx-lobes:—

Fruit ellipsoid to ovoid, .2 to .25 in. long, its pedicel short; leaves narrowly oblong-lanceolate to lanceolate 2. *P. Roxburghii*.

Fruit clavate .5 to .75 long, mammillate at the apex, not ridged; leaves broadly elliptic-oblong ... 3. *P. venulosa*.

1. PETUNGA LONGIFOLIA, DC. Prod. IV. 399. A small tree; young branches almost as thin as a crow-quill, 4-angled, cinereous-puberulous at first, afterwards glabrous. *Leaves* membranous, oblong-elliptic, much tapered to both ends, glabrous except the midrib and main-nerves on the lower surface; both surfaces olivaceous-brown when dry; the lower conspicuously and transversely reticulate; main-nerves 6 to 8 pairs, slightly curved, ascending, thin but prominent on the lower surface, obsolete on the upper; length 4 to 5.6 in.; breadth 1.25 to 1.5 in.; petioles about .35 in., deciduously puberulous; stipules broadly triangular, acuminate, the midrib hairy, .2 in. long. *Racemes* at first not much longer than the petioles but afterwards lengthening much. *Flowers* .2 in. long, the pedicels at first very short but lengthening in fruit from .2 to .35 in., pubescent like the triangular bracteoles. *Calyx* funnel-shaped, less than .1 in. long, its mouth with 4 broad acute teeth. *Corolla* more than twice as long as the calyx, funnel-shaped, 4-lobed. *Fruit* clavate, crowned by the small calyx-limb, about .3 in. long when ripe, puberulous, the pedicel usually longer. Koord. & Valet. Bijdr. 8. 114. *Higginsia longifolia*, Blume MSS.

PENANG: *Phillips*, Wall. Cat. 8301a.; *Curtis* 2476, 2839; *Ridley* 10238; *King's Collector* 1447. PERAK: *Wray* 863, 1350; *Scortechini*; *King's Collector* 470, 4567, 7700; *Curtis* 3143 (in part). PAHANG: *Ridley* 2194.—DISTRIB. Sumatra.

This differs from *P. Roxburghii* in having all parts of the inflorescence hairy, and in having differently shaped fruits on long pedicels. It has also broader leaves, the under surfaces of which are pubescent on the midrib, main-nerves and conspicuously transverse reticulations.

2. PETUNGA ROXBURGHII, DC. Prod. IV. 399. An evergreen much-branched shrub 3 to 8 feet high; young branches 4-angled, cinereous when dry, thicker than a crow-quill. *Leaves* thinly coriaceous, oblong-lanceolate to lanceolate, tapering equally to each end; upper surface

olivaceous-brown, not reticulate; the lower rather darker faintly reticulate; main-nerves 8 to 10 pairs, spreading, faint on both surfaces; length 2·5 to 5 in.; breadth ·75 to 1·5 in.; petiole ·1 to ·2 in., stipules about one-third of the length of the leaves. *Racemes* more than 1 in. long, but shorter than the leaves, slender, glabrous. *Flowers* ·25 in. long, with several bracteoles at their bases. *Calyx* funnel-shaped, the limb with 4 broad triangular lobes. *Corolla* salver-shaped, glabrous except the villous throat; the mouth with 4 broadly oblong obtuse reflexed lobes. *Anthers* partly exerted from the throat. *Style* with two thick hairy arms. *Fruit* elliptic to ovoid, ·2 to ·25 in. long, glabrous, surmounted by the small calyx-limb; the pedicels very short. Hook. fil. Fl. Br. Ind. III. 120. *P. microcarpa*, DC. Prod. IV. 399. *P. variabilis*, Hassk. in Flora 1845, 232. *Higginsia microcarpa*, Blume Bijdr. 988. *Spicillaria Leschenaultii*, A. Rich. in Mem. Mus. Hist. Nat. Paris V. 252. *Randia racemosa* and *R. polysperma*, Roxb. Hort. Beng. 15; Fl. Br. Ind. I. 525, 527. *R. polysperma*, DC. l.c. 389. *Hypobathrum racemosum*, Kurz. For. Fl. Burm. II. 51. *Rubiacea*, Wall. Cat. 8302, 8312.

PERAK: *Curtis* 3143 (in part); *King's Collector* 1385, 2900; *Scortechini* 335, 1093. PENANG: *Curtis* 3387. PANGKOR: *Curtis* 1387. SINGAPORE: *Ridley* 1990. MALACCA: *Griffith*, *Ridley* 230. SELANGOR: *Ridley* 3187.—DISTRIB. Northern India; Burma; Java; Sumatra; Borneo.

VAR. *floribunda*. *Racemes* longer than the leaves, flowers very numerous; a tree.

PERAK: *King's Collector* 10023. JOHOR: *Ridley* 11157. SELANGOR: *Ridley* 3187.

It is probable that this should rank as a species.

3. PETUNGA VENULOSA, Hook. fil. Fl. Br. Ind. III. 121. All parts glabrous; young branches thicker than a crow-quill, somewhat compressed, shining, dark-coloured when dry. *Leaves* coriaceous, elliptic-oblong, shortly and rather abruptly acuminate, cuneate or rounded and sometimes slightly oblique at the base; both surfaces warm-brown when dry; main-nerves 6 or 7 pairs, slightly curved, ascending, thin but prominent on the lower surface like the midrib, and depressed on the upper; length 3 to 6 in.; breadth 1·5 to 3 in.; petioles ·2 to ·3 in.; stipules triangular, acuminate, keeled, as long as the petioles. *Racemes* at first only about 1 in. long, afterwards much longer. *Flowers* ·35 in. long, on short pedicels with one or two ovate-acute bracteoles at their bases. *Calyx* less than ·1 in. long, campanulate, the mouth with 4 broad blunt lobes hairy at the edge. *Corolla* ·3 in. long, funnel-shaped, the throat densely pubescent, otherwise glabrous, the limb

with 4 ovate-acute reflexed lobes. *Anthers* oblong, apiculate, partially exerted. *Style* with 2 thick hairy arms. *Fruit* clavate, slightly mammillate at the apex and much narrowed at the base when ripe, .5 to .75 in. long and .2 to .25 in. in diam. at the middle; pericarp leathery, endocarp woody.

PENANG: 8301 (in part); *Curtis* 762, 3386; *King's Collector* 1332. MALACCA: *Griffith* (K.D.) 2829; *Maingay* (K.D.) 911; *Holmberg* 774; *Derry* 1116. SINGAPORE: *Ridley* 8427. PERAK: *Wray* 500, 2315, 2487, 3386; *Ridley* 7183; *King's Collector* 1332, 2594, 3156; *Scortechini* 141, 1411.

The fruits of this species are often attacked by an insect and become .5 to 1.75 in length and .4 in. in diam. These galled-fruits are fusiform in shape and have 6 or 7 sharp vertical ridges and their apices are crowned by the slender much elongated calyx-tubes. They are moreover borne on peduncles nearly as long as themselves.

28. DIPLOSPORA, DC.

Shrubs or trees with shortly petiolate coriaceous leaves and triangular acuminate stipules. *Flowers* small, in axillary fascicles or small cymes, polygamo-dioecious, greenish or white; bracts free or connate in a cup. *Calyx* with short tube and truncate 4- or 5-toothed or -lobed limb. *Corolla* cylindric-campanulate or salver-shaped; the limb with 4 or 5 spreading lobes twisted in bud. *Stamens* 4 or 5, inserted by long or short filaments on the throat of the corolla; anthers oblong or linear, exerted, sub-basifixed, often recurved. *Ovary* 2-, rarely 3-celled. *Style* long or short, its branches linear or oblong; ovules 2 or 3 in each cell; placentas on the septum. *Berry* ovoid or globose; seeds few in each cell, imbricate; embryo small.—**DISTRIB.** Species about 16; tropical Asiatic and Malayan.

All parts quite glabrous:—

- | | | | | | |
|------------------------------------------------------------------------|-----|-----|-----|-----|--------------------------|
| Leaves broadly elliptic, 6 or 7 in. long; fruit ovoid,
·85 in. long | ... | ... | ... | ... | 1. <i>D. Beccariana.</i> |
| Leaves narrowly elliptic, 2·25 to 4·5 in. long; fruit
fusiform | ... | ... | ... | ... | 2. <i>D. malaccense.</i> |

Nerves and midrib of leaves pubescent or puberulous on the lower surface:—

Leaves 6 to 11 in. long:—

- | | | | | | |
|-------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|------------------------|
| Leaves shortly caudate-acuminate, main-nerves 7
or 8 pairs; young branches deciduously pubescent | ... | ... | ... | ... | 3. <i>D. Wrayi.</i> |
| Leaves with long narrow apical tail; main-nerves
10 to 12 pairs; young branches cinereous-tomen-
tose | ... | ... | ... | ... | 4. <i>D. velutina.</i> |

Leaves usually under 6 in. in length:—

- | | | | | | |
|--------------------------------------------------------------------------------------|-----|-----|-----|-----|-------------------------|
| Leaves oblanceolate, their main-nerves 8 to 10
pairs; petioles .35 to .4 in. long | ... | ... | ... | ... | 5. <i>D. Kunstleri.</i> |
|--------------------------------------------------------------------------------------|-----|-----|-----|-----|-------------------------|

Leaves narrowly elliptic or elliptic-oblong, not
 oblanceolate, their main-nerves 6 or 7 pairs; petioles
 .15 to .2 in. long 6. *D. pubescens.*
 Imperfectly known species 7. *D. n. sp.?*

1. DIPLOSPORA BECCARIANA, King & Gamble n. sp. A glabrous tree 30 to 40 feet high; young branches compressed, thinner than a goose-quill. *Leaves* coriaceous, broadly elliptic, shortly and bluntly cuspidate, the base broad, rounded and slightly unequal; both surfaces pale olivaceous-brown when dry, shining (the lower the paler), with wide faint reticulations; main-nerves about 7 pairs, much curved, ascending, thin but distinct on both surfaces; length 6.5 to 7.5 in.; breadth 3.25 to 3.75 in.; petioles .5 in.; stipules triangular, sub-acute, only .15 in. long. *Flowers* not seen. *Fruit* ovoid, mammillate at the apex and tapered to the base, smooth, several-seeded; length .85 in., breadth about .2 in. when dry.

PERAK: *King's Collector* 6408.

A species badly represented in the Calcutta collections. It appears to be the same as Beccari's Bornean (Sarawak) plant Nos. 300 and 2062 and we have associated it with the name of that distinguished botanist and explorer.

2. DIPLOSPORA MALACCENSIS, Hook. fil. in Fl. Br. Ind. III. 124. A small tree; all parts quite glabrous; young branches rather thicker than a crow-quill, cinereous, glabrous. *Leaves* narrowly elliptic, shortly abruptly and obtusely acuminate, more or less narrowed at the base; upper surface brown when dry, the lower very pale-olivaceous; main-nerves 4 or 5 pairs, faintly prominent on the lower surface and slightly depressed on the upper; length 2.5 to 4.5 in.; breadth 1 to 2 in.; petioles .15 to .2 in.; stipules shorter than the petioles. *Flowers* .2 in. long, in small clusters in the axils of fallen leaves; their pedicels short, bracteolate at the base, usually (*vide* Hook. fil.) unisexual. *Calyx* shorter than the corolla, tubular-campanulate, the mouth with 4 broad, coriaceous, acute teeth. *Corolla* thin, tubular, cut half-way down into 4 blunt oblong lobes. *Anthers* 4, narrowly ovate, sessile, half-exserted from the throat. *Fruit* fusiform, surmounted by the calyx, glabrous. *Lachnostoma triflorum*, Korth. in Ned. Kruidk. Arch. II. 202; Miq. Fl. Ind. Bat. II. 257.

In all the provinces; common.

3 DIPLOSPORA WRAYI, King & Gamble n. sp. A shrub or small tree; young branches half as thick as a goose-quill, cinereous, covered like the stipules and petioles with minute deciduous cinereous pubescence; all other parts save the interior of the corolla-tube glabrous. *Leaves* elliptic or elliptic-oblong, often somewhat obovate, shortly caudate-acuminate, the base cuneate; both surfaces pale

olivaceous-green when dry, the lower the paler; main-nerves 7 or 8 pairs, curved, ascending, thin but prominent on the lower surface, faint on the upper; length 6 to 11 in.; breadth 2·5 to 4·75 in.; petioles ·25 to ·4 in.; stipules shorter than the petioles, broadly ovate, acuminate, keeled. *Flowers* ·25 in. long, in dense shortly peduncled or sessile axillary minutely bracteolate fascicles a little longer than the petioles. *Calyx* very short, cupular, with 4 broad shallow teeth. *Corolla* tubular, slightly inflated above the middle; the tube villous inside; the lobes of the limb shorter than the tube, glabrous, imbricate, oblong, sub-acute. *Anthers* sessile in the tube ·1 in. long oblong. *Style* cylindrical, as long as the corolla, divided into 2 linear hairy arms; ovary with 2 bi-ovulate cells. *Fruit* globular-ovoid, crowned by the faint scar of the calyx, glabrous, ·4 in. long, and about ·3 in. in diam.

PERAK: *Wray* 60, 2879, 3469; *Ridley* 5544; *King's Collector* 2366, 2697, 2782, 5277, 6253.

This closely resembles specimens in Herb. Kew. named *Vangueria palembanica* Teysm. & Binn. which is a *Diplospora*.

4. *DIPLOSPORA VELUTINA*, King & Gamble n. sp. A small tree; young branches half as thick as a goose-quill, densely covered with short dark-cinereous tomentum like the stipules and petioles. *Leaves* coriaceous, oblong-elliptic, sometimes slightly obovate, the apex abruptly contracted into a narrow acute point about 1 in. long, the base rounded or slightly narrowed; upper surface glabrous, shining, the midrib and main-nerves depressed; the lower with bulbous-based hairs in the interspaces between the nerves; main-nerves 10 to 12 pairs, slightly curved, ascending, stout, the latter as well as the bold midrib and transverse curved veins very pubescent; length 8 to 10 in.; breadth 3 to 4·5 in.; petioles about ·2 in.; stipules about as long as the petioles, keeled, triangular, very acuminate. *Flowers* ·25 in. long, sessile, in dense sessile axillary heads not much longer than the petioles. *Calyx* very short, cupular, obscurely lobed. *Corolla* funnel-shaped, glabrous except the densely villous throat; the limb with 4 oblong, broad, slightly emarginate lobes. *Anthers* sagittate. *Style* slender, with 2 short, linear, compressed stigmatic lobes. *Fruit* unknown.

PERAK: *King's Collector* 3142.

5. *DIPLOSPORA KUNSTLERI*, King & Gamble n. sp. A small tree; young branches thinner than a goose-quill, deciduously puberulous like the stipules, petioles, and lower surfaces of the midrib and main-nerves, otherwise glabrous. *Leaves* sub-coriaceous, oblanceolate to elliptic or oblong, shortly, abruptly, and bluntly acuminate, the base rounded or slightly cuneate; both surfaces of rather a dark-brown

when dry; the midrib impressed on the upper, prominent on the lower; main-nerves 8 to 10 pairs, oblique, little curved, prominent beneath; veins transverse, thin but distinct on the lower surface; length 6 or 7 in.; breadth 1.75 to 2.5 in.; petioles .35 to .4 in. long; stipules about as long as the petioles, triangular-lanceolate, keeled, produced into a long narrow point. *Cymes* small, shortly peduncled, axillary. *Flowers* not seen. *Fruit* mamillate when young, ovoid and crowned by the small calyx-scar when ripe, smooth, .4 in. long; 2-celled, 2-seeded.

PERAK: *Scortechini* 298; *King's Collector* 3211.

6. *DIPLOSPORA PUBESCENS*, Hook. fil. Fl. Br. Ind. III. 124. A shrub; young branches thicker than a crow-quill, compressed, minutely pubescent like the stipules and petioles. *Leaves* coriaceous, narrowly elliptic or elliptic-oblong, shortly and obtusely caudate-acuminate, the base cuneate; both surfaces when dry pale-brown, the upper everywhere glabrous and the midrib and main-nerves channelled; the lower glabrous between the minutely pubescent stout midrib and 6 or 7 pairs of slightly curved slender but prominent main-nerves; length 3 to 6 in.; breadth 1.25 to 2.25 in.; petioles .15 to .2 in.; stipules about as long as the petioles, narrowly lanceolate, tapering into long subulate points. *Flowers* about .2 in. long, in dense short axillary sub-sessile heads slightly longer than the petioles. *Calyx* short, with 4 very small blunt lobes, pubescent. *Corolla* longer than the calyx, tubular, lobes of limb 4, short, the throat villous. *Fruit* ovoid-globular, smooth, the calyx scar small; length .4 in.; seeds 4. Wall. Cat. 8297.

PERAK: *Scortechini* 6, 94; *Ridley* 5537.—DISTRIB. Mergui, *Griffith* 1108; *Helfer* (Kew. Dist. 2799).

Imperfectly known species.

7. *DIPLOSPORA*, n. sp.? Young branches thicker than a crow-quill, densely and minutely cinereous-pubescent. *Leaves* coriaceous, narrowly elliptic, shortly and somewhat bluntly caudate-acuminate, the base slightly narrowed; both surfaces dark-brown when dry; the upper shining, glabrous, lower dull, puberulous on the bold midrib and 6 or 7 pairs of prominent oblique little curved main-nerves; length 4.5 to 5.5 in.; breadth 1.5 to 2.35 in.; petioles .15 to .2 in.; stipules about as long as the petioles, triangular, sub-acute or acute but not acuminate. *Flowers* not seen. *Fruit* ovoid-globular, crowned by the small calyx-scar, smooth, .45 in. long, and .35 in. in diam.

PERAK: at an elevation of 5,000 feet; *Wray* 4086.

29. *SCYPHIPHORA*, Gaertn.

A small tree with stout terete nodose branches, gum-yielding when young; all parts except the inside of the corolla-tube glabrous.

Leaves coriaceous, obovate, obtuse; stipules short, broad. *Flowers* small, in dense, shortly-pedunculate cymes. *Calyx-tube* elongate-obconic; the limb cupular, truncate, minutely 4- or 5-toothed, persistent. *Corolla-tube* cylindrical; the throat dilated and villous; the limb with 4 or 5 oblong lobes twisted in bud. *Stamens* 4 or 5, inserted by short filaments between the lobes of the corolla, anthers linear, sagittate. *Disk* annular, lobed. *Ovary* with 2 narrow cells; style filiform, with 2 linear obtuse stigmatic branches. *Ovules* 2 in each cell, attached to the middle of the cell, one pendulous, the other ascending; the contiguous funicles dividing each cell into 2 chambers. *Drupe* sub-cylindrical, 8- to 10-grooved and winged, separating into 2 crustaceous 4- to 5-ribbed pyrenes. *Seeds* sub-cylindrical; testa membranous; albumen scanty; cotyledons oblong.—**DISTRIB.** A single species in Malaya and Ceylon.

SCYPHIPHORA HYDROPHYLLACEA, Gaertn. Fruct. III. 91. t. 196. A miniature evergreen tree, with a spherical crown and simple stem hardly exceeding 4 feet in height. *Leaves* acute at the base on a petiole .5 to 1 in. long; nervation obsolete; length about 2 in.; breadth 1.5 in. *Flowers* whitish often tinged with red; collected in small dichotomously branched axillary cymes. *Calyx* about .15 in. long. *Corolla-tube* about as long as the calyx and its lobes half as long. *Drupe*s elliptically oblong, about .35 in. long. DC. Prod. IV. 577; Kurz. Fl. Burm. II. 4; Hook. fil. Fl. Br. Ind. III. 125; Miq. Fl. Ind. Bat. II. 239; Koord. & Valet. Bijdr. 8. 125; Trimen Fl. Zeyl. III. *Epethenia malayana*, Jack in Mal. Misc. I. 12; Wall. Cat. 8444; DC. l.c. 478; W. & A. Prod. 424. *Epithenia* sp., Griff. Notul. IV. 269; Ic. Pl. Asiat. 478 and 644 A. (*Lumintzera*). *Rubiacea*, Wall. Cat. 9055 A. *in part.*

In Mangrove swamps.—**DISTRIB.** Coasts of S. India and Ceylon; Andaman Islands; Malay Archipelago to N. Australia; Philippines and New Caledonia.

30. JACKIA, Wall.

A tall tree; young branches stout, obtusely 4-angled, covered by the persistent bases of the fallen leaves and by the large coriaceous, sheathing long-bristled stipules. *Leaves* coriaceous, large. *Flowers* densely pubescent, in prominently bracteolate scorpioid cymes arranged corymbosely in long-peduncled pendulous axillary panicles. *Calyx-tube* small, obconic, the limb with 5 unequal lobes, two of them small the other 3 coriaceous, large, veined, accrescent and forming wings to the ripe fruit. *Corolla* funnel-shaped, the tube narrow, sub-glabrous inside, lobes of the limb 5, valvate in bud, triangular. *Anthers* 5, linear, sub-sessile in the throat, the connective apiculate. *Disk* hairy. *Ovary*

2-celled, ovules 2 in each cell, attached to the apex of an erect basilar placenta. *Style* compressed, slender, long-exserted, thickened and hairy about the middle, stigmatic-lobes 2, short. *Fruit* dry, indehiscent, obconic, '1 in. long, densely hairy, crowned by 3 accrescent, persistent, veined, oblong somewhat oblanceolate blunt calyx-lobes about '6 in. long; *seeds* (by abortion) solitary, ellipsoid, embryo straight in the axis of much fleshy albumen; cotyledons broad, flat.—DISTRIB. A single Malayan species.

JACKIA ORNATA, Wall. in Roxb. Fl. Ind., ed. Carey & Wall. II. 321. Young branches as thick as the little finger. *Leaves* oblanceolate, the apex sub-acute, narrowed from above the middle to the short stout petiole; upper surface glabrous and shining, the lower adpressed-puberulous; main-nerves about 12 pairs, prominent beneath; length 6 to 12 in.; breadth 2·5 to 5 in.; petiole '4 to '9 in.; stipules widely and deeply cupular, often 1 inch or more in length (to the end of the hairy bristles). *Flowers* '4 in. long; corolla many times longer than the calyx-tube, twice as long as the calyx-lobes when young, densely sericeous externally; bracteoles broadly oblong-ovate, shorter than the flowers, imbricate, sericeous, the lower ones sometimes connate. Wall. Pl. As. Rar. t. 293; Wall. Cat. 6284; DC. Prod. IV. 621; Hook. fil Fl. Br. Ind. III. 126; Miq. Fl. Ind. Bat. II. 237.

In all the provinces.—DISTRIB. Malay Archipelago.

C. S. Robinson

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.

[*Reprinted from the "Journal, Asiatic Society of Bengal," Vol. LXXIII,
Part II, No. 3, 1904.*]

No. 15.

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PRINTED AT THE BAPTIST MISSION PRESS.

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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 JAMES SYKES GAMBLE, Esq., C.I.E., M.A., F.R.S., late of the Indian Forest Department.

No. 15.

[Read March 2nd, 1904.]

In the last of these contributions thirty genera of *Rubiaceæ* were described. In the present one descriptions are given of the twenty-three remaining genera. Our account of the species of *Psychotria* ought to have been included here. But, owing to an unfortunate circumstance, it has been necessary to keep it back for publication in the next paper of the series. In the accompanying key to the genera, *Psychotria* is however included. The species described in the present paper number 123, and of these 47 are believed to be new.

Ovary 2-celled with 2 ovules in each cell, or imperfectly 4-celled with 1 ovule in each cell, always pendulous from about the middle of the septum; calyx-limb truncate; drupe with 2 or 4 pyrenes; flowers umbellate; corolla-lobes narrow, valvate in bud; scandent shrubs

... 31. COELOSPERMUM.

Ovules solitary in each cell; ovary 2- to many-celled:—

Radicle superior:—

Ovules pendulous from the apex of the cell:—

Fruit composed of several cohering woody pyrenes; stamens inserted on the mouth of the corolla-tube:—

Pyrenes 4 to 9: corolla imbricate, calyx-limb deciduous: shrubs or trees

... 32. GUETTARDA.

Pyrenes 12 to 24: corolla valvate; calyx-limb persistent, cupular: shrubs or trees

... 33. TIMONIUS.

Fruit 2-celled, consisting of 2 dry small indehiscent cocci; herbs with connate setaceous stipules

... 34. KNOXIA.

Ovules pendulous from the septum near its apex:—

Drupe with 2 free or cohering pyrenes; trees or shrubs with axillary inflorescence:—

Stipules equal: shrubs (often climbing); drupe didymous and 2-seeded or sub-globose and (by abortion) 1-seeded; seeds oblong

... 35. CANTHIUM.

Stipules unequal, (one very large); seeds cup-shaped; a tree ... .. 36. MESOPTERA.

Radicle inferior:—

Ovules on the septum of the ovary:—

Corolla-lobes imbricate in bud:—

Ovary 2-celled, each cell with an ovule on the middle of the septum; flowers ebracteate, in small supra-axillary clusters, 5-merous: calyx-lobes as long as the tube, thickened and persistent, stamens 5, inserted near the base of the corolla-tube; style short; stigma fusiform; fruit boldly 10-ridged; a shrub ... .. 37. GARDENIOPSIS.

Corolla-lobes twisted in bud:—

Ovary 2-celled, each cell with one ovule (in one species with 2 ovules); flowers 5-merous; style short, pubescent; stigmas stout and grooved: fruit with scanty pulp; seeds plano-convex, often cupped ... .. 38. WEBERA.

Ovary 2-celled, each cell with one ovule inserted near the middle of the cell, not basilar; flowers 4-merous (5-merous in one species of *Ixora*); style long, slender, glabrous, exserted; stigmas slender, smooth; fruit globose or didymous with leathery or pulpy pericarp; pyrenes 2, coriaceous, each with a single plano-convex seed:—

Style exserted but never twice as long as the corolla-tube; stigma thicker than the style, bifid: stipules and bracts of the inflorescence coriaceous, usually small, the latter not sheathing; leaves usually coriaceous ... 39. IXORA.

Style very slender much longer (often twice as long) than the corolla-tube; stigma not thicker than the style (sometimes thinner), usually entire; stipules and bracts of the inflorescence large and membranous (the latter sheathing); leaves membranous ... 40. PAVETTA.

Corolla-lobes valvate in bud:—

Stamens 4 or 5, usually inserted on the mouth of the corolla (rarely in the tube); ovules usually inserted below (rarely above) the middle of the septum, amphitropous; fruit a 2- or 4-celled berry or a drupe with 2 or 4 pyrenes; trees or shrubs, (sometimes scandent):—

Flowers united by their calyx-tube into more or less fleshy heads:—

Heads many-flowered, ovoid, solitary or in axillary or terminal umbels or panicles; seeds obovoid or reniform ... 41. MORINDA.

- Heads few-flowered, sub-spicate in terminal panicles; seeds thin, orbicular ... .. 42. *RENNELIA*.
- Flowers free:—
- Flowers unisexual:—
- Calyx-limb cupular; throat of corolla glabrous, stamens included in its tube; flowers terminal and axillary; berry 1- to 2-seeded; seeds sub-globose, peltate ... .. 43. *PRISMATOMERIS*.
- Calyx-limb annular, truncate, entire or 5-toothed; throat of corolla woolly and bearing the stamens; flowers in axillary heads; drupe globose; seeds compressed ... .. 44. *GYNOCNODOS*.
- Flowers bisexual:—
- Calyx-limb truncate, entire or obscurely lobed; throat of corolla glabrous or hairy; flowers in umbels; fruit a berry or drupe with 2 to 4 pyrenes; seeds obscurely trigonous ... .. 31. *COELOSPERMUM*.
- Stamens 4, inserted on the throat of the corolla; style filiform; stigma capitate or bifid; ovules inserted on the middle of the septum; fruit a crustaceous or coriaceous dehiscent mericarp; seeds oblong or ovoid with ventral groove; herbs ... .. 45. *SPERMACOCE*.
- Ovules basilar, erect:—
- Corolla-lobes inflexed-valvate in bud:—
- Stamens 4 or 5, inserted in the corolla-tube; style-arms 2, twisted; fruit capsular, compressed or globular, containing 2 dorsally compressed,—winged or cupped pyrenes often pendulous from a columella; seeds compressed, the testa membranous; foetid climbing shrubs ... .. 46. *PAEDERIA*.
- Corolla-lobes valvate in bud; stamens usually 4, but sometimes 5 to 7, inserted near mouth of the corolla; ovules cuneate, anatropous; drupe with 2 or more pyrenes:—
- Flowers axillary and terminal, solitary or in small fascicles; anthers 4, sub-sessile:—
- Calyx-limb dilated, unequally 4- to 6-lobed; drupe with 2 pyrenes; foetid terrestrial shrubs ... .. 47. *SAPROSMA*.
- Calyx-limb truncate; drupe with 2 pyrenes; epiphytes with tuberous honey-combed stems ... .. 48. *HYDNOPHYTUM*.
- Flowers solitary, capitate or fascicled, axillary or terminal:—
- Flowers solitary; calyx with 4 rather long

- lobes; stamens 4 to 7; creeping herbs often with cordate leaves ... .. 49. GEOPHILA.  
 Flowers numerous, in heads surrounded by many large thick involucre; calyx-limb entire; style-arms 2; stamens 4 or 5 .. 50. CEPHAELIS.  
 Flowers in axillary fascicles or condensed cymes, calyx-limb 3- to 6-fid or entire and truncate; stamens 4 to 6; style-arms 3 to 9: leaves distichous, not cordate; pyrenes 3 to 9 51. LASIANTHUS.  
 Flowers in terminal (rarely axillary) corymbose or paniced, rarely capitate, never involucre cymes:—  
 Calyx-limb short, 4- or 5-toothed; corolla-tube usually long and curved; seeds orbicular, very concave on the ventral surface .. 52. CHASALIA.  
 Calyx-limb short, 4- to 6-toothed; corolla-tube usually short, straight; seeds plano-convex ... .. 53. PSYCHOTRIA.\*

### 31. COELOSPERMUM, Blume.

Scandent glabrous shrubs; the young branches often compressed. *Leaves* coriaceous, elliptic, oblong or obovate, with few and indistinct nerves; stipules short, broad, connate below, acute or bifid at the apex, caducous and leaving an annular scar on the branch. *Flowers* in 3-6-flowered paniced umbels. *Calyx-tube* short, campanulate or hemispheric; the limb membranous, truncate or obscurely lobed, sometimes deciduous. *Corolla* coriaceous, clavate in bud, funnel-shaped or salver-shaped; the limb with 4 or 5 linear-oblong or lanceolate, sub-acute, patent or reflexed lobes longer than the tube, in bud valvate, the edges and apices often recurved. *Stamens* 4 or 5, on the throat of the corolla; filaments slender; anthers linear, versatile; exerted. *Ovary* 2-celled or imperfectly 4-celled; style filiform; stigmas 2, linear-lanceolate. *Ovules* 2 in each cell in the 2-celled species and 1 in each cell in the 4-celled species, on fleshy placentas. *Fruit* depressed-globular, dry or fleshy, containing 2 or 4 pyrenes.—**DISTRIB.** Malaya and Australia—about 10 species.

- Limb of calyx membranous, deciduous: cells of ovary 2,  
 each with 2 or more ovules ... .. 1. *C. truncatum*.  
 Limb of calyx coriaceous, permanent: cells of ovary 4,  
 cells uni-ovulate ... .. 2. *C. scandens*.

1. COELOSPERMUM TRUNCATUM, King & Gamble. A shrubby glabrous creeper: youngest branches thinner than a goose-quill, pale-brown,

\* The descriptions of the species of this genus will be printed in No. 16 of the present series of papers.

terete. *Leaves* coriaceous, elliptic-oblong, or sub-obovate, shortly and rather obtusely acuminate, the base cuneate; both surfaces (when dry) dark-brown with a tinge of olivaceous, dull; the midrib depressed on the upper, prominent on the lower; main-nerves about 4 pairs, curving upwards, slender, distinct on the lower surface; length 3 to 4 in., in breadth 1.25 to 2.5 in.; petiole .3 to .5 in. *Stipules* small, transversely oblong, very short (often only .05 in. long), pale: coriaceous, 2-lobed. *Panicles* about 1 in. long and twice as broad, ternately umbellate on the apex of naked compressed peduncles as long as or longer than the leaves: the umbels with 5 or 6 spreading flowers, minutely but deciduously bracteolate at the base. *Flowers* .4 in. long, on unequal pedicels shorter than themselves. *Calyx-tube* campanulate, the limb membranous, truncate or obscurely 5-toothed, deciduous, .1 in. long, *Corolla* .35 in. long, clavate in bud, the tube short, hairy within, the throat glabrous, the lobes 5, valvate in bud, their apices inflexed. *Stamens* 5, inserted in the throat of the corolla. *Anthers* linear, exserted. *Ovary* 2-celled with ovules 2 (or more?) in each cell. *Coelospermum scandens*, Hook. fil. Fl. Br. Ind. III. 159 in part. *Triscadia truncata*, Hook. fil. in Gen. Plant. II. 69; Fl. Br. Ind. III. 94. *Webera truncata*, Roxb. Fl. Ind. ed. Carey and Wall. II. 538. *Stylocoryna truncata*, Wall. Cat. 8403. *Cupia truncata*, DC. Prod. IV. 394. *Pseudoxora truncata*, Miq. Fl. Ind. Bat. II. 210.

PENANG: Wallich. SINGAPORE: Mainyay (K.D.) 933.

2. COELOSPERMUM SCANDENS, Blume Bijd. 994. Scandent: the young branches cylindric, pale-brown, thinner than a goose-quill. *Leaves* broadly elliptic, or obovate-elliptic, much narrowed to the base; midrib and 4 or 5 pairs of spreading nerves faintly depressed on the upper surface, slightly prominent on the lower; length 2.5 to 5 in.; petioles .35 to .6 in. *Stipules* less than .1 in. long, narrow. *Peduncles* usually longer than the leaves, slender, compressed, bearing at the apex three pedunculate few-flowered umbels. *Flower-pedicels* unequal, shorter than the flowers. *Calyx* campanulate, less than .1 in. long, the mouth truncate, usually with 5 minute teeth. *Corolla* four times as long as the calyx, clavate in bud, salver-shaped, coriaceous; the tube slender, longer than the 5 reflexed linear-oblong valvate lobes. *Anthers* as long as the corolla-lobes, much exserted. *Ovary* 4-celled, each cell with a single ovule. *Fruit* depressed-globular, .4 in. across and .35 in. long, glabrous, shining, smooth but with 4 shallow ventral grooves and a minute apical areolus: pyrenes two, each 2-seeded. DC. Prod. IV. 468; Hook. fil. Fl. Br. Ind. III. 159 (in part).

MALACCA: Griffith (K.D.) 3087. SINGAPORE: Ridley 109; Hullett 623. PERAK: King's Collector 3992, 7248.

The material is imperfect and we describe the characters of the ovary and ovules with some hesitation.

### 32. GUETTARDA, Linn.

Trees or shrubs. *Leaves* sometimes three in a whorl; stipules deciduous. *Flowers* secund on the branches of axillary forked pedunculate cymes. *Calyx-tube* short; the limb tubular, toothed, usually deciduous. *Corolla* with a long cylindric straight or curved tube, the limb with 4 to 9 lobes imbricate in bud. *Anthers* 4 to 9, linear, subsessile, included within the glabrous tube. *Ovary* with 4 to 9 elongate cells, with a solitary ovule in each cell; style filiform; stigma sub-capitate. *Drupe* more or less globular, crowned by the short calyx-limb; endocarp 4- to 9-celled, perforated near the apices of the cells. *Seeds* pendulous, oblong cylindrical or curved, testa membranous, albumen scanty or none. —DISTRIB. About 45 species; mostly American.

1. GUETTARDA SPECIOSA, Linn. Sp. Pl. 991. A small evergreen polygamous tree; young branches as thick as a goose-quill, deciduously puberulous. *Leaves* membranous, broadly obovate or ovate, cuspidate, narrowed to the rounded or sometimes minutely cordate, rarely acute base; upper surface pale-brown when dry, glabrous; the lower pale-greenish, puberulous, minutely reticulate; main-nerves 7 to 8 pairs, little curved, spreading, thin but rather prominent on the lower surface, faint on the upper; length 4 to 8 or 10 in.; breadth 3 to 7 in.; petioles .5 to 1.5 in.; stipules lanceolate or oblong, deciduous, .3 in. long. *Cymes* axillary or from the axils of fallen leaves; few-flowered, little-branched, on puberulous peduncles 1.5 to 2.5 in. long. *Flowers* 1.5 to 2 in. long, some sessile others on short pedicels. *Calyx* about .2 in. long, minutely velvety; tube short-grooved; limb widely cupular, truncate entire or faintly and irregularly toothed. *Corolla* salver-shaped, many times longer than the calyx, softly pubescent outside; the tube narrow; the limb 1 in. in diam. divided into 7 or 8 obtuse lobes. *Style* glabrous, stigma conical. *Drupe* depressed-ovoid or turbinate, woody, globose, obscurely lobed, 4- to 6-celled, about 1 in. in diam. Lam. Ill., t. 154 f. 2; Roxb. Fl. Ind. I. 686. Wall. Cat. 6219; W. & A. Prod. Fl. Pen. Ind. 422; Wight Ic. t. 40; Kurz For. Flor. Burm. II. 37; Hook. fil. Fl. Br. Ind. III. 126. *Cadamba jasminiflora*, Sonner. Voy. Ind. II. t. 128. *Nictanthes hirsuta*, Linn. Sp. Pl. 8. *Jasminum hirsutum*, Willd. Sp. Pl. I. 36.—Rheede Hort. Mal. t. 47, 48.

In all the provinces—on the sea-coasts.—DISTRIB. Shores of the tropics of old and new worlds.

### 33. TIMONIUS, Rumph.

Shrubs or trees: stipules ovate-lanceolate, deciduous: leaves more

or less coriaceous. *Flowers* rather small, polygamo-dioecious, in axillary cymes. *Male* cymes with few or many secund flowers. *Female* 1- to 3-flowered, the pedicels bibracteolate. *Calyx-tube* short; the limb cupular, persistent. *Corolla* coriaceous, pubescent, funnel-shaped; the throat and the tube within glabrous; limb with 4 or 5 (rarely with 10) lobes, valvate in bud or nearly so. *Stamens* as many as the lobes of the corolla, inserted by short filaments in the tube; anthers linear, dorsifixed. *Disk* small, hispid. *Ovary* many-celled; style short, thick, hairy, with several more or less united linear (often unequal) branches; *ovules* solitary in each cell, pendulous. *Fruit* ovoid or globose, usually 4-grooved, composed of 12 to 24 or even 30 small elongated 1-celled 1-seeded pyrenes cohering by their sides and sunk in a 4-armed, placentiform mass, the whole being enclosed in an epicarp crowned by the remains of the calyx. *Seeds* cylindric, straight, rarely curved, with thick funicles and membranous testas; albumen scanty or absent: cotyledons small, radicle long.—**DISTRIB.** About 30 species, Tropical Asiatic and Polynesian.

Female flower solitary on a long peduncle :—

- |                                                                                                           |        |                           |
|-----------------------------------------------------------------------------------------------------------|--------|---------------------------|
| ♂ peduncles long, slender, glabrous; leaves glabrous except the nerves beneath; fruit 4-grooved, glabrous | ... .. | 1. <i>T. Jambosella.</i>  |
| ♂ peduncles short, rusty-pubescent; leaves rusty-pubescent beneath; fruit not grooved, rusty-pubescent    | ... .. | 2. <i>T. Wrayii.</i>      |
| Female flowers in small pedunculate cymes                                                                 | ... .. | 3. <i>T. Rumphii.</i>     |
| <i>Species of which ♂ flower and fruit are unknown :—</i>                                                 |        |                           |
| Stipules triangular, acuminate                                                                            | ... .. | 4. <i>T. laxus.</i>       |
| Stipules cupular, the mouth with several unequal linear points                                            | ... .. | 5. <i>T. malaccensis.</i> |

1. **TIMONIUS JAMBOSELLA**, Thwaites Enum. Pl. Ceyl. 153. A small ever-green tree or shrub; young branches thinner than a goose-quill, brown when dry, glabrous or sparingly silky. *Leaves* coriaceous, their margins sometimes recurved, lanceolate, elliptic-lanceolate, or elliptic, acuminate, the base narrowed, cuneate; both surfaces dull-brown when dry, glabrous; the lower paler, faintly reticulate; main-nerves 5 or 6 pairs, curving upwards, prominent and silky on the lower surface, less prominent and glabrous on the upper; length 2·5 to 4 in.; breadth 1 to 2·5; petioles ·1 to ·3 in.; stipules lanceolate, acuminate, silky, slightly exceeding the petioles. *Male* cymes 3- to 12-flowered, on peduncles ·35 to ·75 in. long. *Female* flowers solitary, on peduncles longer than those of the males: the calyx 4-gonous; suburceolate, the mouth with 4 shallow obscure teeth. *Corolla* hypocrateriform, ·3 to ·5 in. long, the throat valvate. *Anthers* slightly exserted. *Disk* large. *Stigmas* 4,

*Fruit* at first ellipsoid, but when ripe depressed-globose, 4-gonous, subtruncate, about .35 in. across, crowned by the calyx-limb and large disk; crustaceous; covered by a smooth pericarp: the placentas 4, cruciate, each bearing about 6 ovules sunk in pits. *Bedd. Ic. Pl. Ind. Or. t. 190; Hook. fil. Fl. Br. Ind. III, 127. T. flavescens, Baker Fl. Maurit. 144. Nelitris Jambosella, Gaertn. Fruct. I. 134, t. 90 (excl. syn.). Helospora flavescens, Jack in Trans. Linn. Soc. XIV. 127, t. 4, f. 3; DC. Prod. IV. 391; Miq. Fl. Ind. Bat. II. 234. Eupyrena glabra, W. & A. Prod. 423. Bobea glabra, Korth. in Ned. Kruidk. Arch. II. 211. Polyphragmon flavescens, Kurz For. Fl. Burm. II. 38. Guettarda? peduncularis, Wall, Cat. 6222; Don. Gen. Syst. III. 551. G. Brunonis and G. missionis Wall. Cat. 6220, 6221.*

In all the provinces: common.—DISTRIB. Andaman Islands Ceylon, Malay Archipelago.

VAR. *Finlaysoniana*; leaves elliptic or elliptic-oblancolate, shortly acuminate or acute, 3 to 5.5 in. long, the petioles .3 to .6 in. long, fruit, nearly .5 in. in diam. *T. Finlaysoniana, Hook. fil. Fl. Br. Ind. III. 127. Guettarda Finlaysoniana, Wall. Cat. 6223. G. peduncularis, Wall. Cat. 6222. Timonius, Wall. Cat. 8446.*

SINGAPORE: *Wallich, G. Thomson, Ridley 2762.* PENANG: *Curtis 3388.* PERAK: *King's Collector 1529, 6209.* ANDAMAN ISLANDS: *King's Collector.*

2. TIMONIUS WRAYI, King & Gamble, n. sp. A tree 20 to 50 feet high; young branches as thick as a goose-quill, dark-brown when dry, the leaf-cicatrices large, distinct. *Leaves* coriaceous, elliptic or obovate-elliptic, sometimes rhomboidal, the apex acute, the base much narrowed into the long petiole; upper surface olivaceous-brown when dry, glabrous everywhere and shining; the lower paler, dull, the nerves and midrib adpressed rusty-sericeous, otherwise glabrous; main-nerves 6 or 7 pairs, only slightly curved, ascending, very bold on the lower surface like the midrib, somewhat depressed on the upper; length 5.5 to 8 in.; breadth 2.25 to 4.5 in.; petiole .6 to 1.5 in.; stipules lanceolate, acuminate, sparsely sericeous, about .5 in. long. *Male cymes* pedunculate, dichotomous, 6- to 8-flowered, the branches bracteate, short, spreading, everywhere densely rusty-pubescent: the peduncle about .5 in. long; flowers secund, sessile. *Calyx* .3 in. long, cylindric, campanulate with 4 broad blunt unequal lobes, densely rusty-pubescent outside. *Corolla* coriaceous with wide short tube and 4 blunt, concave, slightly imbricate lobes nearly as long as the tube, rusty-pubescent outside. *Anthers* 4, included, linear, sessile. *Female flower* not seen. *Fruit* solitary on a peduncle longer than that of the male cyme, ellipsoid or globose, crowned by the large calyx and with a single oblong bract at its base,

minutely rusty-pubescent, '6 in. in diam. when dry. *Seeds* about 12, in pits on the cruciform placentas.

PERAK: *Wray* 3200, *King's Collector* 5168.

This species is very distinct from the others described here. Its nearest ally is one from New Guinea, to which Dr. Scheffer gave the MS. name *Polyphragmon sessile*. But the latter has smaller leaves more hairy below and with rather more main-nerves; the petioles moreover are shorter, and the fruits have peduncles less than '1 in. long.

3. *TIMONIUS RUMPHII*, DC. Prod. IV. 461 A small tree. Young branches twice as thick as a crow-quill, striate, sparsely pubescent at first, finally glabrous. *Leaves* thinly coriaceous or membranous, narrowly elliptic, somewhat oblanceolate, shortly and bluntly acuminate, much narrowed at the base: upper surface dark-brown when dry, usually glabrous except for a few hairs on the midrib; the lower paler, minutely reticulate and with fine white adpressed-sericeous hairs; main-nerves 8 or 9 pairs, slightly curved, ascending, thin and faint on the lower surface, almost obsolete on the upper; length 3'5 to 5'5 in.; breadth, 1'5 to 2 in.; petiole '25 to '4 in.; pubescent; stipules lanceolate, caudate-acuminate, shorter than the petioles. *Male cymes* many-flowered pubescent, with many divergent trichotomous branches; the flowers '3 to '5 in. long, secund, sessile, pubescent; *calyx* campanulate '05 in. long. *Female cymes* trichotomous, on peduncles 1 to 1'25 in. long, and sometimes bearing small leaves. *Flowers* in threes, the middle one sessile, the two lateral pedicellate, '4 in. long. *Calyx* with a subulate bracteole at its base, about as long as the pedicel; the tube narrowly campanulate 4-grooved, densely tomentose, somewhat constricted at the base of the less hairy limb; lobes of limb 4, ovate, subacute, spreading. *Corolla* coriaceous, '3 in. long, twice as long as the calyx, outside adpressed-pubescent, inside glabrous; the tube cylindric; the mouth with 4 blunt lobes. *Anthers* 4, linear-oblong, sessile. *Style* stout, grooved by the pressure of the anthers, stigmatic lobes small. *Fruit* ellipsoid to subglobose, tetragonous, crowned by the erect calyx-lobes, densely covered with short white deciduous pubescence, '35 in. long: the placentas cruciate bearing many seeds, each enclosed in a woody pyrene. Hook. fl. Fl. Br. Ind. III. 127: Wall. Cat. 6217. *Bohea Wallichiana*, Korth in Ned. Kruidk. Arch. II. 211.—Rumph. Herb. Amb. III. 216 t. 140.

In all the provinces: common;—DISTRIB. Malay Archipelago.

Near *T. Jambosella*, but with more hairy leaves, more numerous main-nerves and hairier inflorescence. The female flowers are in small cymes instead of being solitary as in that species.

4. *TIMONIUS LAXUS*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches thicker than a crow-quill, covered with coarse

short rusty-deciduous hairs, the leaf-cicatrices bold. *Leaves* thickly membranous, narrowly elliptic-obovate, shortly acuminate, the base cuneate: upper surface dark-brown when dry, glabrous; the lower paler, minutely rusty-pubescent especially on the nerves and stout midrib; main-nerves 5 or 6 pairs, curved upwards, bold on the lower surface, slightly depressed on the upper; length 3·5 to 5 in.; breadth 1·5 to 2·25 in.: petioles ·1 to ·15 in.; stipules about ·35 in. long, triangular with long apices, the midrib rusty-pubescent. *Male cymes* on slender pubescent peduncles 1 to 2 in. long, with 2 diverging 1- to 2-flowered branches and a sessile flower at the fork. *Flowers* 3·5 in. long, those on the branches on pedicels ·3 in. long. *Calyx* cupular, subentire, less than ·1 in. long. *Corolla* thickly coriaceous, outside with dense yellowish-brown silky tomentum, inside nearly glabrous, the tube cylindrical, the mouth with 4 broad blunt lobes one-third of the length of the tube. *Female flowers* and *fruit* unknown.

PERAK: *King's Collector* 10609.

This has been collected only once and its female flowers and fruit are unknown. It appears to be near *T. Jambosella* but differs in its hairy leaves and lax, long-peduncled male cymes.

5. *TIMONIUS MALACCENSIS*, King & Gamble, n. sp. A small tree? Young branches slender, obtusely 4-angled, clothed in dense pale minute tomentum. *Leaves* membranous, broadly oblanceolate or elliptic, bluntly and shortly acuminate, narrowed to the base; upper surface glabrous, the midrib alone minutely rufous, puberulous when young, pale-brown when dry; the lower paler, reticulate, with sparse slender pale hairs, the midrib and main-nerves cinereous-tomentose; main-nerves 5 or 6 pairs, little curved, ascending; length 3·5 to 4·5 in., breadth 1·5 to 1·75 in.; petioles ·15 to ·2 in.; stipules shortly cupular the mouth with several unequal filiform processes, two being very long. *Cymes* 2 or 3 in the uppermost leaf-axils, about 6-flowered, one quarter of the length of the leaves, tomentose; their peduncles ·35 to ·6 in. long. *Flowers* densely pubescent outside, their pedicels ·05 in. long. *Calyx* tomentose, slightly more than ·1 in. long, campanulate: the mouth with 4 broad, triangular, spreading lobes. *Corolla* nearly twice as long as the calyx, salver-shaped, pubescent outside, glabrous inside except the villous throat; limb with 4 ovate-lanceolate sub-acute lobes. *Anthers* 4, sessile in the throat, short, elliptic. *Style* stout, elongate, sparsely hairy below, divided into several broad flat truncate stigmatic lobes. *Fruit* unknown.

MALACCA: (on Mount Ophir) *Ridley* 3217.

This differs notably from *T. Rumphii* in its shorter flowers and its stipules. The leaves also differ. It has been only once collected.

Erect herbs or under-shrubs; stems terete or obtusely angled with linear lines of hairs or glabrous. *Leaves* equal, usually narrow, stipules connate with the petiole to form a truncate cup often with bristles on its mouth. *Flowers* white, pink or lilac, small, dimorphous, in corymbose cymes. *Calyx-tube* ovoid or didymous; teeth 4 minute, subequal or 1 or 2 elongate, persistent. *Corolla-tube* long, its throat villous; lobes 4, valvate in bud, with the tips inflexed. *Stamens* 4, inserted on the throat; anthers linear, included or exerted. *Ovary* 2-celled: style filiform: stigma included or exerted, 2-lobed: ovules solitary in each cell, pendulous. *Fruit* globose or oblong, small, of two semi-terete or dorsally compressed indehiscent cocci. *Seeds* with membranous testa and thick funiculus; albumen fleshy; embryo axile, the cotyledons thin and the radicle superior.—DISTRIB. Species about 10: Indian, Malayan and Australian.

KNOXIA CORYMBOSA, Willd. Sp. Plant I. 582. Herbaceous, 1 to 4 feet high. *Stem* terete or obscurely 4-angled, little-branched, pubescent, tomentose or villous, never glabrous. *Leaves* membranous, pale-brown and somewhat olivaceous when dry, petiolate or sessile, narrowly elliptic, linear or ovate-lanceolate, tapered to each end, the apex acuminate; both surfaces hairy like the stems: main-nerves 5 to 9 pairs, rather straight, ascending, most prominent on the lower surface; length 1.5 to 5 in.; breadth .4 to 1 in.; petiole .2 to .4 in. or more. *Stipules* narrowly cupular, their edges with bristles .1 to .2 in. long. *Corymbs* on the end of the branches, shorter than the leaves, minutely bracteolate, trichotomous; the ultimate branches spicate when in fruit. *Flowers* .05 in. long, on peduncles shorter than themselves, white or purplish. *Calyx* ovoid, with 4 broad blunt triangular sub-equal teeth. *Corolla-tube* hairy within. *Fruit* less than .1 in. long, puberulous. W. & A. Prod. 439; Wight Ill. t. 123: Dalz & Gibs. Fl. Bomb. 111. Hook fil. Fl. Br. Ind. III. 128. *K. teres*, DC. Prod. IV. 569; Wall. Cat. 819 in part. *K. exserta*, DC. l.c. *K. umbellata*, Banks; Spreng. Syst. I. 406. *K. sumatrensis*, Wall. Cat. 6183. *K. mollis*, Br. in Wall. Cat. 820, not of W. & A. *K. stricta*, Thw. Enum. 152. *Spermacoce?* *teres* and *S. exserta*, Roxb. Hort Beng. 10; Fl. Ind. I. 367, 368: Ed. Carey & Wall. I. 373, 374. *S. sumatrensis*, Retz. Obs. IV. 23, ex Cham. & Schl. in Linnaea, III. 316 (not of Roxb. Fl. Ind. I. 336?) *Cuncea trifida*, Ham. in Don. Prodr. 135.

In all the provinces.—DISTRIB. Malayan Archipelago, British India, tropical Australia.

#### CANTHIUM, Lam.

Shrubs (sometimes climbing), unarmed or spinous, their stipules often connate. *Flowers* small, axillary, fascicled, or in corymbose, often

pedunculate, cymes; sometimes polygamous. *Calyx* with short tube and short persistent or deciduous cupular 4- or 5-toothed limb. *Corolla-tube* funnel-shaped, campanulate or urceolate, usually with a ring of deflexed hairs in the throat; limb 4-5-lobed, valvate in bud, finally reflexed. *Anthers* equal in number to the lobes of the limb, inserted in the mouth or throat of the corolla, sessile or on short filaments. *Disk* annular, tumid or depressed. *Ovary* 2-celled; style stout; stigma large, entire or bifid; ovules solitary in the loculi and pendulous. *Drupe* didymous or sub-globose or (when one of the carpels is suppressed) reniform, with 1-2 pyrenes, or a 2-celled putamen. *Seeds* pendulous, oblong, with membranous testa and fleshy albumen; embryo elongate, sub-terete; the cotyledons short and the radicle superior.—DISTRIB. About 80 species; in Asia, Africa, tropical Australia and Polynesia.

Flowers 1 in. long, solitary or in pairs, axillary ... 1. *C. pauciflorum*.

Flowers less than .5 in. long, in axillary cymes:—

Spiny straggling or scandent shrubs with more or less hairy leaves:—

Leaves rarely so much as 1.5 in. long, with 3 pairs of main-nerves, the remains of the calyx on the top of the fruit inconspicuous ... 2. *C. parvifolium*.

Leaves 2 to 3 in. long with 5 pairs of main-nerves: fruit crowned by the large calyx-tube ... 3. *C. molle*.

Unarmed trees or shrubs, glabrous or nearly so:—

Corolla-tube wide, short:—

Fruit much compressed, obovate, about .15 in. long; pyrenes not keeled: whole plant quite glabrous ... 4. *C. confertum*.

Fruit ellipsoid, smooth, obscurely 4-angled, somewhat compressed, 1 in. or more in length: pyrenes prominently keeled on the back, not warted; leaves with a few adpressed hairs on their lower surface ... 5. *C. glabrum*.

Corolla salver-shaped, the tube very narrow. Fruit much compressed, didymous, minutely velvety, .25 to 6 in. long: pyrenes warted, not keeled: leaves quite glabrous ... 6. *C. didymum*.

1. *CANTHIUM PAUCIFLORUM*, King & Gamble, n. sp. A spiny glabrous shrub 15 to 20 feet high: young branches thicker than a crow-quill, pale, terete; spines few, slender, curved, shorter than the petioles, supra-axillary. *Leaves* membranous, elliptic-ovate, shortly and somewhat obtusely acuminate, the base cuneate; both surfaces pale olivaceous-brown when dry, dull; main-nerves 4 to 5 pairs, spreading, somewhat prominent on the lower surface but evanescent at the tips, almost obsolete on the upper; length 4 or 5 in.; breadth 1.5 to 2.25 in.;

petioles .15 to .25 in.; stipules small, broadly triangular. *Flowers* about 1 in. long, solitary or in pairs on a short minutely bracteolate axillary branch. *Calyx* .2 in. long, cupular-campanulate, the mouth with 5 short broad acute teeth. *Corolla* with a wide cylindrical tube .5 in. long, having a ring of hairs inside near the base, otherwise glabrous; the limb with 5 lanceolate erect or spreading lobes half as long as the tube. *Anthers* exserted, narrowly oblong, inserted by short filaments in the glabrous throat. *Ovary* 2-celled; style exserted; stigma mitriform, oblong, 2-partite. *Fruit* nearly 1 in. long, pulpy, smooth, crowned by the large wide calyx-tube. *Plectronia pauciflora*, K. & G. MS.

PERAK: *Scortechini*, 62.

At once distinguishable by its large flowers, solitary or in pairs.

2. *CANTHIUM PARVIFOLIUM*, Roxb. Hort. Beng. 15 : Fl. Br. Ind. I. 534. A rambling spiny shrub often subscaudent or scandent; young branches thicker than a crow-quill, angled, at first densely rusty adressed-pilose, ultimately often sub-glabrous; spines supra-axillary, .05 to .2 in. in length, straight or curved, pubescent at the base, the tips glabrous and shining. *Leaves* small, subcoriaceous, greenish when dry, ovate or elliptic, acute, the base cuneate; upper surface glabrous; the lower often sparsely hairy; the three pairs of slightly curved ascending main-nerves and the midrib pubescent usually on both surfaces; length .75 to 1.5 in.; breadth .5 to .75 in.: petioles .05 to .15 in.; stipules broad and short with an acute abrupt point. *Flowers*. .2 in. long, in small axillary clusters, on short pedicels. *Calyx* cupular-truncate, entire, or minutely 4- to 5- toothed. *Corolla* several times longer than the calyx: the tube widely tubular in bud and constricted below the limb, when expanded the tube globular, glabrous outside, but with a ring of dense deflexed white hairs inside; the limb with 4 or 5 lanceolate deflexed lobes. *Anthers* partly exserted, ovate, on short filaments. *Stigma* mitriform, sulcate. *Fruit* when ripe the size of a small cherry or black currant, glabrous. DC. Prod. IV, 474. Hook. fil. Fl. Br. Ind. III, 135. *C. scandens*, Blume Bijdr. 966; DC. Prod. IV, 475. *C. horridum*, Blume Bijdr. 966; DC. Prod. IV, 474; Miq. Fl. Ind. Bat. II, 255; Hook. fil. Fl. Br. Ind. III, 135. *Plectronia parvifolia* and *P. horrida*, Kurz. For. Fl. Burm. II, 36. *Gardenia rigida*, Wall. Cat. 8257 in part. *C. zizyphinum*, Wall. Cat. 8288 A. *C. Rubiaceae*, Wall. Cat. 8288 B. *Hyptianthera rhamnoides*, Zoll. et Mor. in Zoll. Syst. Verzeichn. 60. *Dondisia horrida*, Korth. in Ned. Kruiddk. Arch. II, 236.

In all the provinces: not uncommon.

We have here reduced Blume's species *C. horridum* to the older one of

Roxburgh; for we can find no character to separate the two, the form of the spines, the size of the fruit, and the amount of pubescence hitherto relied upon being as a matter of fact inconstant.

3. *CANTHIUM MOLLE*, King & Gamble, n. sp. A straggling spiny shrub (? scandent); all parts more or less densely pale rusty-pubescent; the young branches thinner than a goose-quill, dark-brown, more or less 4-angled; spines stout, supra-axillary, much curved downwards, .2 to .6 in. long. *Leaves* thickly membranous, ovate to ovate-lanceolate, shortly acuminate, the base cuneate or rounded; main-nerves about 5 pairs, spreading, slightly prominent on the lower surface when dry, obsolete on the upper; length 2 to 3 in.; breadth .75 to 1.5 in.; petioles .15 to .2 in.; stipules broadly triangular, apiculate, very short. *Flowers* .2 in. long, on pedicels nearly as long, in small axillary cymes or on short, minutely bracteolate, sometimes leaf-bearing, axillary branches. *Calyx* small, cupular, with 5 small acute teeth. *Corolla* with a wide tube glabrous outside, but inside with a ring from the throat of long deflexed white stout hairs: the lobes of the limb about as long as the tube, narrowly oblong, glabrous, deflexed. *Anthers* sessile, shortly oblong, exerted. *Style* exerted; stigma large, ovoid-globose, ridged. *Fruit* unknown.

SINGAPORE: in the Bot. Garden Jungle; *Ridley* 2859.

4. *CANTHIUM CONFERTUM*, Korth. in Ned. Kruidk. Arch. II, 235. A shrub? everywhere glabrous; young branches rather thicker than a crow-quill, pale brown and striate when dry. *Leaves* coriaceous, olivaceous when dry, elliptic or elliptic-lanceolate, shortly and bluntly acuminate, the base narrowing into the petiole; both surfaces dull, the reticulations obsolete; main-nerves 3 (rarely 4) pairs, oblique, ascending, scrobiculate at the axils, rather faint on both surfaces; length 2.5 to 4 in.; breadth 1.25 to 1.75 in.; petioles about 3 in., winged in the upper half; stipules triangular, acuminate, much shorter than the petioles. *Cymes* sessile, shorter than the petioles, the very short axis bearing a few minute bracts and 6 or 8 flowers on pedicels .1 in. long. *Flowers* .25 in. long. *Calyx* very short and cupular, with 5 often minute teeth. *Corolla* coriaceous, rotate, the tube very short: the 5 lobes broadly triangular with thickened edges, reflexed, villous inside and bearing between the lobes 5 ovate exerted anthers on short filaments. *Style* .1 in. long, bearing a large capitate-peltate corrugated stigma. *Disk* large, thick, cushion-like. *Fruit* solitary, on a thin peduncle .15 in. long, compressed, obovate, smooth, cushion-like, glabrous. *Hook. fil. Fl. Br. Ind.* III, 133. *C. glomerulatum*, *Miq. Fl. Ind. Bat. Suppl.* 585. *Meme-cylon pauciflorum*, *Wall. Cat.* 4114.

MALACCA: *Griffith* (K.D.) 2973; *Maingay* (K. D.) 832, 942. PENANG:

Wallich, Curtis 1119, 694. SINGAPORE: Ridley 302, 358, 1895, 4124, 4893, 9421, 9518, 9857. JOHORE: King and Hullett. PAHANG: Ridley 2245. PERAK: Scortechini.

5. *CANTHIUM GLABRUM*, Blume Bijdr. 967. A small unarmed tree: young branches thinner than a goose-quill, 4-angled, pale-brown when dry, glabrous. *Leaves* thickly membranous or sub-coriaceous, elliptic or ovate-elliptic, olivaceous and dull when dry, shortly and rather abruptly acuminate, the base slightly and abruptly narrowed, or broad and rounded; upper surface glabrous, the lower with some white sub-adpressed hairs, especially by the sides of the stout midrib and larger nerves; main-nerves 6 to 8 pairs, spreading, slightly curved, inconspicuous on the upper and only slightly conspicuous on the lower surface; length 5 to 7 in.; breadth 2 to 3 in.; petiole .4 to .6 in. *Stipules* broadly triangular at the base, much acuminate, shorter than the petioles. *Cymes* many-flowered, about 1 in. in diam., on short peduncles, dichotomously branched. *Flowers* pentamerous, .15 in. long, their pedicels slightly shorter. *Calyx* shortly campanulate or cupular, the mouth undulate and with 5 small triangular teeth. *Corolla* widely tubular, constricted at the throat, the limb with 5 deep valvate broadly lanceolate acute spreading or reflexed lobes. *Anthers* ovate, on short filaments in the throat, with a line of vertically deflexed stout white hairs just below them. *Stigma* large, sub-globular, rather turbinate, corrugated. *Ovary* 5-celled. *Fruit* ellipsoid, pulpy, 4-angled (when dry) often compressed, smooth outside, the two enclosed pyrenes triangular, the inner face of each being flat, the outer faces deeply grooved so as to leave a bold central keel. DC. Prod. IV, 478: Hook. fil. Fl. Br. Ind. III, 133. *Plectronia glabra*, Kurz For. Fl. II, 35. *Vangueria? atroviridis*, Wall. Cat. 8412. *Rubiaceae*, Wall. Cat. 8303.

In all the provinces: common.

This species is easily distinguished from *C. didymum* by its short widely tubular corolla slightly constricted just below the limb, that of *C. didymum* being hypocrateriform with a narrow tube. The fruit of this is also large and quite glabrous.

6. *CANTHIUM DIDYMU*M, Gaertn. fil. Fruct. III, 94. A tree: young branches without spines, nearly as thick as a goose-quill, 4-angled, at first brown, but afterwards pale, smooth, the nodes thickened. *Leaves* thinly coriaceous, glabrous, narrowly elliptic or ovate-lanceolate, occasionally sub-orbicular, the apices sub-acute, acute or shortly and bluntly acuminate, usually much narrowed at the base, but sometimes rounded; upper surface dark-brown when dry, shining, the lower paler: main-nerves 3 to 5 pairs, slightly curved, ascending, thin but prominent on the lower surface as is the midrib, faint on the upper; length 2.5 to 6 in.; breadth 1.5 to 3.5 in.; petioles .25 to .3 in.; stipules .25 in. long,

triangular, with broad base and narrowly acuminate apex. *Cymes* subsessile or on short peduncles (.25 to 1 in. long) sometimes puberulous; branches longer than the peduncles, spreading, corymbose, crowded, many-flowered. *Flowers* about .25 in. long, on unequal slender pedicels. *Calyx* less than .1 in. long, narrowly campanulate; mouth with short acute teeth or truncate. *Corolla* salver-shaped, the throat villous: the mouth with 5 blunt oblong deflexed lobes as long as or longer than the tube. *Anthers* narrowly oblong, on filaments half their length, inserted on the throat, exserted and deflexed. *Style* glabrous; stigma subquadrate, notched or bifid. *Fruit* variable, always compressed and more or less didymous, usually somewhat obovoid or obovoid-ellipsoid, .25 to .6 in. long, minutely velvety: pyrenes with hard dark warted putamen. Roxb. Fl. Ind. I, 535: W. & A. Prodr. 425; DC. Prod. IV, 473; Wall. Cat. 8413; Hook fil. Fl. Br. Ind. III, 132; Trimen Fl. Ceyl. II, 343. *Plectronia didyma*, Kurz For. Flor. Burma. II, 35. *Psydrax dicoccos*, Gaertn. Fruct. p. 125, t. 26; DC. Prod. IV, 476. *Vangueria dicocca* Miq. Fl. Ind. Bat., II 250. *Webera cymosa*, Willd. Sp. p. 1224. *Indeterm.* Wall. Cat. 9069.

In all the provinces, very common.

The South Indian species *C. umbellatum*, Wight, Ic. 1034 is, in my opinion, only a form of this species.

#### Doubtful Species.

7. *CANTHIUM GRISEUM*, King & Gamble. A shrub? Young branches nearly as thick as a goose-quill, striate and purplish-brown when dry. *Leaves* membranous, narrowly elliptic, tapering to each end; upper surface dark, sparsely strigose when young, afterwards glabrous; lower surface cinereous with pale curved hairs, especially on the midrib and 4 or 5 pairs of rather prominent little-curved ascending main-nerve; length (when young) 2 to 2.5 in.; breadth .75 to 1.25 in.; petioles .2 to .25 in.; stipules broadly triangular, acute, much shorter than the petioles. *Flowers* .2 in. long, pedicellate, crowded on short multi-bracteolate axillary branches longer than the petioles, the pedicels .15 to .2 in. long, pubescent. *Calyx* one-third the length of the corolla, rotate, with 5 long narrow spreading lobes. *Corolla* much pointed in bud, with a short wide tube puberulous outside but densely hairy inside; the 5 lobes about as long as the tube, triangular, acuminate, sub-erect. *Anthers* sub-sessile in the tube, included, elliptic. *Stigma* large, globose, ribbed. *Fruit* unknown.

LANKAWI; *Curtis* 2804.

Only once collected. Has a strong superficial resemblance to *Vangueria spinosa* Roxb.

## 36. MESOPTERA, Hook fil.

A tree with stout terete branches and large, very coriaceous leaves: stipules large, coriaceous, unequal. *Flowers* minute, in dense ebracteolate axillary cymes shorter than the petioles. *Calyx-tube* short, hemispheric, 5-toothed. *Corolla-tube* short; throat hairy; lobes of the limb short, acute, valvate in bud. *Stamens* 5, inserted on the throat; filaments short, subulate; anthers oblong, apiculate. *Ovary* 2-celled: style short, stout; stigma capitate, 10-lobed: ovules 1 in each cell, attached to the septum. *Fruit* small, 2-celled and didymous, or 1-celled and globose, smooth: pericarp coriaceous, with a thin fleshy covering. *Seeds* cup-shaped, embracing a thick horny projection from the inner angle of the cell; testa adnate to the fleshy albumen: embryo slender, cylindric, coiled in the middle of the albumen; cotyledons short, obtuse; radicle long, superior.—A single Malayan species.

MESOPTERA MAINGAYI, Hook fil. in Benth. & Hook. fil. Gen. Plantar. II. 131; Fl. Brit. Ind. III, 137. Young branches as thick as a goose-quill, deciduously rusty-tomentose. *Leaves* elliptic or broadly ovate; shortly acuminate, smooth and shining on the upper surface, rusty-tomentose on the lower; main-nerves 5 to 7 pairs, curved, ascending, depressed on the upper, bold and prominent on the lower surface; length 7 to 9 in.; breadth 4.5 to 5.5 in. *Stipules* very unequal and obtuse, with strong parallel nerves, one obliquely oblong, 1 in. in length, the other shorter and rounded; petiole .5 in. long, very stout. *Cymes* less than .5 in. in diam. in flower, but in fruit 2.25 in. in diam. and much branched, pubescent. *Fruit* when didymous .2 to .25 in. across; when single-seeded and globular about half as much.

MALACCA: *Maingay* (K.D.) 939.

Known only from Maingay's two specimens in Herb. Kew. The above description is mainly copied from Sir Joseph Hooker's.

## 37. GARDENIOPSIS, Miq.

Shrubby or sub-arboreous, glabrous, with stout branches. *Leaves* very coriaceous, oblanceolate, many-nerved; stipules lanceolate, caducous. *Flowers* in small somewhat supra-axillary clusters without bracts or bracteoles. *Calyx* small, its tube cylindric; the limb with 5 spreading lobes. *Corolla* much larger than the calyx (1 in. or more in length); its tube widely cylindric, less than half as long as the limb; lobes of limb large, ovate, imbricate. *Stamens* 5, inserted near the base of the corolla-tube; the anthers linear, acuminate, included. *Style* short, stigma fusiform acute; ovary 2-celled with 1 ovule in each cell. *Fruit* broadly ovoid, rugulose, with 10 broad bold ridges, its sub-truncate apex

surrounded by the enlarged thickened incurved calyx-lobes, 2-celled, 2-seeded. **DISTRIB.**—One or perhaps two species, both Malayan.

**GARDENIOPSIS LONGIFOLIA**, Miq. in Ann. Mus. Lugd. Bat. IV. 250 and 262. A small tree 10 or 12 feet high: young branches as thick as a goose-quill, pale-brown. *Leaves* coriaceous, oblanceolate, gradually narrowed, in their lower three-fourths, to the stout petiole; main-nerves 15 to 20 pairs, slightly curved upwards and interarching  $\cdot 1$  in. from the slightly recurved edges, the intermediate nerves are numerous but fainter, all prominent on the lower surface and depressed on the upper; both surfaces yellowish-brown, the lower paler and reticulate, length 6 to 16 in.; breadth  $1\cdot 5$  to  $3\cdot 5$  in.; petioles  $\cdot 3$  to  $\cdot 5$  in. long; stipules narrowly lanceolate, acuminate,  $\cdot 4$  to  $\cdot 5$  in. long. *Flowers* sessile in clusters of 5 or 6; the calyx-tube about  $\cdot 1$  in. long: the limb about  $\cdot 15$  in. across, its lobes ovate. *Fruit*  $\cdot 4$  to  $\cdot 6$  in. long.

**MALACCA:** *Derry* 960. **PERAK:** *Scortechini* 1234; *Wray* 2832, 3693; *King's Collector* 2361, 2850, 6934; *Ridley* 9722. **PAHANG:** *Ridley* 2661. **NEGRI SEMBILAN:** *Ridley* 10081. **DISTRIB.**—Sumatra.

There is what appears to be a distinct species of this in Borneo (*Haviland* 3011) with longer narrower calyx-lobes and fruit  $1\cdot 25$  in. long.

### 38. WEBERA, Schreber.

Trees or shrubs with thinly coriaceous or membranous leaves drying black. *Flowers* in terminal paniculate cymes, usually on bi-bracteolate pedicels. *Calyx-tube* campanulate or urceolate, the limb 5-toothed or 5-partite. *Corolla* cylindric or narrowly funnel-shaped; its tube shorter, equal to or longer than the lobes of the limb; throat glabrous or with a line of hairs; limb 5-lobed, narrowly oblong, spreading or reflexed, twisted in bud. *Stamens* 5, linear, inserted by short filaments on the throat. *Style* short, usually pubescent; *stigma* long, spindle-shaped or ligulate, grooved, exserted. *Ovary* 2-celled, each cell with a single or at most with 2 ovules. *Fruit* baccate, with little pulp, 2-celled; each cell with a single plano-convex seed often cupped on the plane surface: testa various, albumen fleshy or horny; embryo small, cotyledons leafy. **DISTRIB.**—About 20 species, all tropical.

The genus *Webera*, as understood in Hooker's Flora of British India, is composed of two sets of plants, one with 2 or more ovules in each cell of the ovary, the other with only a single ovule in each. The former are, in that work, formed into the section *Euwebera*. In these *Materials* the same plants are described under the genus *Stylocoryna* of Cavanilles. By other authors they have been treated as a genus either under the name of *Tarenna*, Gaertner or of *Chomelia*, Linn. (not of Jacquin and Velloso). The species with single ovules in each cell are, in the Flora of British India, grouped in a section named *Pseudixora*. Here they are treated under the generic name *Webera*. The two sections, *Euwebera* and *Pseudixora*, are

thus, on account of their ovulation, removed to distant positions in the family of *Rubiaceæ*.

Lobes of the corolla longer than its tube:—

Apices of the corolla-lobes acuminate, reflexed in bud and forming a stem at the apex of the flower-bud: fruit ovoid ... ..

1. *W. stellulata*.

Apices of the corolla-lobes not linear or reflexed in bud; fruit globular:—

Lobes of corolla with ciliate margins; calyx .25 in. long, its lobes large, oblong-lanceolate, acuminate ... ..

2. *W. Ridleyi*.

Lobes of corolla glabrous; calyx .15 in. long, its lobes broadly triangular, acute:—

Leaves 5 to 8 in. long, with 8 to 10 pairs of nerves ... ..

3. *W. Wallichii*.

Leaves 2.5 to 3.5 in. long, with 5 or 6 pairs of nerves ... ..

4. *W. Curtisii*.

Lobes of the corolla and its tube of equal length ...

5. *W. odorata*.

Lobes of the corolla shorter than its tube:—

Cymes trichotomously paniced, on peduncles several inches in length:—

Calyx a little over .1 in. long, the limb with 5 short blunt teeth; leaves glabrous with 8 to 10 pairs of nerves ... ..

6. *W. grandifolia*.

Calyx .15 in. long, the limb with 5 deeply linear lobes as long as its tube; leaves puberulous beneath, with 8 to 16 pairs of nerves ... ..

7. *W. longifolia*.

Cymes condensed, with very short peduncles:—

Leaves glabrous and with 16 to 18 pairs of sub-horizontal nerves; lobes of calyx linear-lanceolate, longer than the tube ... ..

8. *W. Wrayi*.

Leaves with scattered adpressed hairs on the under surface, especially on the midrib and 8 to 10 pairs of nerves; lobes of calyx less than half as long as its tube, triangular, sub-acute ... ..

9. *W. Yappii*.

1. *WEBERA STELLULATA*, Hook. fil. Fl. Br. Ind. III. 104. A shrub: young branches much thinner than a goose-quill, dark-coloured, subterete, glabrous. *Leaves* thinly coriaceous, oblong-elliptic to elliptic, shortly acuminate at the apex, cuneate at the base, upper surface glabrous, shining, very dark when dry, the midrib and nerves depressed; the lower paler and dull, sometimes puberulous when young, but usually glabrous; main-nerves 7 to 10 pairs, rather faint, curved, ascending: length 4.5 to 9 in.; breadth 1.5 to 2.5 in.; petiole .25 to .4 in.; stipules ovate, acuminate, .15 in. long. *Cymes* (including the short peduncle) 1 to 1.5 in. long, terminal, solitary, at first puberulous, afterwards glabrous, trichotomous, rather few-flowered; the bracteoles

linear-lanceolate, persistent. *Flower-pedicels* shorter than the calyx, bracteolate. *Calyx* about .15 in. long, narrowly campanulate, cut about half-way down into 5 acute triangular lobes. *Corolla* .4 in. long; the tube cylindric, only .1 in. long; the limb .3 in. long, its lobes imbricate, oblong, acuminate with free reflexed linear points; throat slightly hairy. *Anthers* linear, acuminate, on short filaments, included. *Ovary* with two 1-ovuled cells; *style* much shorter than the fusiform hairy included stigma. *Fruit* broadly ovoid or sub-globular, crowned by the calyx-lobes, glabrous, 4 in. long. *Seeds* 2. *Stylocoryne Webera*, Wall. Cat. 840 I (*in part*). *Pavetta aristata*, Wall. Cat. 6169.

PENANG: *Wallich*. MALACCA: *Griffith* (K.D.) 3086; *Maingay* (K.D.) 850. SELANGOR: *Ridley*, 10220. PERAK: *King's Collector*, 973, 4309, 5951, 6169, 10228; *Wray*, 458, 1094, 3745.

Some of the specimens of this have the leaves of a pale olivaceous-brown colour (when dry), contrasting in this respect strongly in colour with the majority which are very dark. The species is well-marked by its corolla, the tube of which is only one-quarter as long as the oblong lobes of the limb, while the five linear points of the latter are reflexed and form a kind of star at the apex of the flower-buds. The lobes do not appear to expand, for in all the specimens I have seen they remain convolute.

2. WEBERA RIDLEYI H.H.W. Pearson MSS. in Herb. Kew. A low glabrous shrub; young branches pale-brown, obtusely 4-angled. *Leaves* thinly coriaceous, narrowly elliptic, acute or shortly acuminate, the base cuncate; both surfaces olivaceous-brown, shining (especially the upper) when dry, main-nerves 10 to 14 pairs, curved, spreading, faint but distinct on both surfaces; length 5.5 to 7 in.; breadth 2 to 3 in.; petioles .4 to .7 in.; stipules broadly triangular, acute, about .2 in. long. *Cymes* several together, terminal, in short pedicels, trichotomous, few-flowered; the branchlets angled and with a few permanent boat-shaped acute bracteoles. *Flower pedicels* about as long as the calyx, bibracteolate near the apex. *Calyx* .25 to .3 in. long, campanulate, the limb as long as the tube, deeply divided into 5 oblong-lanceolate acuminate lobes. *Corolla* not much longer than the calyx; the tube short; the limb three times longer and deeply divided into 5 oblong, acute, contorted lobes with ciliate margins. *Anthers* 5, inserted on the throat in a band of hair. *Ovary* with two uni-ovulate cells; *style* very short: stigma fusiform, sulcate, glabrous. *Fruit* fusiform, glabrous, the calyx-scar apiculate.

SINGAPORE: at Chan Chu Kang, *Ridley*, 6147. JOHORE: *King*, 602, PERAK: *King's Collector*, 4585, 4615.

Only once collected and not in fruit; flowers white. A species near *W. Wallichii* but with longer corolla lobes ciliate at the margin.

3. *WEBERA WALLICHII*, Hook fil. Fl. Br. Ind. III. 105. A shrub 4 to 8 feet high, glabrous except the branches of the inflorescence and the calyx: young branches thinner than a goose-quill, usually dark-coloured, obscurely 4-angled. *Leaves* membranous, oblong-elliptic, oblong, or elliptic, rarely oblanceolate, the apex shortly acuminate, the base cuneate; both surfaces more or less darkly olivaceous when dry, the midrib rather bold; main-nerves 8 to 10 pairs, slightly curved, ascending, thin and only slightly prominent; length 5 to 8 in.; breadth 2 to 2·75 in., petiole ·4 to ·6 in. *Stipules* broadly triangular, acuminate, ·25 in. long. *Panicles* terminal, much branched, shortly pedunculate, about 1·25 to 2·5 in. long including the peduncle, and equally broad branches and their divisions puberulous, cymose; bracteoles triangular acute, about 1 in. long. *Flowers* ·4 to ·6 in. long, on compressed pedicels longer than the calyx. *Calyx* ·15 in. long, bracteolate (often bibracteolate) at the base, shortly campanulate, with 5 broadly triangular acute teeth, puberulous externally. *Corolla* ·45 in. long, glabrous, salver-shaped, the short tube with a belt of hair inside: the lobes linear-lanceolate, longer than the tube, reflexed. *Anthers* 5, exserted, linear-oblong, the apex sub-acute, the base blunt and prolonged beyond the attachment to the short filament. *Style* cylindrical, hairy in the middle: stigma as long as the style, compressed, exserted. *Fruit* fusiform, glabrous, reticulate when dry, shining, not ridged, crowned by the small calyx, ·4 in. long and ·3 in. in diam. *Seeds* 2. *Stylocoryne Webera*, Wall. Cat. 840, I (for the most part). *Pavetta weberæfolia*, Wall. Cat. 6182 A, in part B.

MALACCA: *Griffith* (K.D.) 3084, 3004; *Maingay* (K.D.) 851. PERAK: *Wray*, 3745; *King's Collector*, 1932, 2516, 2921, 2794, 5032, 5957, 10228; *Scortechini*, 429.

4. *WEBERA CURTISII*, King, n. sp. A small shrub; all parts glabrous except the cinereous-puberulous inflorescence. *Leaves* coriaceous, narrowly elliptic, shortly acuminate, the base cuneate; both surfaces drying dark olivaceous-brown, the lower paler; main-nerves 5 or 6 pairs, rather straight, ascending: length 2·5 to 3·5 in.; breadth ·9 to 1·35 in. petiole ·15 to ·3 in.; stipules ovate or ovate-lanceolate, much acuminate. *Cymes* terminal, sub-sessile, only about 1 in. in diam. each way, trichotomous, few-flowered, the short branches and the flower-pedicels cinereous-puberulous, angled; pedicels slightly longer than the calyx; *Calyx* ·1 in. long, campanulate; the limb with 5 acute triangular erect lobes. *Corolla-tube* widely cylindrical, not much exceeding the calyx, and about one-third of the length of the 5 imbricate, oblong, blunt, reflexed lobes of the limb. *Style* shorter than the lobes of the limb, but exserted on account of their reflexion; clavate, grooved. *Ovary* 2-celled: cells each with a single ovule. *Fruit* globular, crowned by the small

calyx-scar, glabrous, .2 in. in diam. when dry. *Seeds* 2, plano-convex, the plane surface with a large pit.

KEDAH: *Curtis*, 2545, 2546. LANGKAWI: *Curtis*, 2805. PERAK: *Wray*, 3612.

5. WEBERA ODORATA Roxb., Hort. Beng. 15: Fl. Ind. I, 699. A short shrub 6 to 10 feet high; young branches cinereous, sub-terete, *Leaves* membranous oblong-elliptic (often narrowly so), shortly acuminate, the base much narrowed; both surfaces dull, glabrous, the lower pubescent in *var.*, deep olivaceous when dry: main-nerves 8 or 9 pairs, faint, little curved, ascending or spreading, length 5 to 8 in.; breadth 1.5 to 3 in.; petiole .4 to .8 in.; stipules triangular, acuminate, much shorter than the petioles. *Cymes* large terminal, paniculate, trichotomous, lax, 5 or 6 inches wide and equally long, spreading; the peduncles and branches long and slender, 4-angled, cinereous-pubescent: bracteoles linear, persistent. *Flower-pedicels* as long as or longer than the flowers, pubescent. *Calyx* urceolate-campanulate, about .1 in. long; the teeth shorter than the tube, lanceolate. *Corolla-tube* slender, cylindrical, .25 in. long, the lobes imbricate, clavate in bud, about the same length, narrowly oblong, acute, sub-falcate, reflexed, their upper surfaces glabrous. *Ovary* 2-celled, each cell with 2 ovules; *stigma* exserted, clavate-subulate. *Fruit* the size of a large pea, 2-celled, 2-seeded. Hook fil. Fl. Br. Ind. III, 102. *W. macrophylla*, Roxb. l.c. 697. *Pavetta weberæfolia*, Br. in Wall. Cat. 6182 A, in part. *P. cerberæfolia*, Miq. Fl. Ind. Bat. II, 279. *Stylocoryne Webera* Wall. Cat. 8401. *S. penangensis*, Miq. l.c. 207. *Cupia macrophylla* DC. Prod. IV, 394.

PENANG: *Wallich*. PERAK: *King's Collector* 3121, 3807, 4236; *Wray* 1147.

VAR. *pubescens*, King; lower surfaces of leaves pubescent.

PERAK: at 3400 feet: *Wray*, 474.

6. WEBERA GRANDIFOLIA, Hook. fil. Fl. Br. Ind. III. 105. A shrub or small tree: young panicles obtusely 4-angled, deciduously and minutely rusty-pubescent. *Leaves* thinly coriaceous, elliptic to elliptic-oblong or oblong-ob lanceolate, shortly and often abruptly acuminate, much narrowed at the base: both surfaces (when dry) brown, tinged with olivaceous, the lower slightly the paler, quite glabrous; main-nerves 8 to 12 (rarely as many as 16) pairs, thin but distinct on both surfaces, spreading, curved: length 5 to 10 (rarely 12) in.; breadth 2 to 4 in.; petiole .4 to .75 in.; stipules broadly ovate, shortly acuminate, .2 to .3 in. long. *Cymes* as in *W. longifolia*, but on shorter peduncles and with fewer bracteoles. *Calyx* slightly more than .1 in. long, flask-shaped, the limb with 5 short blunt teeth. *Flowers* as in *W. longifolia*, but slightly

shorter, and more obovate in bud; fruit as in *W. longifolia*. *Ixora grandifolia*, Br. in Wall. Cat. 6134.

MALACCA: Griffith (K.D.) 2796; Maingay (K.D.) 854. SINGAPORE; Wallich; Ridley 1800, 3764, 10411, 10852. PERAK: Wray 3001, 3377; Ridley 5557; King's Collector 763. JOHORE: Ridley, 11167.

7. WEBERA LONGIFOLIA, Hook. fil. Fl. Br. Ind. III, 105. A shrub, young branches thinner than a goose-quill, obtusely 4-angled, deciduously rusty-puberulous. Leaves thinly coriaceous, oblanceolate, elliptic-oblong or elliptic-lanceolate, shortly acuminate, narrowed from the middle or above it to the short petiole; both surfaces drying olivaceous-brown; the upper glabrous and shining, the lower deciduously cinereous-puberulous, main-nerves 8 to 16 pairs, spreading, slightly prominent on the lower surface, faint on the upper, length 6 to 12 in.: breadth 2 to 3 in.: petiole 4 to 1 in.; stipules ovate, much acuminate, hairy, about 3 in. long. Cymes erect, terminal, paniculate, trichotomous, on rusty-pubescent obtusely 4-angled peduncles several inches (sometimes 9 or 10) in length: ultimate branchlets crowded: the flower-pedicels each with 2 linear bracteoles at its base. Calyx 15 in. long, narrowly campanulate, divided into 5 deep linear hairy lobes as long as the tube. Corolla pubescent, about 65 in. long; the tube cylindric, more than twice as long as the oblong obtuse lobes. Style exserted. Ovary 2-celled, each cell with one ovule. Fruit globular, glabrous, 4 in. in diam. (when dry), crowned by the long linear calyx-lobes. *Ixora longifolia*, G. Don. Gen. Syst. III, 573. *I. macrophylla* Br. in Wall. Cat. 6165 (not of Bartl.). *Pavetta longifolia*, Miq. Fl. Ind. Bat. II, 275.

PENANG: Wallich, Phillips; Ridley, 9395; Curtis 947, 1144. PERAK: King's Collector, 2737, 3825, 6220, 6632, 10662; Wray, 2081, 2864, 2885; Scortechini, 228; Ridley, 2920. JOHORE: Ridley, 11166.

8. WEBERA WRAYI King, n. sp. Glabrous, except the inflorescence: young branches 4-angled, thinner than a goose-quill. Leaves thinly coriaceous, large, oblong-elliptic, shortly acuminate, cuneate at the base; both surfaces blackish-olivaceous when dry, shining, the midrib conspicuous on both, channelled on the upper; main-nerves 16 to 18 pairs, spreading, sub-horizontal, faintly visible on both surfaces; length 9 to 11 in. long; breadth 2.5 to 3.5 in.; petiole 5 in. long, narrowly winged above. Cymes terminal, umbellately paniced, about 1.25 in. long and broad; the branches few, pubescent, slender, angled, few-flowered, the bracteoles minute: pedicels shorter than the calyx, pubescent, bracteolate. Calyx 15 in. long, narrowly campanulate, the teeth linear-lanceolate, pubescent, erect, longer than the tube. Corolla narrowly funnel-shaped, puberulous outside, 35 in. long: lobes linear-oblong, blunt, about a third of the length of the tube. Stigma narrowly clavate, exserted,

glabrous. *Fruit* depressed globular, smooth, shining, black when dry, crowned by the small calyx-scar, .4 in. in diam. and .25 in. long. *Seeds* 2, plano-convex with a depression on the plane side.

PERAK: *Scortechini*; *Wray*, 2477.

9. *WEBERA YAPPII*, King, n. sp. Young branches thinner than a goose-quill, pale-brown when dry, glabrous. *Leaves* membranous, narrowly oblong-elliptic, acuminate, the base cuneate, both surfaces olivaceous when dry, the upper quite glabrous, the midrib slightly channelled; the lower paler, glabrous but for a few scattered adpressed pale hairs chiefly along the prominent midrib and 9 or 10 pairs of curved ascending distinct nerves: length 5 to 7 in.; breadth 1.5 to 1.75 in.; petioles .3 to .5 in.; stipules broadly lanceolate-oblong, blunt, shorter than the petiole. *Cyme* on a short peduncle, terminal, paniculate, condensed, about 2.5 in. in diam., its branches pubescent; bracteoles few, linear. *Flower-pedicels* about as long as the calyx. *Calyx* .1 in. long, narrowly campanulate, pubescent; its 5 lobes less than half as long as the tube, triangular, sub-acute, rusty-pubescent. *Corolla-tube* narrowly infundibuliform, about .4 in. long, pubescent; the 5 blunt oblong lobes of the limb imbricate in bud, reflexed where expanded, glabrous. *Style* short; stigma slightly exerted, ligulate. *Fruit* the size of a small pea, glabrous. *Seeds* 2, plano-convex.

PERAK: *Yapp*. 482; *Wray* 10.

### 39. *IXORA*, Linn.

Shrubs or small trees with terete branches. *Leaves* opposite, rarely in whorls of three, often coriaceous, rarely sessile. *Stipules* interpetiolar, often with broad bases and acuminate or linear apices, deciduous or persistent. *Flowers* in terminal trichotomously branched, often corymbose *cymes*, each bi-bracteolate, rarely 5-merous. *Calyx-tube* campanulate, often narrowly so; the limb 4-toothed, persistent. *Corolla* salver-shaped: the tube narrowly cylindric much longer than the calyx, rarely widened towards the apex, the throat naked or hairy; the limb with 4, rarely 5 spreading or reflexed lobes, twisted in bud. *Stamens* as many as the corolla-lobes, and inserted on its mouth by short filaments or sessile; anthers linear or oblong usually acuminate, the base bifid, dorsifixed, erect, more or less exerted. *Ovary* 2-celled. *Style* filiform, exerted but never twice as long as the corolla-tube. *Stigma* slender, fusiform before expansion, after expansion its two arms curved and divergent; ovules solitary, peltately attached to the septum of each cell: micropyle inferior. *Fruit* globose or didymous, with 2 plano-convex or ventrally concave coriaceous pyrenes. *Seeds* of the same shape as the pyrenes; testa membranous; albumen cartilaginous;

embryo curved; cotyledons foliaceous; radicle inferior.—DISTRIB. Species about 110; mostly tropical Asiatic and African.

Lobes of the calyx as long as, or longer than, its tube :—

Leaves hairy beneath :—

Calyx-lobes narrowly lanceolate, acuminate ... 1. *I. Brunonis*.

Leaves everywhere glabrous :—

Calyx-lobes broadly lanceolate, acute, unequal ... 2. *I. merguensis*.

Calyx-lobes broad, blunt, unequal; bracts not covering the calyces ... 3. *I. Kingstoni*.

Calyx-lobes ovate, obtuse, puberulous; bracts longer than the calyces and covering them ... 4. *I. multibracteata*.

Calyx-lobes narrowly lanceolate, about as long as the tube ... 5. *I. arguta*.

Lobes of the calyx shorter than its tube :—

Lobes acute :—

Tube of corolla 1 to 1.25 in. long :—

Leaves sessile, cordate at the base, 2 to 3 in.

long ... 6. *I. coccinea*.

Leaves elliptic to oblong-elliptic, not cordate, 6 to 9 in. long; their petioles .3 to .5 in.

long ... 7. *I. congesta*.

Tube of the corolla .25 to .3 in. long :—

Leaves oblong-elliptic, shortly petiolate, 3.5 to 5 in. long; cymes with many divergent branches 8. *I. undulata*.

Lobes blunt :—

Tube of corolla 1 to 1.25 in. long :—

Cymes pendulous on long slender peduncles 9. *I. pendula*.

Cymes not pendulous; peduncles 1 to 2 in. long :—

Main-nerves of leaves 15 to 20 pairs ... 10. *I. opaca*.

Main-nerves of leaves 8 to 12 pairs ... 17. *I. grandifolia*, var. *Kurziana*.

Tube of corolla 1 to 1.75 in. long :—

Cymes lax, spreading, leaves petiolate, acute at the base; branching shrubs (often tall) :—

Leaves thinly membranous, their main-nerves 15 to 25 pairs ... 11. *I. Lobbii*.

Leaves coriaceous, their main-nerves 10 to 12 pairs ... 12. *I. fulgens*.

Cymes not spreading, simple unbranched shrubs

1 or 2 feet high; leaves sessile, oblanceolate, cordate at the base :—

Main-nerves of leaves 15 to 18 pairs ... 13. *I. humilis*.

Main-nerves of leaves 8 to 10 pairs ... 14. *I. Scortechinii*.

Tube of corolla .8 in. long; cymes dense, 2 to 3 in.

in diam. ... 15. *I. stricta*.

- Tube of corolla .4 in. long; cymes lax, slightly branched, 1 to 1.5 in. long ... .. 16. *I. continna*.  
 Tube of corolla .2 to .4 in. long:—  
 Cymes 2 to 4 in. across, branched, spreading:—  
 Leaves coriaceous: cymes branched from the base ... .. 17. *I. grandifolia*.  
 Leaves membranous; cymes on long slender naked peduncles 3 to 4 in. long ... 18. *I. diversifolia*.

1. *IXORA BRUNONIS*, Wall. Cat. 6136. A shrub; young branches thicker than a crow-quill, covered with short cinereous-brown tomentum. *Leaves* thinly membranous, sessile, oblanceolate, sometimes sub-panduriform, shortly caudate-acuminate, tapering much to the rounded or minutely cordate base; upper surface with the interspaces shining and glabrous, the depressed midrib and 10 to 12 pairs of rather faint curved ascending main-nerves minutely tomentose; lower surface with minute spreading pubescence especially on the prominent midrib, main-nerves and reticulations, length 5 to 10 in.; breadth 1.5 to 2.25 in.; stipules with broad ovate bases with stout midribs, and long thin linear apical tails, length (including the tails) .5 in. *Cymes* about 1.5 in. long, 12- to 20-flowered, on short tomentose peduncles, 4 to 6 collected in corymbs on the apices of the branches, their bracteoles filiform and hairy. *Flowers* sessile; calyx .15 to .2 in. long, narrowly campanulate, the 4 teeth narrowly lanceolate, acuminate, as long as the tube. *Corolla* 1 to 1.5 in. long, externally with long cinereous spreading deciduous hairs, ultimately nearly glabrous; the tube very narrowly cylindric, glabrous and ridged inside, the throat hairy: limb .5 in. across, its lobes 4, oblonge-elliptic, acute, spreading or reflexed, quite glabrous on the upper surface, sparsely hairy on the lower. *Anthers* elongate, narrow, acuminate, deflexed, longer than their filaments. *Stigma* slender, slightly exserted. *Fruit* ovoid, puberulous, .35 in. long, and .25 in. in diam. when dry. G. Don Gen. Syst. III. 573; Kurz Flora Burm. II. 20; Hook fl. Fl. Br. Ind. III. 139. *Pavetta Brunonis*, Miq. Fl. Ind. Bat. II, 270 (not of Wight Icon.)

PENANG: Wallich, (6136); Phillips; Ridley, 7682. PERAK: Wray, 3478, 3524; King's Collector, 1658. SINGAPORE: Lobb. MALACCA: Main-gay (K.D.) 858. DISTRIB. Burma; Wall. Cat. 8447.

2. *IXORA MERGUENSIS*, Hook fl. Fl. Br. Ind. III. 140. A robust shrub only 2 or 3 feet high, glabrous; stem as thick as a swan's-quill, compressed, cinereous. *Leaves* large, coriaceous, elliptic-oblong or obovate, abruptly and shortly acuminate, the base very cuneate: both surfaces olivaceous and dull; when dry the lower paler and reticulate; main-nerves 10 to 14 pairs, slender, slightly curving upwards; length 7 to 12 in.; breadth 2.25 to 4 in.; petioles .5 to 1 in., stout, channelled. *Cyme*

globose, sub-sessile, terminal, with numerous very short branches, about 3 in. in diam., dense, many-flowered, pedicellate, each flower with a lanceolate small bract. *Calyx* .15 in. long, campanulate, the 4 lobes of the limb unequal, broadly lanceolate, acute, somewhat longer than the tube. *Corolla-tube* puberulous, .6 in. long, cylindric, narrow below, somewhat wider above; the limb .6 in. across; its lobes oblong, broad, blunt, spreading, the throat with a few hairs. *Anthers* sub-sessile, narrow, apiculate. *Fruit* unknown.

MALAY PENINSULA: *Griffith* (K.D.) 3003. PUNGAH: *Curtis*, 2961.  
PERAK: *Wray*, 3543?

Mr. Curtis has sent from Pungah two specimens bearing the number 2961, one in Herb Kew and the other in Herb. Calcutta. The one in Herb. Calcutta is typical *I. merguensis*; that in Kew forms the variety described below.

VAR. *Curtisii*, King & Gamble; *leaves* narrowly elliptic-oblong, not at all obovate; nerves about 14 pairs, curving upwards, distinct on both surfaces; length 14 in.; breadth 4.25. *Corolla-tube* about .8 in. long, cylindric, widening upwards, puberulous; its limb nearly 1 in. across; the lobes ovate-lanceolate, sub-acute, the throat hairy.

PUNGAH: *Curtis*, 2961.

3. IXORA KINGSTON, Hook. fil. Fl. Br. Ind. III, 140. A shrub or small tree: young branches as thick as a duck's quill, terete, smooth and dark-coloured when dry. *Leaves* thinly membranous, shining and of a pale warm-brown colour when dry; glabrous, oblong or elliptic-oblong, sometimes oblanceolate, the apex with a short usually blunt point, tapered from below the middle to the short petiole; the reticulations slender; main-nerves 15 to 18 pairs, slender, spreading; length 5 to 9 in.; breadth 2 to 3 in.: petiole .4 to .5 in. channelled; stipules semilunar, broad but only about .1 to .15 in. long, the apex bearing a short bristle. *Cymes* 4 to 6, in a dense terminal corymbose panicle 3 or 4 in. in diam., each on a puberulous bracteate peduncle about .5 in. long (longer in fruit) and bearing numerous bibracteolate flowers, the bracts and pairs of bracteoles ovate-lanceolate, subcoriaceous, sub-acute, more or less persistent. *Flowers* 4-merous, sessile, crowded. *Calyx* .2 to .3 in. long; the tube short, narrow; the limb with 4 large deep broad blunt lobes longer than the tube, one usually longer than the other 3 and resembling the bracts and bracteoles in texture. *Corolla-tube* 1 to 1.25 in. long, slender, cylindric, glabrous; the limb .5 to .6 in. across, the lobes broadly obovate, obtuse, spreading. *Anthers* narrow, apiculate, reflexed, longer than their filaments. *Stigma* slightly exserted, small. *Fruit* ovoid, puberulous, crowned by the persistent calyx-lobes; length (including calyx-lobes) .7 in.: diameter .3 to .4 in (when dry).

MALACCA: *Griffith* (K.D.) 2996; *Goodenough*, 1271. PERAK: *Scortechini*, 2030; *Wray*, 626; *King's Collector*, 733, 871, 920, 932, 2540, 3167, 4200, 5972. SELANGOR: *Ridley*, 3674, 7300; *Curtis*, 2346. JOHORE: *Curtis*.—DISTRIB. Andaman Islands.

The corolla, according to *Kunstler*, is yellowish-red. The Andamanese specimens look slightly different, and may belong to a new species. Fruit of the Andaman plant is wanting.

4. *IXORA MULTIBRACTEATA*, H. H. W. Pearson in *Kew Bull.* ed. A bush or small tree, all parts glabrous except the inflorescence; young branches thinner than a goose-quill, somewhat compressed, pale when dry. *Leaves* membranous, pale yellowish-green when dry, oblong-ob lanceolate to oblong-elliptic, shortly and bluntly acuminate, much narrowed to the base; both surfaces finely reticulate, main-nerves 10 to 16 pairs, slightly curved, spreading, faint on both surfaces; length 5 to 9 in.; breadth 1.5 to 3 in.; petiole .3 to .6 in.; stipules cupular, only about .1 to .15 in. long, shortly apiculate. *Cymes* axillary and terminal, from 2.5 to 5 in. in diam. with many spreading ridged glabrous branches, and a peduncle less than 1 in. long; bracts at the bases of the branchlets broad, blunt, from .2 to .3 in. long; ultimate branchlets with numerous imbricate ovate-triangular sub-cordate obtuse puberulous 1-nerved bracts .2 in. long at their bases, and 3 to 5 flowers nearly 1.5 in. in length; flower bracteoles ovate-obtuse, nerved, about .15 in. long. *Calyx* sessile, about .25 in. long, puberulous, its lobes 4, ovate, obtuse. *Corolla-tube* puberulous outside, glabrous within, narrowly cylindrical, 1 in. to 1.25 in. long: its limb nearly .5 in. across: the 4 lobes oblong, blunt, glabrous. *Anthers* longer than the very short filaments, narrowly oblong, short, apiculate, the base sagittate. *Fruit* unknown.

MALACCA: *Maingay* (K. D.) 856. PUNGAH: *Curtis* 2954. LANKAWI: *Curtis* 3408. ANDAMANS: *Helper* (K. D.) 2997. PERAK: *Scortechini*; *Wray* 3317. QUEDA: *Ridley* 5540.

A species allied to *I. Kingstoni*, Hook. fil., but with less membranous leaves. It is readily distinguished by the numerous bracteoles at the bases of the flowers and by the large imbricate bracts at the bases of the ultimate branchlets.

5. *IXORA ARGUTA*, Br. in *Wall Cat.* 6157. A tree; all parts except the inflorescence glabrous; young branches much thinner than a goose-quill, obtusely 4-angled, glabrous, dark-coloured. *Leaves* thinly coriaceous, broadly oblanceolate, rarely obovate or elliptic, rather abruptly and shortly acuminate, the base much narrowed, both surfaces drying very dark-brown, almost concolorous, shining; main-nerves 6 or 7 pairs, curved, spreading, faint on both surfaces; length 3.5 to 6 in.; breadth 1.5 to 2.25 in.; petiole .2 to .4 in.; stipules lanceolate, linear-acuminate,

shorter than the petiole. *Cymes* solitary, terminal on peduncles 1·9 to 3 in. long, spreading, trichotomous, many-flowered, the bracteoles linear, persistent. *Flower-pedicels* shorter than the narrowly campanulate calyx. *Calyx* less than 1 in. long, narrowly campanulate, its 4 or 5 narrowly lanceolate acute teeth as long as the tube, erect. *Corolla-tube* narrowly cylindrical, 4 or 5 in. long: the limb with 5 oblong apiculate lobes 2 in. long. *Stigma* narrowly fusiform (before the expansion of its lobes), slightly exserted. *Fruit* like a small pea if one-seeded; broader and with two vertical grooves if two-seeded, crowned by the small scar of the calyx, glabrous, smooth. *I. nigricans*, Hook. fil. Fl. Br. Ind. III. 149, var. *arguta*. *I. nigricans*, Wall. Cat. 6154 B. and C. only.

PERAK: *Wray* 2135, *Curtis* 1303, 980; *Kings Collector* 684, 870, 2072, 4286, 4573, 4966, 8718, 10269, 10658, 10901; *Scortechini*. KEDAH: *Ridley* 8299. SELANGOR: *Ridley* 8240. WELLESLEY: *Ridley* 7013; *Curtis*, 2451, 3206. MALACCA: *Maingay* (K.D.) 859.

The type specimens of this in the Wallichian Catalogue consist of two sheets distinguished by the letters A and B. The former was received from Herb. Heyne, and is therefore supposed to have come from Southern India. Sheet B is attributed to Penang. What appears to be the same plant but with somewhat broader leaves also forms B and C of No. 6154 which was distributed under the name *I. nigricans*, R. Br. Under this name (*I. nigricans*, R. Br.) there were unfortunately issued by Wallich two other plants lettered respectively 6154 A and D. These two not only differ from B and C, but also from each other. The name has however been adopted in the Flora of British India and the Wallichian No. 6154, without distinction of letters, has been taken as its basis. As the simplest solution of the confusion which has thus arisen, I have ventured to restore the MSS. name *I. arguta*, R. Br. for the plant—a common one in all the provinces—above described.

6. *IXORA COCCINEA* Linn. Sp. Pl. 159 (excl. syn.) A much branched shrub, the smaller branches of the cymes and the calyces puberulous, otherwise quite glabrous; young branches thinner than a goose-quill, pale. *Leaves* coriaceous, pale when dry, broadly ovate or elliptic, sessile, the base cordate and stem-clasping or slightly narrowed; the apices sub-acute or blunt and mucronate; nervation indistinct when dry; length 2 to 3 in.; breadth 1·25 to 1·75 in.; stipules narrowly semilunar with long straight linear stiff apices. *Cymes* several together, at the apices of the branches, each on a short peduncle, minutely bracteate and bracteolate; *calyx* less than 1 in. long, puberulous cylindrical, with 4 acute teeth shorter than the tube. *Corolla-tube* 1·25 to 1·5 in. long, narrowly cylindrical; the 4 lobes of the limb broad, acute, spreading, 25 in. long. *Fruit* fusiform, sometimes pulpy. Roxb. Fl. Ind. I, 375; W. & A. Prod. Fl. Pen. Ind. 427; Wight Icon. 153; Brand. For. Flora 275; Kurz. For. Flora, Burma II, 26; Hook. fil. Fl. Br. Ind.

III, 145. *I. grandiflora*, Br. in Bot. Reg. t. 154; DC. Prod. IV, 486. Wight in Hook. Bot. Misc. III. Suppl. t. 35. *I. propinqua*, Br. in Wall. Cat. 6119. *I. incarnata*, DC. Prod. l.c. *I. obovata*, Heyne in Roth Nov. Spec. 90. *I. Bandhuca*, Roxb. Hort. Beng. 10; Fl. Ind. I. 376; Wall. Cat. 6120; DC. Prod. l.c.; Wight Ic. 149. *Pavetta coccinea* and *P. incarnata*, Blume Bijdr. 950. *P. Bandhuca*, Miq. Fl. Ind. Bat. II, 266.

In most of the provinces; cultivated on account of its brilliant scarlet flowers.

7. *IXORA CONGESTA*, Roxb. Fl. Ind. I 387. A shrub, glabrous except the smaller branches of the cymes; young branches half as thick as a goose-quill, dark-coloured. *Leaves* thinly coriaceous, elliptic to oblong, elliptic, sub-acute or shortly and bluntly acuminate, the base rounded or cuneate; both surfaces brown when dry and rather dull, the lower paler; main-nerves 12 to 20 pairs, spreading and interarching at the tips, depressed on the upper and prominent on the lower surface; length 6 to 9 in.; breadth 2.25 to 4 in.; petioles .3 to .5 in.; stipules .15 in long, broad, shortly cuspidate. *Cyme* terminal, corymbiform, trichotomous on a short peduncle, 2.5 to 4 in. long (including the peduncle) and rather more in diam., condensed, the branches many-flowered. *Calyx* sessile or on a short pedicel, less than .1 in. long, with 4 triangular acute teeth shorter than the tube. *Corolla-tube* 1.25 to 1.5 in. long, narrowly cylindrical; its limb .5 or .6 in. across, its 4 lobes spreading or reflexed, ovate-lanceolate, blunt or sub-acute, .25 to .3 in. long; *stigma* slender, slightly exserted. *Fruit* compressed, fusiform, with 2 vertical grooves, glabrous. DC. Prod. IV, 486; Wall. Cat. 6138. Hook. fil. Fl. Br. Ind. III, 146. *I. Griffithi*, Hook. Bot. Mag. t. 4325. *I. fulgens*, Wall. Cat. 6512 B. *Pavetta congesta*, Miq. Fl. Ind. Bat. II, 269.

SINGAPORE: Lobb; Anderson 92; Ridley 5674, 6911. JOHORE: King, Ridley 4168. MALACCA: Griffith (K.D.) 2984; Maingay (K.D.) 848; 848-2; Ridley 5675, 6911; Derry 8; Goodenough 1967. PENANG: Wallich; King; Curtis 1729, 1730, 2265, 2975. PERAK: Scortechini; King's Collector 675, 2448 2865, 2867, 3982, 3998; Wray. DISTRIB.—Malayan Archipelago, Burma.

Allied to *I. Lobbii*, Loud. but with more coriaceous broader leaves, with more nerves, shorter flowers in more condensed cymes. The corolla is orange or red.

8. *IXORA UNDULATA*, Roxb. Hort. Beng. 10: Fl. Ind. I, 385. A glabrous shrub or small tree, the cymes often pubescent; young branches thinner than a goose-quill, pale-brown, shining. *Leaves* coriaceous, oblong-elliptic, sub-acute, the base much narrowed; both surfaces olivaceous-brown when dry, rather dull; main-nerves about 12 pairs, thin

but distinct on both surfaces, curved, spreading; length 3·5 to 5 in.; breadth 1·25 to 2 in.; petioles ·3 to 4 in., stipules triangular, acuminate, ·2 in. long. *Cymes* nearly as long as the leaves, almost sessile, branching from near the base, the branches divergent, trichotomous, many-flowered, the bracteoles few and minute, lanceolate. *Calyx* sessile, less than ·1 in. long, cylindric, with 4 ovate-acute teeth. *Corolla-tube* ·25 to ·3 in. long, narrowly cylindric; the limb ·2 in. across, its 4 lobes narrowly oblong, blunt, reflexed. *Fruit* (in Indian specimens) fusiform, smooth. Roth Nov. Spec. 91; DC. Prod. IV, 488; Wight & Arn. Prod. 428; Wight Icon. 708; Hook. fil. Fl. Br. Ind. III, 147; Wall. Cat. 6129, excl. *Herb. Ham. I. canja*, Wall. Cat. 6130.

PERAK: at elevation of 4000 feet; Wray 3934.

Only once collected in our region. A common species at the base of the eastern Himalaya, and in the Khasia Hills.

9. *IXORA PENDULA*, Jack in Mal. Misc, I, 11. A small shrub, all parts glabrous except the branches of the inflorescence; young branches thinner than a goose-quill. *Leaves* thinly coriaceous, oblong to elliptic-oblong, sometimes slightly oblanceolate, sub-acute, the base more or less cuneate, both surfaces pale-olivaceous when dry, smooth, the upper shining, the reticulations fine, not prominent; main-nerves 12 to 16 pairs, curved, ascending, faint on the upper surface, thin but prominent on the lower; length 9 to 11 in.; breadth 2·5 to 3·5 in.; petiole ·5 to ·75 in., stout, channelled: stipules about ·2 in. long, broadly ovate, abruptly acuminate. *Cymes* terminal, 3-branched, pendulous, often nearly as long as the leaves (half the length being slender peduncle): branches puberulous trichotomous, with subulate bracts at the divisions; ultimate branchlets with about 9 flowers. *Calyx* under ·1 in. in length, with 4 short blunt teeth. *Corolla-tube* slender, cylindric, about 1·25 in. long, the limb about ·4 in. across, the 4 lobes oblong, blunt, reflexed. *Anthers* short, narrow, acute, sagittate at the base, longer than their filaments. *Stigma* slightly exerted. *Fruit* ellipsoid, blunt, smooth, ·3 in. long and ·25 in. in diam. Hook. fil. Fl. Br. Ind. III, 141.

In all the provinces, common.

The flowers of this are rose-coloured. The long slender drooping peduncle of the cyme has often a whorl of lanceolate bracteoles near the base, and the upper leaves of the stem are often much reduced in size. There are specimens in which the peduncle of the cyme is only 2 or 3 inches long, but usually it is twice as long.

10. *IXORA OPACA*, Br. in Wall. Cat. 6141. A small shrub, glabrous except the puberulous branches of the cyme; young branches thinner than a goose-quill, pale-brown. *Leaves* thickly membranous, oblong to elliptic-oblong, obtusely and shortly acuminate, the base rounded or

cuneate; both surfaces olivaceous when dry; the upper dark and shining; the lower paler, much reticulate, and dull; main-nerves 15 to 20 pairs, spreading, curved, prominent on the lower surface; length 4 to 7 in.; breadth 1·25 to 2·5 in.; petioles ·3 to ·5 in.; stipules triangular with broad bases and long linear points. *Cyme* corymbose, with many short spreading branchlets, sometimes laxly trichotomous, 2·5 to 5 in. across, terminal, on a slender erect peduncle 1 or 2 in. long. *Flowers* as in *I. pendula*, but smaller, the limb of the corolla being only ·3 in. across. *Fruit* as in *I. pendula*, Jack. G. Don, Gen. Syst. Gard. III. 573. Hook. fil. Fl. Br. Ind. III. 147. *Pavetta opaca*, Miq. Fl. Ind. Bat. II. 270.

MALACCA: *Ridley* 966. PENANG: *Curtis* 3385. PERAK: *Wray* 3447: *King's Collector* 2699, 2805, 2829, 2917, 4061; *Ridley* 3071.—DISTRIB. Burma, Sumatra.

A species closely allied to *I. pendula*, Jack, but the cymes have shorter peduncles and the leaves are narrower.

11. IXORA LOBBII, Loudon, Encycl. Supplem. II, 1543. A shrub, everywhere glabrous except the smaller branches of the inflorescence and the calyces; youngest branches as thick as a duck's quill, dark-coloured, shining. *Leaves* thinly membranous, oblong, oblong-lanceolate or elliptic-oblong, rarely oblanceolate, the apex acute or shortly acuminate, the base cuneate; both surfaces rather pale-brown when dry and shining; main-nerves 15 to 25 pairs, rather straight, spreading, inter-arching at the tips, slender but distinct on the lower surface, very faint on the upper; length 5 to 8 in.; breadth 1·25 to 2 in.; petioles ·2 to ·3 in.; stipules triangular, acuminate, about ·15 in. long. *Cymes* terminal, corymbose, shortly pedunculate, 3 to 8 in. across, the bracts and bracteoles minute, lanceolate, deciduous. *Calyx* cylindric-campanulate, less than ·1 in. long, its 4 broad blunt lobes shorter than the tube. *Corolla-tube* slender, cylindric; 1 to 1·75 in. long; the limb ·4 to ·5 in. across; its 4 lobes narrowly oblong, blunt or sub-acute, spreading; stigma slender, slightly exserted. *Fruit* ellipsoid, blunt, ·25 to ·3 in. long and ·25 to ·3 in. in diam. (when dry), smooth. *I. fulgens*, Hook. fil. Fl. Br. Ind. (not of Roxb.) *in part*. *Pavetta Lobbii*, Teysm. & Binn. in Miq. Ann. Mus. Lugd. Bat. IV. 194.

MALAYAN ARCHIPELAGO; *Helper* (K.D.) 2998. MALACCA: *Grijith* (K.D.) 2985; *Maingay* (K.D.) 845; *Derry* 10, 966; *Cuming* 2396 PENANG: *Curtis* 479; *Lobb*. WELLESLEY: *Ridley* 6991. PERAK: *Wray* 476, 952, 2891, 3449; *King's Collector* 407, 2374, 2908, 3828, 4196, 5626, 5968; *Scortechini* 96, 349. SINGAPORE: *Lobb*; *King*; *Ridley*; *Anderson* 94. KEDAH: *Curtis* 2659.—DISTRIB. Malay Archipelago.

VAR. *angustifolia*, King & Gamble; leaves narrowly oblong-lanceolate about 1 in. in width.

SINGAPORE: King. PERAK: Wray 519; Scortechini 1893; King's Collector 2718. PAHANG: Ridley 2215.

This variety comes near to *Pavetta salicifolia*, Blume, but its leaves have more numerous main-nerves, and its corolla lobes are much shorter.

12. *IXORA FULGENS*, Roxb. Hort. Beng. 10: Fl. Ind. I. 378. A shrub, all parts glabrous: young branches thicker than a crow-quill, dark, shining. Leaves coriaceous, oblong-lanceolate or oblanceolate, shortly acuminate, the base cuneate; both surfaces shining when dry, the upper dark-brown, the lower paler; main-nerves 10 to 12 pairs, curved, spreading, interarching, slender; length 3·5 to 5·5 in., breadth 1·25 to 1·5; petiole ·2 to ·3 in.; stipules ·2 in. long, triangular, the base broad, with a long linear point. Cymes terminal, corymbose, rather lax, spreading, ·3 to ·5 in. in diam., many-flowered; bracteoles triangular, minute. Calyx less than ·1 in. long, cylindric-campanulate, with 4 shallow broad teeth. Corolla-tube 1·25 to 1·5 in. long, narrowly cylindric; its limb ·8 in. across; the 4 lobes broadly ovate or lanceolate, acute, spreading. Anthers narrow, on short filaments. Fruit fusiform, somewhat 2-lobed, smooth, purple when ripe. DC. Prod. IV, 486: Wight Icon. 451: Wall. Cat. 6152; Hook. fil. Fl. Br. Ind. III. 146, *not of Roxb.*

SINGAPORE: Lobb 102. PERAK: Scortechini; Wray 3024; King's Collector 2949, 5075, 5522.

This species is not common. It has been confused with the much more common *I. Lobbii*, Loud. from which it differs in having about half as many leaf-nerves. It is to *I. Lobbii* that the description of *I. fulgens* given in the Flora of British India really refers.

13. *IXORA HUMILIS*, King & Gamble, n. sp. A small unbranched glabrous shrub little more than a foot high. Leaves large, coriaceous, sessile, elliptic to sub-panduriform, the apex sub-acute, narrowed below the middle to the broadly cordate auriculate base; both surfaces brown when dry, the lower paler and with the reticulations distinct; main-nerves 15 to 18 pairs, curved, slender but distinct, spreading and only slightly curved: length 9 to 12 in.; breadth 3·5 to 4 in.; stipules of opposite sides united into a short tube with a cusp on each side. Cyme terminal, 2·5 to 3 in. long (including the short peduncle), and as much across; branches few and short, bracteoles minute. Calyx under ·1 in. long, its lobes shorter than the tube, blunt. Corolla-tube about 1·5 in. long, narrowly cylindric; the limb about ·7 in. across; its 4 lobes sub-rotund, spreading. Anthers linear, apiculate, on short filaments inserted in the throat. Fruit unknown.

PENANG: Curtis 400. SELANGOR: Ridley 7422a. PERAK: Wray 4157; Ridley 7186; Yapp 204; *Scortechini*.

A distinct species distinguished by its short bushy habit, and its large leaves tapered to a broad cordate-auriculate base.

14. *IXORA SCORTECHINI*, King & Gamble, n. sp. An unbranched shrub about a foot in height: the stem as thick as a goose-quill, pale-brown, rather rough. *Leaves* large, almost sessile, coriaceous, broadly oblanceolate, sub-acute or blunt, narrowed from about the middle to the rounded or cordate base; upper surface brown when dry and somewhat shining; the lower pale, reticulate and dull; main-nerves 8 to 12 pairs, slightly prominent on both surfaces, curving upwards, interarching; length 5.5 to 9 in.; breadth 2 to 3 in.; petioles about .1 in. long or absent; stipules very short, broadly triangular and with an abrupt linear point. *Cymes* terminal, about 2 in. long (including the short peduncle), the branches short, puberulous. *Calyx* nearly .1 in. long, cylindric, with 4 very broad short blunt teeth. *Corolla-tube* 1 to 1.25 in. long, narrowly cylindric, glabrous; the limb .5 in. across with 4 blunt broad oblong spreading lobes. *Fruit* fusiform, deeply 2-grooved, smooth.

PENANG: Curtis 400. PROVINCE WELLESLEY: Ridley 6992. PERAK: *Scortichini* 1277; Wray 4157; *King's Collector* 3120.

15. *IXORA STRICTA*, Roxb. Hort. Beng. 10: Fl. Ind. 1, 379. A large shrub, everywhere glabrous: young branches thicker than a crow-quill, dark-brown, shining. *Leaves* thinly coriaceous, lanceolate or elliptic, lanceolate, rarely elliptic, acute or acuminate, the base cuneate; upper surface olivaceous when dry, the lower brown; main-nerves 7 or 8 pairs: obsolete on the upper surface, faint and interarching on the lower; length 2.5 to 5 in.; breadth 1.25 to 2 in.; petiole .15 to .2 in.; stipules .2 in. long, triangular, with broad bases and long linear points. *Cymes* almost sessile, terminal, corymbose, dense, 2 or 3 in. in diam., bracteoles minute. *Calyx* under .1 in. long, cylindric, broadly 4-lobed or sub-entire. *Corolla-tube* narrow, cylindric, .8 in. long; the limb .4 in. across, its 4 lobes oblong, sub-acute or obtuse, spreading or reflexed. *Fruit* broadly fusiform, smooth. DC. Prod. IV. 486; W. & A. Prod. 427; Wight Ic. 184; Kurz For. Fl. Burma, II. 26; Wall. Cat. 6123; Hook. fil. fl. Br. Ind. III. 145. *I. coccinea*, Bot. Mag. 169. *I. alba*, Roxb. ll. cc; Wight Ic. 707. Wall. Cat. 6122. *I. blanda*, Ker in Bot. Reg. t. 100; DC. l. c., 487. *I. incarnata*, Roxb. Fl. Ind. I. 379: DC. l. c. 486. *I. crocata*, Lindl. in Bot. Reg. t. 782; DC. l. c. 486. *I. rosea*, Wall. Cat. 6124; Bot. Mag. t. 2428, (not of Wall. in Roxb. Fl. Ind. I. 398). *I. amoena*, Wall. Cat. 6121 D.E.F.G.; Don, Gen. Syst. III. 571; Hook. fil. Fl. Br. Ind. III. 146. *I. densa*, Wall. Cat. 6150, *in part*.

MALACCA: *Griffith* (K.D.) 2986; *Maingay* (K.D.) 846, 846 $\frac{1}{2}$ , 849; *Goodenough* 1753; *Derry* 257. PERAK: *Wray* 3293, 3448; *King's Collector* 2247, 3978; *Scortechini*. PAHANG: *Ridley* 2227. SINGAPORE: *Ridley* 5004; *Lobb*. PENANG: *Wallich*; *Curtis* 1122; *Deschamps*. KEDAH: *Ridley* 7092. DINDINGS: *Ridley* 7187.—DISTRIB. British India, Burmah.

Owing to the beauty of its flowers this species is much cultivated in gardens. But it also occurs in a wild state. The corolla is usually scarlet, but individuals with white, rosy, or yellowish corollas are frequent. As regards leaves the species varies somewhat. I can find nothing except the slightly different reticulation of the leaves to distinguish *I. amoena*, Wall., and I have therefore reduced it here. In the Flora of British India, Sir Joseph Hooker, without actually making the reduction, expresses himself in favour of it.

16. *IXORA CONCINNA*, Br. in Wall. Cat. 6149. A shrub, all parts glabrous: young branches slightly thicker than a crow-quill, pale-brown. *Leaves* thinly coriaceous, elliptic-oblong or elliptic-oblongate, very shortly and rather bluntly acuminate, the base cuneate: both surfaces slightly shining when dry, olivaceous-brown, the lower the paler; main-nerves 8 or 9 pairs, slender, slightly depressed on the upper and prominent on the lower surface; length 2.5 to 5 in.; breadth 1 to 1.75 in.; petioles .15 to .25 in.; stipules triangular, .2 in. long with broad bases and long stiff linear apices; a few of the upper leaves much reduced in size. *Cymes* (including their peduncles) from 1 to 1.5 in. long, three or four collected at the apex of a branch, each 5- or 6-flowered; bracteoles minute. *Calyx* under .1 in. long, campanulate, with 4 broad teeth shorter than the tube. *Corolla-tube* about .4 in. long, narrowly cylindrical; the limb about .3 in. across, its 4 lobes oblong, spreading, blunt. *Fruit* about as large as a small pea, broader than long, deeply 2-grooved, glabrous. Hook. fil. Fl. Br. Ind. III. 647. *Rubiacea*, Wall. Cat. 8449.

SINGAPORE: *Wallich*; *Ridley* 8451. MALACCA: *Griffith*; *Lobb* 189; *Maingay* (K.D.) 847; *Derry* 962. PERAK: *Scortechini* 174; *Wray* 1317; *King's Collector* 3068, 3978, 3530, 4639, 5648.

17. *IXORA GRANDIFOLIA*, Zoll. & Mor. Syst. Verz. 65. A bush or small tree, quite glabrous or with the cymes puberulous; young branches pale-brown when dry, not so thick as a goose-quill (paler and thinner in some vars.). *Leaves* large in the typical form, sub-coriaceous, elliptic, ovate (oblong or lanceolate in vars.), obtuse or acute, the base cuneate or broadly rounded, sometimes (in vars.) minutely cordate, both surfaces brown when dry, shining, obscurely reticulate; main-nerves 8 to 12 pairs, not usually very prominent on either surface: length 8 to 10 in. (less in var. 3), breadth 3 to 5 in. (less in var. 3), petiole .5 to .75 in. stout (shorter in some vars.); stipules broad, .35 in. long, cuspidate

or sometimes bifid. *Cymes* varying, always pedunculate, laxly trichotomous, or in var. 2 densely crowded, 3 or 4 in. across (much less in var. 2) the branches cinereous-puberulous. *Flowers* crowded, shortly pedicellate, glabrous, about .5 in. long, (longer in vars.). *Calyx* under .1 in. long, with 4 blunt teeth shorter than the tube. *Corolla-tube* cylindric, slender, .35 in. long. (longer in vars. 2 and 4), the limb with 4 broad blunt oblong reflexed lobes .15 in. long: stigma narrowly clavate in bud. *Fruit* broadly fusiform, smooth. Hook. fil. Fl. Br. Ind. III. 143. *I. elliptica*, Br. in Wall. Cat. 6153.

MALACCA: *Griffith*; *Maingay* (K.D.) 843. PENANG: *Wallich* 6153. PERAK: *King's Collector* 410, 4083, 4756; *Scortechini* 1368.—DISTRIB. Nicobars, *Kurz*.

A very variable species of which the following forms may be distinguished. The corolla is white.

VAR. 1 *gigantea*, King & Gamble. A tall tree, leaves very coriaceous, elliptic, obtuse at base and apex, 7 to 10 in. long and 3 to 5 in. broad; cymes (including their peduncles) 3 to 7 in. long, with spreading puberulous branches; corolla about .5 in. long.

PENANG: *Curtis*, 3384. SINGAPORE: *Ridley*, 4120. PERAK: *Wray* 2973, 3678, 3971; *King's Collector* 5609, 5466, 10294. ANDAMANS: *Heinig* 22.

This may be separable as a species. More specimens (in flower) are wanted.

VAR. 2 *coriacea*, Hook. fil. Fl. Br. Ind. III. 143 (excl. syn. *I. macrosiphon*); leaves very coriaceous, oblong-lanceolate or oblong-elliptic, sub-acute, the base cuneate; length 8 to 10 in.; breadth 2.5 to 3 in.; cymes (including their peduncles) 3 in. long or less. *Corolla* about .6 in. long. *I. coriacea*, Br. in Wall. Cat. 6151.

PENANG AND SINGAPORE: *Wallich*; *Curtis* 2486. MALACCA: *Griffith* in Herb. Wight, (K.D.) 2999; *Maingay* (K.D.) 844. PERAK: *Wray* 2140, 2626; *King's Collector* 5935. PAHANG: *Ridley* 2213.—DISTRIB. Andaman Islands.

There is in Herb. Calcutta a single specimen (in flower only) collected by *Ridley* in Pahang (Herb. *Ridley* 2213) which in most of its characters resembles this. The texture of the leaves and their nervation are however slightly different, and the flowers are somewhat longer and in less spreading cymes.

VAR. 3 *arborescens*, Hook. fil. l.c.; branches thinner than a goose-quill, the bark very pale; leaves sub-coriaceous, only 4 to 6 in. long, and from 2 to 2.5 in. broad; sub-obtuse at the apex and broadly rounded at the base, the petiole only .3 to .4 in. long; cymes (including peduncle) 3 to 7 in. long, the branches long and spreading; corolla little more than .5 in. long. *I. arborescens*, Hassk. in *Retzia* I. 22.

MALACCA: *Griffith* Herb. Wight, (K.D.) 2987; *Derry*, 310, 571;

Cumming 2332. PERAK: King's Collector 4686. JOHORE: Ridley 4165.

—DISTRIB. Andaman Inlands.

VAR. 4 *Kurzeana*, Hook. fil. l.c.; leaves sub-coriaceous, elliptic to elliptic-oblong, the apex acute; the base rounded or cuneate; corolla 1·25 in. long. *I. Kurzeana*, Teysm. & Binn. in Nat. Tijds. Ned. Ind. 100. *I. macropsiphon*, Kurz in Trimen Journ. Bot. 1875, 327; For. Flora Burm. II. 24.

ANDAMAN ISLANDS: Kurz, Prain's Collector. SUMATRA, JAVA, &c.

18. *IXORA DIVERSIFOLIA*, Wall. Cat. 6146. A shrub or small tree, the branches of the inflorescence slightly puberulous, otherwise glabrous; young branches thinner than a goose-quill, pale when dry. Leaves membranous, oblong to broadly elliptic, acute or sub-acute, the base rounded or cuneate; the upper pair sometimes sessile and sub-cordate, often reduced in size, the majority with stout petioles ·3 or ·4 in. long; both surfaces smooth, shining, brown when dry; main-nerve 10 to 12 pairs, curved, spreading, prominent as the lower surface; length of blade 4 to 10 in.; breadth 2 to 4 in.; stipules elongated-triangular, ·25 in. long (sometimes longer and sometimes blunt). Cyme 3 to 4 in. in diam. (its slender peduncle included) 3 to 6 in. long, trichotomous; the ultimate branchlets minutely bracteolate at the divisions, 2- to 3-flowered. Flowers ·4 to ·6 in. long, mostly on short puberulous pedicels, some sessile, glabrous. Calyx less than ·05 in. long, the 4 teeth shorter than the tube, blunt. Corolla-tube narrowly cylindrical, very short in the bud, afterwards lengthening to ·2 to ·4 in.; sometimes longer, lobes of the limb 4, narrowly oblong, sub-acute, much reflexed, ·2 in. long. Stigma exerted, clavate at first, the arms afterwards divergent. Fruit ellipsoid, blunt, ·3 in. long and ·2 in. diam. (when dry) glabrous. Kurz. For.; Flora Burm. II. 22; Hook. fl. Fl. Br. Ind. III. 141.

PENANG: Curtis, 2486. PERAK: King's Collector 5691, 5737, 5896; (Wray 3491?); Scortechini 168.—DISTRIB. Burma; Griffith (K.D.) 2992.

The corolla of this is much shorter than those of *I. pendula*, and it is white and the leaves are often broader. The two species are closely allied. A form collected in Perak by Wray (No. 3491) connects the two, combining the longer corollas and peduncles which are characteristic of *I. pendula* with the general facies of *I. diversifolia*.

#### 40. PAVETTA, Linn.

Characters of *Ixora*, but the style very slender and much longer than (often twice as long as) the corolla-tube; the stigma not thicker and sometimes even thinner than the style and usually entire; the stipules larger and sheathing, especially those of the lower part of the

inflorescence; leaves membranous.—Species about 70, in the tropics of the old world.

Large much branched shrubs; cymes corymbose pedunculate, 2 to 4 in. in diam., often in panicles:—

- |                                                                                    |        |                                         |
|------------------------------------------------------------------------------------|--------|-----------------------------------------|
| Leaves pubescent to tomentose beneath, ovate-elliptic, elliptic or elliptic-rotund | ... .. | 1 <i>P. indica</i> .                    |
| Leaves slightly pubescent to glabrous beneath, elliptic lanceolate or oblanceolate | ... .. | 1 <i>P. indica</i> var. <i>glabra</i> . |

Small little branched or unbranched shrubs; cymes sessile or nearly so, 1 to 2 in. in diam., never in panicles: leaves pubescent beneath:—

- |                                                            |                            |
|------------------------------------------------------------|----------------------------|
| Calyx woolly; leaves densely and softly pubescent beneath  | 2 <i>P. naucleiflora</i> . |
| Calyx glabrous or nearly so; leaves hispidulous beneath... | 3 <i>P. humilis</i> .      |

1. PAVETTA INDICA, Linn. sp. Pl. 110. A shrub or small tree, young branches slender, glabrous, pubescent, or tomentose like the leaves. *Leaves* membranous, variable in form, in the Malayan specimens (var. *polyantha*) elliptic-lanceolate or oblanceolate, in the British Indian ovate-elliptic, elliptic, or elliptic-rotund; in all, except some of the latter, acute or acuminate at the apex, pubescent tomentose or glabrous beneath, the base always much narrowed; main-nerves 5 to 7 pairs, usually faint, curved; length (in Malayan specimens) 4 to 7 in.; breadth 1 to 2 in.; petiole .35 to 5 in.; stipules triangular, acuminate, shorter than the petioles, deciduous. *Cymes* terminal, shorter than the leaves, on peduncles 1.5 to 4 in. in length, corymbose, many-flowered, 2 to 4 in. in diam., often in panicles; the stipules at the bifurcations rather large and persistent. *Flowers* on pedicels about .2 in. long. *Calyx* from .05 to .1 in. long, narrowly campanulate, with 4 short triangular teeth or sub-truncate. *Corolla* .5 to .75 in. long; the tube very slender, cylindrical; the limb .3 to .4 in. across, with 4 oblong blunt lobes. *Style* much exerted, slender like the stigma. *Fruit* globular-oblong, glabrous, about the size of a pea. Wall. Cat. 6175; Blume Bijdr. 951; W. & A. Prod. 431; Wight Ic. t. 148; Miq. Fl. Ind. Bat. II. 276; Hook. fil. Fl. Br. Ind. III. 150; Trim. Fl. Ceyl. II. 349. *P. Finlaysoniana*, Wall. Cat. 6177. *P. alba*, Vahl. Symb. III. 11. *P. petiolaris*, Wall. Cat. 6786; Hook. fil. Fl. Br. Ind. III. 150. *Ixora paniculata*, Lam. Dict. III. 344. *I. Pavetta*, Roxb. Fl. Ind. I. 385; Kurz Fl. Burm. II. 18.

In all the provinces, but not common.

VAR. *polyantha*, Hook. fil. l.c. 150. *Flowers* numerous, crowded in puberulous or pubescent cymes; leaves thinly membranous, oblanceolate or elliptic-lanceolate, glabrous or puberulous beneath. *P. polyantha*, Wall. Cat. 6176; Bot. Regist. t. 198. *P. graciliflora* Wall. Cat. 6178. *P. petiolaris*, Wall. Cat. 6180. *P. Rothiana*, DC. Prod. IV. 491:

W. & A. Prod. 431. *P. villosa*, Heyne in Roth. Nov. Sp. 88 (not of Napl.)  
*Ixora tomentosa* var. *glabrescens*, Kurz. Fl. Burm. II. 19.

In all the provinces: common.

The variety *tomentosa*, Hook. fil. l.c. characterised by ovate or rotund elliptic often subacute thickly membranous leaves more or less pubescent or tomentose, and with the inflorescence also pubescent or tomentose occurs chiefly in British India. The synonymy of it is as follows: *P. tomentosa*, Wall. Cat. 6173 all the sheets except E.: *P. velutina* 6174: *P. mollis* 6179; *P. canescens* 6181.

2. PAVETTA NAUCLEIFLORA, Wall. Cat. 6171. A shrub or small tree, young branches thicker than a crow-quill, tawny-tomentose. *Leaves* oblanceolate, shortly acuminate, narrowed from above the middle to the petiole; both surfaces olivaceous when dry; the upper at first pubescent, afterwards becoming less so, but even when adult the midrib always pubescent; the lower densely and persistently pale-pubescent, especially on the midrib and 9 or 10 pairs of oblique prominent main-nerves; length 4·5 to 7 in.; breadth 1·35 to 2·75 in.; petiole ·3 to ·75 in., pubescent. *Stipules* broadly triangular, acuminate. *Cymes* terminal, solitary, densely compound-umbellate, 1·75 in. broad and not quite so long, the branches and pedicels densely pubescent; branches divaricate with a few ovate-lanceolate bracteoles near the flowers. *Flowers* ·75 in. long, excluding the style, on unequal pedicels always longer than the calyx. *Calyx* tubular ·1 in. long, ribbed, densely pubescent, the mouth with 5 short triangular erect teeth. *Corolla-tube* narrowly cylindrical, sub-glabrous; limb pubescent and with 4 oblong blunt lobes. *Fruit* globular not ridged, sparsely hairy, crowned by the small calyx, ·25 in. in diam. two-celled by abortion. *Seed* single fleshy, convex on the back; G. Don, Gen. Syst. III. 575: Hook. fil. Fl. Br. Ind. III. 152. *Ixora naucleiflora*, Kurz, For. Flora. II. 19.

PENANG: Curtis 1060, 2217, 2646, 3382. PERAK: *Scortechini*; Wray 3619.—DISTRIB. Base of Eastern Himalaya, Burma.

3. PAVETTA HUMILIS, Hook. fil. Fl. Br. Ind. III. 151. A small shrub with unbranched pale rough stem 6 to 12 in. long, densely pubescent at first but afterwards sub-glabrous. *Leaves* membranous, close together, oblong-oblanceolate, shortly acuminate, much narrowed at the base; upper surface minutely rugulose when dry, glabrous, the midrib sparsely adpressed-hispid; lower surface sub-adpressed hispidulous: main-nerves 6 or 7 pairs, faint, little curved, ascending; length 3·5 to 6 in.; breadth 1·25 to 1·75 in.; petiole ·3 to ·5 in., swollen at the base, hispid; *stipules* broadly triangular, acuminate, hispid. *Cymes* solitary, terminal, sessile or sub-sessile, usually 1 to 1·5 in. in diam., dense. *Flowers* shortly pedicellate, glabrous, ·75 in. long. *Calyx* funnel-shaped, the mouth with 4 short acute teeth. *Corolla-tube* about ·6 in. long,

narrowly cylindric, the limb with 4 blunt oblong lobes. *Fruit* globular, glabrous, .25 in. in diam.

MALACCA: *Griffith* (K.D.) 3007; *Maingay* (K.D.) 855; *Hullett*, 763.

#### 41. MORINDA, Linn.

Shrubby, sometimes scandent; rarely arboreous. *Leaves* membranous, rarely in whorls of three: stipules connate, sheathing. *Flowers* connate by their calyces, axillary or terminal, simple paniced or umbellate pedunculate heads. *Calyx-tube* short, the limb short or absent. *Corolla* salver- or funnel-shaped, coriaceous, the tube short; the limb usually 5- (rarely 4- to 7-) lobed, valvate in bud. *Stamens* equal in number to the corolla-lobes, on short filaments; anthers linear or oblong, dorsifixed. *Ovary* 2- or spuriously 4-celled; style included or exerted, 2-branched: ovules solitary in the ovarian cells, ascending. *Fruit* formed of the succulent enlarged calyces; the contained pyrenes 1-seeded, horny or cartilaginous, usually free but 2 or 4 of them sometimes cohering together. *Seeds* obovoid or reniform, with membranous testa and fleshy or horny albumen; the embryo terete, radicle inferior.—DISTRIB. Species about 40, all tropical.

|                                                                                                                    |        |                           |
|--------------------------------------------------------------------------------------------------------------------|--------|---------------------------|
| Erect shrubs or trees, with pulpy infrutescences                                                                   | ...    | 1. <i>M. citrifolia</i> . |
| Large woody climbers:—                                                                                             |        |                           |
| Infrutescence dry, more than 1 to 2 in. in diam., externally marked with many large deeply pitted hardened calyces | ... .. | 2. <i>M. lacunosa</i> .   |
| Infrutescence about 1 in. in diam., pulpy, smooth, bearing externally a few long narrow soft tubular calyces       | ... .. | 3. <i>M. rigida</i> .     |
| Infrutescence about .25 in. in diam., without large protruding calyces                                             | ... .. | 4. <i>M. umbellata</i> .  |

1. MORINDA CITRIFOLIA, Linn. Sp. Pl. 176. A glabrous small tree or large shrub; young branches thinner than a goose-quill, obtusely 4-angled, pale-brown. *Leaves* broadly elliptic, occasionally obovate-elliptic, shortly acuminate, the base cuneate, one of the pair opposite the peduncle often suppressed; both surfaces pale-brown when dry: main-nerve 6 or 7 pairs, curved upwards, thin but slightly prominent on both surfaces; length 5 to 10 in.; breadth 2.25 to 4.5 in.; petioles .2 to .4 in.; stipules transversely oblong or sub-orbicular, entire or 2- to 3-fid., .3 to .5 in. long. *Peduncles* axillary, solitary, about .5 in. long, each bearing a many-flowered capitulum 1 to 1.75 in. in diam. *Calyx* truncate. *Corolla* fusiform in bud: the tube .3 to .5 in. long, pubescent in the throat, otherwise glabrous: limb .5 or .6 in. across, with 5 lanceolate lobes. *Anthers* with their tips exerted, filaments woolly. *Infrutescence* when

ripe ovoid or globose, 1 to 1.75 in. long, yellow, fleshy: each pyrene 2-seeded. Roxb. Fl. Ind. I. 541; Hunter in As. Resear. IV. 35; DC. Prod. IV. 446; Ham. in Trans. Linn. Soc. XIII. 533; W. & A. Prod. 419; Wall. Cat. 8418; Brand. For. Flora, 277; Kurz, For. Fl. Burm. II. 60; Hook. fil. Fl. Br. Ind. III. 155; Trimen Fl. Ceyl. III. 354; Gaertn. Fruct. I. 29. *M. bracteata*, Roxb. Hort. Beng. 15; Fl. Br. Ind. I. 544; Ham. l.c. 534; DC. l.c. 447; W. & A. l.c.; Wight Ill. t. 126; Wall. Cat. 8419; Brandis l.c. 277.

In all the provinces: in or near cultivation, but probably in many cases not wild.—DISTRIB. Brit. India, Ceylon, Malay Archipelago.

VAR. *elliptica*, Hook. fil. l.c. *Leaves* narrowly elliptic-oblong, tapering to each end, shining: peduncles slender, 1 to 1.5 in. long: fruiting heads .5 to .75 in. diam. Wall. Cat. 8434.

In all the provinces: more frequent than the typical form.

2. *MORINDA LACUNOSA*, King & Gamble, n. sp. A powerful climber 30 to 60 feet long: young branches thinner than a goose-quill, angled, sparsely and minutely pubescent. *Leaves* thickly membranous, elliptic, sharply and shortly acuminate, the base cuneate; upper surfaces dark-brown when dry, glabrous except the puberulous midrib; lower paler, the reticulations very distinct; main-nerves about 8 pairs, curving upwards, very bold on the lower surface, slightly depressed and faint on the upper; length 4.5 to 6 in.; breadth 2 to 2.75 in.; petioles .5 to 1.25 in.; stipules apiculate, only 15 in. long. *Heads* about .5 in. in diam. (when in flower) with one or two linear coriaceous bracts at their bases, solitary, on puberulous peduncles about 1 in. long, collected in twos or threes at the apices of the branches. *Calyces* completely confluent by their sides, irregularly cupular, the limb coriaceous, produced into a large oblique triangular lobe at one side, otherwise sub-truncate. *Disk* large, cushion-like, convex. *Ocorolla* unknown. *Infrutescence* (when ripe) globular, 1.5 in. in diam.; the surface covered with the protruding irregularly 4-sided conical enlarged calyces, each with a wide pit on its apex; individual fruits 2-celled, 2-seeded.

PERAK: *King's Collector*, 4320, 6030, 8254; *Scortechini*.

This is easily distinguished by its large deeply pitted infrutescence which is dry, not at all pulpy.

3. *MORINDA RIGIDA*, Miq. Fl. Ind. Bat. II. 246. A woody climber 20 to 30 feet long; young branches thinner than a goose-quill, at first minutely rusty-tomentose, afterwards with glabrescent pale spongy bark. *Leaves* dark-coloured when dry, the edges recurved, thickly coriaceous, narrowly elliptic, shortly and bluntly acuminate or blunt, the base cuneate; upper surface shining, glabrous except the pubescent

base of the midrib; the lower uniformly pale-pubescent; midrib distinct; main-nerves (18 to 12 pairs) very indistinct on both surfaces; length 2 to 4 in.; breadth 1 to 1.6 in.; petiole .3 or .4 in., pubescent. *Stipules* broadly oblong, blunt, scaly, .2 in. long. *Capitula* on puberulous peduncles .2 to .3 in. long, in fascicles of 3 or 4 at the apices of the branches. *Flowers* .4 in. long, confluent by their calyces into globular capitula .2 in. in diam. *Calyx* very short, cupular. *Corolla* salver-shaped, .35 in. long, the tube narrow, the limb with deflexed oblong blunt lobes .1 in. long, densely hairy on the upper surface. *Infrutescence* when ripe pulpy, elliptic (often transversely so) with one or two elongate very protruding enlarged calyx-tubes.

PERAK: *King's Collector* 4004; *Wray* 2284; *Ridley* 7204, 10258; *Hullett* 5665. SINGAPORE: *Ridley* 3818, 4126. MALACCA: *Griffith* (K.D.) 2947; *Maingay* (K.D.) 874.—DISTRIB. Borneo.

4. MORINDA UMBELLATA, Linn. Sp. Pl. 176. A powerful glabrous climber; young branches thinner than a goose-quill, pale-brown, angled, shining. *Leaves* thinly coriaceous, narrowly oblong or elliptic-lanceolate, the apex shortly acuminate, the base much narrowed; both surfaces pale olivaceous-brown when dry, transversely reticulate; main-nerves 5 or 6 pairs, curved, ascending, faint; length 3.5 to 5 in.; breadth 1 to 1.35; petioles .2 to .3 in.; stipules sheathing, entire, truncate, or slightly toothed, .15 in. long. *Heads* sub-globular, about .25 in. in diam., on slender peduncles varying from .35 to 1 in. in length (lengthening in fruit to nearly 2 in.) from 5 to 8 collected in an ebracteate umbel at the end of a branch. *Calyx* sessile, truncate. *Corolla* almost rotate, longer than the calyx, its tube about 1 in. long, slightly constricted at the mouth, throat densely villous; limb .2 in. across, its lobes oblong, obtuse, glabrous on the outer surface, densely woolly on the inner. *Ripe infrutescences* about .25 in. in diam. DC. Prod. IV. 449; W. & A. Prod. 420; Wall. Cat. 8431; Kurz For. Flora, Burma, II. 62; Hook fil. Fl. Br. Ind. III. 157. *M. scandens*, Roxb. Fl. Ind. I. 548; DC. Prod. IV. 449. *M. tetrandra*, Jack in Mal. Misc. I. 13; Wall. Cat. 8432; Roxb. Fl. Ind. ed. Carey & Wall. II. 203; DC. l.c. *M. Padavora*, Juss. Gen. 206. *Morinda*, Wall. Cat. 8429.

In all the provinces; common.—DISTRIB. Burma, Southern India and Ceylon, Malay Archipelago, China, Japan, Australia.

VAR. *Scortechinii*, King & Gamble. Young branches, under surfaces of the leaves, and peduncles rusty-pubescent; *leaves* elliptic-obovate, shortly and abruptly acuminate; pedicels 1.5 to 2 in. long.

PERAK: *Scortechinii* 2015. Collected only once.

VAR. *Ridleyi*, King & Gamble. Young branches and under surfaces

of the leaves softly pubescent; leaves oblanceolate or oblong-lanceolate, shortly acuminate: peduncles less than 1 in. long.

SINGAPORE: in Botanic Garden Jungle, Ridley 5668, 6470, 6471, 6916.

#### 42. RENNELIA, Korthals.

Characters of *Morinda* but the heads few-flowered and in terminal panicles, the ovules peltate; the seeds thin, orbicular.—DISTRIB. 5 or 6 Malayan species.

NOTE.—In this we include the genus *Tribrachya*, Korthals, which, as described by its author, differs from *Rennellia* only in having the flowers in each head limited to three.

|                          |     |     |     |                          |
|--------------------------|-----|-----|-----|--------------------------|
| Inflorescence paniculate | ... | ... | ... | 1 <i>R. paniculata</i> . |
| „ spicate                | ... | ... | ... | 2 <i>R. speciosa</i> .   |

1. *RENNELIA PANICULATA*, King & Gamble, n. sp. A small glabrous tree or shrub; young branches at first dark-brown, afterwards becoming pale, striate, thickened at the nodes. *Leaves* sub-coriaceous, elliptic, acute or shortly acuminate, the base much narrowed; upper surface dark-brown when dry; the lower paler-brown, finely reticulate; main-nerves 10 to 12 pairs, slightly curved, spreading, prominent like the midrib on the lower surface, indistinct on the upper; length 6 to 9 in.; breadth 2·25 to 3·75 in.; petioles ·8 to 1·25 in.; stipules oblong, obtuse, 4 in. long. *Inflorescence* paniculate, erect, terminal; the branches opposite, or sometimes whorled, 6 to 9 in. long, each bearing at its apex 3 or more sessile flowers. *Calyx* a very shallow entire cup. *Corolla* coriaceous; the tube cylindric, 5 in. long; the limb nearly as long as the tube with 5 recurved lobes. *Anthers* included, attached near the throat, versatile, on short filaments. *Style* short; stigmas lanceolate. *Infrutescence* globular, 5 in. in diam., glabrous, with several orbicular calyces protruding on the surface.

PERAK: *Scortechini* 316; *King's Collector* 2164, 2592, 5432. PENANG: *Curtis*.

2. *RENNELIA SPECIOSA*, Hook. fil. Fl. Br. Ind. III. 158. A small glabrous shrub; young branches about as thick as a goose-quill, pale, striate, thickened at the nodes. *Leaves* thinly coriaceous, oblanceolate or elliptic-lanceolate, shortly acuminate, the base much narrowed; upper surface olivaceous-brown, the lower olivaceous, reticulate; main-nerves 7 to 9 pairs, curved, ascending, slightly prominent; length 5 to 9 in.; breadth 1·5 to 3·5 in.; petioles ·5 to 1 in.; stipules coriaceous, often 2-lobed, oblong, sub-acute, breaking off about the middle. *Inflorescence* 1 to 2 in. long, terminal, erect, on a short petiole; flowers from 3 to 6 on very short branches. *Calyx* sessile, cupular, truncate. *Corolla* coriaceous, 75 in. long, salver-shaped; limb with 5 short oblong

blunt sub-erect lobes. *Infrutescence* the size of a large pea. *Morinda speciosa*, Wall. Cat. 8436; Kurz For. Fl. Burma, II. 62.

MALACCA: Griffith (K.D.) 3046; Maingay (K.D.) 918/2. PERAK: *Scortechini* 668; Ridley 7197; Wray 2897, 4008; King's Collector 495, 5967.—DISTRIB. Burma.

VAR. *elongata* King & Gamble: *inflorescence* 2 to 6 in. long; flowers mostly in threes.

WELLESLEY PROVINCE: Ridley 7010. PAHANG: Ridley 2193, 5834. PERAK: King's Collector 3926; Ridley 9710; *Scortechini* 106.—DISTRIB. Sumatra.

#### 43. PRISMATOMERIS, Thwaites.

Shrubs with compressed 4-angled branches. *Leaves* sub-coriaceous; stipules 1- or 2-cuspidate. *Flowers* unisexual, usually on slender pedicels, in sub-umbellate axillary and terminal, sometimes pedunculate fascicles. *Calyx-tube* in the male flowers small, turbinate; in the female longer, obovoid, persistent; limb cupular. *Corolla-tube* cylindric, with glabrous throat; lobes of the limb 4 or 5, spreading, valvate in bud. *Stamens* included in the corolla-tube and equal in number with the lobes of the limb; dorsifixed near their bases by short filaments. *Ovary* 2-celled; style filiform, with 2 linear or lanceolate arms; ovules solitary in each cell, attached above the middle of the septum. *Berry* small, 1-celled, 1-2-seeded. *Seed* sub-globose, peltate, deeply concave in the ventral surface; testa membranous; embryo small; cotyledons reniform; radicle inferior.—DISTRIB. 3 or 4 species, in tropical India, Ceylon and Malaya.

|                                             |     |                           |
|---------------------------------------------|-----|---------------------------|
| Flowers on rather long slender pedicels ... | ... | 1 <i>P. albidiflora</i> . |
| Flowers sub-sessile or sessile ...          | ... | 2 <i>P. subsessilis</i> . |

1. PRISMATOMERIS ALBIDIFLORA, Thw. in Hook. Kew Journ. VIII. 268, t. VII. f. A. An evergreen shrub or small tree, glabrous; young branches thicker than a crow-quill, pale. *Leaves* narrowly elliptic or elliptic-lanceolate, sometimes oblanceolate, the apex much acuminate, the base much narrowed; both surfaces pale-greenish or yellowish-brown, and rather dull when dry; the lower reticulate; main-nerve 5 to 7 pairs, curved, spreading and interarching about a line from the edge; length 2.5 to 4.5 in.; breadth .75 to 1.5 in.; petioles .1 to .2 in.; stipules small, fugacious. *Flowers* usually in sessile fascicles, rarely in pedunculate umbels; pedicels .3 to .75 in. long, ebracteolate, filiform. *Calyx* .05 to .1 in. long. *Corolla* white; the tube .5 to .75 in. long, narrowly funnel-shaped, the lobes of the limb narrowly oblong, blunt, nearly as long as the tube, spreading. *Fruit* globose or ovoid, smooth, .25 in. in diam. Thwaites Enum. Pl. Ceyl. 154, 421; Bedd. Ic. Pl. Ind. Or. t. 93; Hook. fil. Fl. Br. Ind. III. 159; Trimen Fl. Ceylon, II. 355.

*Coffea tetrandra*, Roxb. Fl. Ind. I. 538; Wall. Cat. 6242; DC. Prod. IV. 499; Kurz For. Fl. Burma. II. 28. *Rubiae*, Wall. Cat. 8470.

In all the Provinces: common.—DISTRIB. Burma, Khasia Hills, Malay Archipelago, Ceylon.

Besides the foregoing there is in Herb. Calcutta a single specimen (Ridley 2196) with flowers only in bud and no fruit. This is distinguished by ovate-elliptic leaves with 4 or 5 pairs of slightly curved ascending nerves, and few-flowered lax panicles on filiform axillary peduncles about 1·5 in. long.

2. PRISMATOMERIS SUBSESSILIS, King & Gamble. A glabrous shrub: young branches thinner than a goose-quill, pale, polished. Leaves narrowly elliptic, the apex and base acuminate; both sides pale-brown when dry, dull, the midrib prominent, the reticulations obsolete; main-nerves 5 to 7 pairs, slender, spreading, interarching ·1 in. from the edge; length 2·25 to 4·5 in.; breadth ·75 to 1·35 in.; petiole ·15 to ·4 in.; stipules under ·1 in. in length, broad, connate into a ring, each 2-toothed. Flowers 2 or 3, on very short pedicels, or sessile, in a terminal fascicle. Calyx about ·2 in. long, funnel-shaped, the limb wide, about as long as the tube, truncate with minute acute teeth. Corolla 1·25 in. long, salver-shaped, the tube narrow; the limb nearly as long as the tube, divided to its base into 5 narrowly lanceolate, deflexed, coriaceous lobes. Fruit a broad smooth didymous berry, about ·6 in. in diam. and ·5 in. long.

PERAK: *Scortechini* 355; *Wray* 289; *King's Collector* 8071: at elevations of 3000 to 4500 feet.

Differs from *P. albidiflora* in its nearly sessile flowers and larger calyx, corolla and fruit.

#### 44. GYNOCETHODES, Blume.

Climbing glabrous shrubs with slender terete branches. Leaves opposite, coriaceous or sub-coriaceous; the stipules broad, acute, deciduous. Flowers small, on short pedicels, unisexual, in axillary fascicles or pedunculate heads; bracts deciduous. Calyx with a small short tube, the limb annular, truncate or 5-toothed, persistent. Corolla coriaceous with a short tube and woolly throat; the limb with 4 or 5 oblong-lanceolate lobes, valvate in bud, the apices inflexed. Disk broad, depressed. Stamens equal in number to the corolla lobes, on short filaments, dorsi-fixed, in the corolla tube, linear-oblong, exserted. Ovary 4-celled; style of male flower entire; of female stout, bifid. Ovules 1 in each cell, broad-based, attached to the inner angle of the cell. Drupe globose, fleshy, with 2 to 4 dorsally compressed pyrenes. Seeds compressed, ascending; testa membranous; embryo small, basal, radicle inferior.—DISTRIB. 3 or 4 species, all Malayan.

- Leaves broad and rounded at the apex, sometimes with a short broad blunt point, 2·25 to 4 in. long and 1·25 to 2·25 in. broad; fruit ·5 in. in diam. ... 1. *G. coriacea*.
- Leaves acuminate at the apex, elliptic-lanceolate, (often narrowly so) 2·25 to 3·25 in. long and ·5 to 1·1 in. broad; fruit the size of a pea ... 2. *G. sublanceolata*.
- Leaves shortly and abruptly acuminate, rarely sub-acute, 3·5 to 5 in. long and 1·35 to 2·5 in. broad; fruit globose, ·5 to ·6 in. in diam. ... 3. *G. macrophylla*.

1. GYNOCHTHODES CORIACEA, Blume Bijdr. 993. Young branches thinner than a goose-quill, nearly black. *Leaves* thinly coriaceous, elliptic, elliptic-rotund or elliptic-obovate, obtuse or shortly bluntly and abruptly apiculate, much narrowed to the base; main-nerves 4 to 6 pairs, spreading, only slightly curved, faint; both surfaces alike, nearly black, slightly shining; length 2·25 to 4 in.; breadth 1·2 to 2·25 in.; petioles ·4 or ·5 in.; *Flowers* ·3 in. long, few, on short axillary peduncles. *Corolla-tube* very narrow, about as long as the limb; lobes of limb linear-oblong, densely hirsute on the upper surface, spreading. *Fruit* globose, pulpy, 4-celled; pyrenes 1-seeded. Miq. Fl. Ind. Bat. II. 313; DC. Prod. IV. 467.

SINGAPORE: (Bot. Garden Jungle), Ridley 6410, 10393, 2871.—  
DISTRIB. Java, Borneo, Timor.

2. GYNOCHTHODES SUBLANCEOLATA, Miq. Fl. Ind. Bat. Suppl. 548. Branches thinner than a goose-quill, dark-coloured when dry. *Leaves* thinly coriaceous, elliptic-lanceolate, often narrowly so, acuminate, the base much narrowed; both surfaces dull and blackish when dry; main-nerves indistinct, 5 or 6 pairs, ascending, little curved; length 2·25 to 3·25 in.; breadth ·5 to 1·1 in.; petioles ·2 to ·4 in.; stipules triangular. *Flowers* few, about ·35 in. long, sub-sessile on very short axillary branches. *Calyx-limb* truncate but with 5 distant minute teeth. *Corolla-tube* short, rather wide, hairy inside; limb with 5 broadly lanceolate sub-acute lobes longer than the tube. *Anthers* slightly exerted. *Stigma* with 2 elongate plano-convex lobes. *Fruit* pisiform, smooth, on a short pedicel. Hook. fil. Fl. Br. Ind. III, 160. *G. coriacea*, var.—, Miq. in. Ann. Mus. Lugd. Bat. IV. 244. *Paederia tetrandra*, Wall. Cat. 6249. ? *Psychotria*, Wall. Cat. 8385. *Rubiacea*? Wall. Cat. 8297.

SINGAPORE: *G. Thomson*; Ridley; King's Collector 319. MALACCA: *Maingay* (K.D.) 919; Griffith. PENANG: Wallich.—DISTRIB. Borneo, Sumatra.

3. GYNOCHTHODES MACROPHYLLA, Kurz in Journ. As. Soc. Beng. 1872, Pt. II, 314. Young branches angled, nearly as thick as a goose-quill, the bark pale. *Leaves* coriaceous, elliptic or elliptic-oblong, shortly

and abruptly acuminate or sub-acute, the base cuneate; upper surface very dark-brown and shining when dry, the lower paler and dull; main-nerves 6 or 7 pairs, spreading, slightly prominent on the lower surface scarcely visible on the upper; length 3·5 to 5·5 in.; breadth 1·35 to 2·5 in.; petioles ·3 to ·5 in.; stipules short, broad. *Flowers* ·25 in. long, on thick short axillary pedicels. *Calyx*-tube almost globular; the limb cupular, as long as the tube, truncate. *Fruit* ·5 or ·6 in. in diam., pulpy, globose or broadly depressed-pyriform with 4 pyrenes (one often abortive). Kurz For. Flora Burm. II. 33: Hook. fil. Fl. Br. Ind. III. 160.

MALACCA: Maingay (K.D.) 934.

PERAK: Ridley; Wray 1156; King's Collector 5807.—DISTRIB. Andamans, Nicobars.

The Andaman specimens have darker narrower leaves than those from the Malay Peninsula.

45. SPERMACOCE, Linn.

Herbs or small under-shrubs, usually with 4-angled branches. *Leaves* membranous or coriaceous, penni-nerved or longitudinally nerved; the stipules connate into a campanulate tube with a truncate bristly mouth. *Flowers* usually red or blueish, small or minute, solitary and axillary, or in axillary or terminal fascicles, heads or cymes, sometimes densely crowded. *Calyx* obovoid, or ovoid, the mouth with 2 or 4 persistent teeth often with interposed bristles or processes. *Corolla* funnel- or salver-shaped; the mouth with 4 valvate lobes. *Stamens* 4, inserted on the throat or tube of the corolla, filaments short or long. *Anthers* linear or oblong, included or excluded. *Disc* tumid or absent. *Ovary* 2-celled; each cell with a single ovule attached to the middle of the septum, amphitropous. *Style* filiform; stigma capitate or with 2 oblong arms. *Fruit* coriaceous or crustaceous, mericarps dehiscent variously. *Seeds* oblong or ovoid, grooved ventrally, the testa thin, embryo axile, cotyledons thin and broad.—DISTRIB. Species about 150, tropical and sub-tropical.

- |                                                                                                                   |        |                           |
|-------------------------------------------------------------------------------------------------------------------|--------|---------------------------|
| Leaves spatulate, obovate or bluntly oblong, the base narrowed, main-nerves 3 pairs, faint, hispid ...            | ...    | 1. <i>S. hispida</i> .    |
| Leaves narrowly elliptic, tapering acutely to each end, main-nerves 3 or 4 pairs, very bold and prominent beneath | ...    | 2. <i>S. scaberrima</i> . |
| Leaves narrowly oblong-lanceolate, acute, pale beneath, main-nerves sub-obsolete ...                              | ... .. | 3. <i>S. stricta</i> .    |

1. SPERMACOCE HISPIDA, Linn. Sp. Pl. 102. Herbaceous, diffuse, spreading or sub-erect; stems half as thick as a goose-quill, acutely 4-angled and somewhat grooved when dry, sparsely and minutely

hispid, especially on the angles. *Leaves* sub-coriaceous, obovate, spatulate or oblong, sometimes elliptic, always blunt at the apex and tapering more or less to the base, continuous with the short, wide-cupular, pubescent bristle-bearing persistent stipules; upper surface reticulate (when dry), scaberulous, olivaceous, strigose; the lower pale, with spreading hispid hairs on the nerves; main-nerves about 3 pairs, rather straight, faint, oblique; length .35 to .75 in.; breadth .15 to .4 in. *Cymes* small, axillary, hardly longer than the stipules, 4- to 6-flowered. *Flowers* .4 in. long, sessile, with a few small membranous toothed bracteoles between them. *Calyx* small, densely silky, urceolate-campanulate, with 4 long narrow acute spreading lobes. *Corolla* three times as long as the calyx, salver-shaped, glabrous, the 4 broadly ovate teeth silky at their apices. *Stamens* about as long as the corolla-lobes; anthers oblong, filaments and style equal. *Stigma* large, transversely oblong. *Capsule* ovoid or sub-globular, sparsely hispid, crowned by the narrow, reflexed calyx-lobes, 2-celled with a single brown seed in each cell. DC. Prod. IV. 555; Roxb. Fl. Ind. I. 373; Wall. Cat. 825; W. & A. Prod. Fl. Penins. Ind. 438; Hook. fil. Fl. Br. Ind. III. 201; Trimen Fl. Ceyl. II. 371. *S. articularis*, Linn. fil. Suppl. 119; Roxb. Fl. Ind. l.c.; Wall. Cat. 827; W. & A. Prod. l.c.; Kurz Journ. As. Soc. Beng. 1877 II. 137. *S. scabra*, Willd. Sp. Pl. I. 572; Roxb. l.c. 371; Wall. Cat. 824. *S. hirta*, Rottb. in Nov. Ac. Berol. 1803, 95. *S. longicaulis*, Wall. Cat. 826. *S. avana*, Wall. Cat. 828. *S. ramosissima*, Wall. Cat. 829. *S. tubularis* Br. in Wall. Cat. 836.

In all the provinces: common.—DISTRIB. British India, Ceylon, S. China, Malaya Archipelago.

2. SPERMACOCE SCABERRIMA, Blume Bijdr. 946. Herbaceous, woody near the base; stems procumbent, much branched, thinner than a goose-quill, 4-angled, the angles with stiff reflexed small white hairs, otherwise glabrous and shining, dark-brown. *Leaves* olivaceous, coriaceous, narrowly elliptic, tapering acutely to each end, sessile, upper surface scaberulous, with a very few short white hairs; the lower paler, pilose on the midrib and nerves; main-nerves 3 or rarely 4 pairs, ascending obliquely, little curved, depressed on the upper surface and very prominent in the lower; length .5 to 1 in.; breadth .2 to .4 in. *Stipules* cupular, the mouth with 3 to 7 erect stiff bristles, glabrous. *Cymes* small, axillary, sessile, 4- to 8-flowered, condensed, .15 to .2 in. in diam. *Flowers* about .15 in. long, sessile or on very short pedicels, with short filiform bracteoles between them. *Calyx* oblong, constricted below the mouth, glabrous, the lobes lanceolate, slightly ciliate on the edges, spreading. *Corolla* not much exceeding the calyx, funnel-shaped, glabrous except for a few ciliae on the edges near the

base of the narrowly-lanceolate spreading lobes. *Stamens* exerted from the throat of the corolla but shorter than its lobes. *Anthers* oblong, the filaments rather long. *Style* about as long as the filaments; stigma large, thick, transversely oblong. *Capsule* slightly more than 1 in. long, oblong, crowned by the large spreading calyx-lobes, smooth, membranous, dehiscent, each cell containing a single oblong blunt black seed. DC. Prod. IV. 555; Miq. Fl. Ind. Bat. II. 331; Hook. fil. Fl. Br. Ind. III. 201. *S. longicaulis*, Br. in Wall. Cat. 826.

MALACCA: *Griffith*. SINGAPORE: *Ridley* 5897, 8954. PERAK: *Scortechini* 12, 64, 78, 602.—DISTRIB. Malay Archipelago.

3. SPERMACOCE STRICTA, Linn. fil. Suppl. 120. Herbaceous, erect, little-branched, pale-olivaceous when dry; branches as thick as a crow-quill, 4-angled and with 2 broad deep grooves, minutely hispid or sub-glabrous. *Leaves* sessile, coriaceous, oblong-lanceolate, acute, the base narrowed to the stipule; upper surface shining, glabrous or minutely hispid; the lower paler, dull, the midrib prominent and sometimes minutely hispid, nerves obsolete on both surfaces; length .75 to 1.25 in. *Stipules* conjoined to form a deep campanulate cup, the mouth acuminate or truncate but always with 6 to 8 long spreading bristles. *Flowers* .3 in. long, in clusters of 2 or 3, axillary, sessile subtended by a few pectinate bracteolates. *Calyx* campanulate, hispid outside, the mouth with 4 deep, lanceolate, acuminate, spreading lobes. *Corolla* much exerted beyond the calyx, tubular, with 4 deep, hollow, sub-erect lobes inflexed and sometimes hispid at the apex. *Stamens* slightly exerted; anthers sagittate, on long filaments. *Stigma* large, 2-lobed, as long as the stamens; style long filiform. *Capsule* oblong-obovoid, smooth, membranous, 2-celled, dehiscent, with a single black oblong seed in each cell. Roxb. Hort. Beng. 83; Fl. Ind. I. 370; DC. Prod. IV. 554; Kurz in Journ. As. Soc. Beng. 1877 II. 137. *S. lasiocarpa* Br. in Wall. Cat. 832. *S. pusilla*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. I. 379; Cat. 823; Don. Prod. 134. *S. filina*, *Gardneri* and *angustifolia*, Wall. Cat. 830, 834, 835. *S. triandra*, Ham. in Don. Prodr. 134. *Bigelovia stricta*, Blume Bijdr. 945. *B. lasiocarpa*, *Roxburghiana* & *Kleinii*, W. & A. Prod. 437. *B. myriantha*, Miq. Fl. Ind. Bat. II. 334. *Borreria pusilla*, DC., Prod. l.c. 543.

PENANG: *Curtis* 1936. MALACCA: *Goodenough* 1490. PAHANG: *Ridley* 1624.—DISTRIB. British India.

#### 46. PAEDERIA, Linn.

Twining, slender, foetid shrubs, glabrous or pubescent; the branches thin. *Leaves* opposite, rarely in whorls of three, membranous

petiolate, stipules broad, acuminate, deciduous. *Flowers* in axillary and terminal 2-3-chotomously branched cymose panicles, with or without bracteoles. *Calyx-tube* campanulate or turbinate; the limb 4 or 5 toothed, persistent. *Corolla* funnel-shaped, its throat glabrous or villous; 4 or 5 lobes of the limb with inflexed crenulate margins, their apices sometimes 3-lobed, spreading. *Stamens* 4 or 5, linear-oblong, inserted in the tube of the corolla by very short filaments. *Ovary* 2-celled; stigmas 2, slender, twisted. *Ovules* one in each cell, basal, erect. *Fruit* compressed or globose, with thin shining fragile epicarp, separating early from the 2 pyrenes; pyrenes orbicular or ovoid, dorsally compressed, with or without wings, each containing a single compressed seed with membranous testa adherent to the pyrene; cotyledons large, thin, cordate; radicle small, inferior.—DISTRIB. Species 10 to 12 mostly in tropical Asia, one in Brazil.

Fruit compressed, orbicular; pyrenes flat, winged, with radiating ridges on the dorsal surface:—

Leaves and the branches of the panicles always opposite ... .. 1. *P. foetida*.

Leaves and the branches of the panicles often in verticels of three ... .. 2. *P. verticellata*.

Fruit globular; pyrenes cupped, with neither marginal wings or dorsal ridges ... .. 3. *P. tomentosa*.

1. PAEDERIA FOETIDA, Linn. Mant. I. 52. Glabrous or puberulous; branches thinner than a goose-quill, dark-coloured and compressed when dry. *Leaves* ovate to lanceolate, the apex acute or apiculate, the base usually rounded or slightly cordate but sometimes cuneate; both surfaces cinereous or olivaceous-brown when dry, and finely reticulate, glabrous except for the occasional pubescence on the leaf nerves beneath and the tufts in their axils; main-nerves 4 or 5 pairs, oblique, faint; length 2 to 3·5 in.; breadth 1 to 1·5 in.; petioles ·5 to 1·5 in.; stipules broadly ovate-lanceolate, acuminate, often bifid, under ·1 in. in length. *Flowers* pink, ·35 in. long, shortly pedicellate, in lax spreading trichotomous (often scorpioid) cymes arranged in divergent axillary and terminal panicles from 3 to 15 in. long and usually bearing leaves like those of the stem but smaller; bracteoles minute, linear. *Calyx* less than ·1 in. long, campanulate, its mouth acutely 4- to 5-toothed. *Corolla* funnel-shaped, three times as long as the calyx, usually pubescent; the lobes of the limb crenulate, short, spreading only slightly. *Fruit* ·4 to ·5 in. across, orbicular; epicarp with 5 curved vertical veins in each side, thin, shining; pyrenes orbicular, with pale marginal wings, the centre with many bold radiating ridges on the dorsal surface, nearly smooth on the ventral. Wall. Cat. 6247, excl. E.; Roxb. Fl. Ind. I. 683; id. ed.

Wall. & Carey II. 517; W. & A. Prod. Fl. Pen. Ind. 424; Blume Bijdr. 968; DC. Prod. IV. 471; Griff. Notul. IV. 267; Ic. Pl. Asiat., t. 479, f. 3; Miq. Fl. Ind. Bat. II. 258; Miq. in Ann. Mus. Lugd. Bat. IV. 254; Hook. fil. Fl. Br. Ind. III. 195.

PERAK: *King's Collector* 1125, 4916, 7560; *Scortechini* 263. PAHANG: *Ridley* 1256. PENANG: *Curtis* 24. MALACCA: *Griffith*.—DISTRIB. British India, Malay Archipelago, Andaman Islands.

2. *PAEDERIA VERTICELLATA*, Blume Bijdr. 968. Glabrous except the lower surfaces of the leaves; branches thinner than a goose-quill, dark and slightly and bluntly 4-angled when dry. *Leaves* coriaceous, usually opposite but sometimes in whorls of three, lanceolate, ovate-lanceolate or elliptic, shortly acuminate, the base cuneate; both surfaces brown when dry, dull, the upper always glabrous, the lower often pubescent, the reticulations on the lower side rather distinct and transverse; main-nerves 6 or 7 pairs, curving, oblique, rather prominent on the lower surface; length 2.5 to 4 in.; breadth 1 to 1.75 in.; petioles 1 to 1.75 in.; stipules broadly triangular, short, very deciduous. *Flowers* .6 in long, funnel-shaped, shortly pedicellate in lax pedunculate branching cymes arranged in pairs or whorls of three in long narrow panicles, bracteoles minute. *Panicles* from 3 to 18 in. long, often bearing petiole narrowly oblong leaf-like bracts .5 in. long; branches from .75 to 3 in. long, diverging, opposite or in whorls of three. *Calyx* less than .1 in. long, glabrous or puberulous, narrowly funnel-shaped, the mouth dilated and with 4 small triangular teeth or sub-truncate. *Corolla* tubular, constricted at the base, .6 in. long; the teeth less than .1 in. long, acute, erect. *Anthers* linear-oblong, apiculate, included in the corolla; their filaments nearly as long as themselves, dorsi-fixed. *Fruit* much compressed, orbicular, .4 to .5 in. across, with 5 curved vertical veins on each side; pyrenes as in *P. foetida*. DC. Prod. IV. 471; Miq. Fl. Ind. Bat. II. 259; Hook. fil. Fl. Br. Ind. III. 195; Ann. Mus. Lugd. Bat. IV. 255.

SELANGOR: *Ridley* 7416. MALACCA: *Maingay* (K.D.) 885. PERAK: *Scortechini* 446, 1573; *Wray* 3042; *King's Collector* 3177, 3736, 4457, 4780, 5316, 5410, 10613; *Curtis* 3182, 3340. SINGAPORE: *Ridley* 2835, 3647, 6469.—DISTRIB. Borneo.

3. *PAEDERIA TOMENTOSA*, Blume Bijdr. var. *GLABRA*, Kunz. Glabrous or sparsely pubescent; branches slightly thicker than a crow-quill, compressed and brown when dry. *Leaves* membranous, ovate to lanceolate; apex acute, base rounded or cuneate: both surfaces brown when dry, the lower paler and minutely reticulate, pubescent in the nerve axils; length 2.25 to 4 in.; breadth .85 to 1.5 in.; petioles .25 to 1 in.; stipules not connate, triangular, acuminate, less than .1 in. long. *Panicles* as

in *P. foetida* but shorter and less branched; the branches long (often 2·5 in.), diverging, markedly scorpioid. *Flowers* ·5 in. long, secund, sessile or pedicellate on the same branch. *Calyx* ·1 in. long, narrowly campanulate, with 5 sharp teeth, glabrous. *Corolla* ·5 in. long, cylindric, the mouth with 5 short erect acute teeth, pubescent outside. *Fruit* ·2 to ·3 in. in diam., globular, shining, without veins, crowned by the small calyx; pericarp brittle, pale-brown when dry. *Pyrenes* cupular, without wings or ridges. DC. Prod. IV. 471; Miq. Fl. Ind. Bat. II. 258; Miq. in Ann. Mus. Lugd. Bat. II. 254; Hook. fil. Fl. Br. Ind. III. 197. *P. barbulate* Miq. in Ann. Mus. Lugd. Bat. IV. 255.

MALACCA: *Maingay* (K.D.) 886. PERAK; *Scortechini* 1376; *King's Collector* 6048.—DISTRIB. Malayan Archipelago.

The typical form of this has pubescence on the stems, under surfaces of the leaves and on the panicles. It is the form found in Burma and Assam. In our region only this variety *glabra* has as yet been collected. Except in the shape of its fruit and seeds this species differs little from *P. foetida*, Linn.

#### 47. SAPROSMA, Blume.

Shrubs, foetid when bruised, usually glabrous, often with subulate bristles at the apices of the branches and the bases of the peduncles. *Leaves* membranous, sometimes in whorls of 3 or 4; stipules usually connate into a 1- to 3-pointed sheath. *Flowers* small, white, axillary or terminal, solitary or in fascicles of about 3, sessile or pedicelled, or in pedunculate cymes; the bracteoles minute, often connate. *Calyx-tube* funnel-shaped; the limb dilated, 4- to 6-lobed or toothed; persistent. *Corolla* funnel-shaped or campanulate, the throat villous; the limb with 4 or 5 broad blunt lobes valvate in bud and with inflexed margins. *Stamens* 4, inserted on the throat, sessile or on short filaments; anthers more or less narrowly oblong. *Ovary* 2-celled; style filiform, with 2 short branches; ovules 1 in each cell, erect, basal. *Fruit* small, oblong or globose, containing 2 or (by abortion) 1 pyrene. *Seeds* elliptic and solitary, or two and plano-convex the plane surface not grooved; cotyledons small and leafy; radicle small, inferior.—DISTRIB. About 10 species, tropical Asiatic.

Flowers sessile in dense glomeruli ... .. 1. *S. glomerulatum*.

Flowers pedicelled, in cymes:—

Glabrous:—

Cymes about 1 in. long, laxly 3-flowered ... .. 2. *S. Scortechinii*.

Cymes from 1·5 to 3·5 in. long, more than 3-flowered,  
the branches lax, spreading ... .. 3. *S. ternatum*.

More or less pubescent... .. 4. *S. Ridleyi*.

1. *SAPROSMA GLOMERULATUM*, King & Gamble, n. sp. A shrub, very foetid when bruised; young branches thicker than a crow-quill,

compressed, brown when dry. *Leaves* thinly coriaceous, elliptic or ovate-elliptic, shortly and sharply acuminate, the base more or less cuneate, both surfaces brown when dry; the lower paler, dull, and with sparse transverse reticulations; main-nerves 6 to 9 pairs, pale and prominent on the lower surface like the midrib, depressed on the upper; length 3·5 to 7 in.; breadth 1·75 to 3 in.; petioles ·25 to ·4 in.; stipules cartilaginous, united into a short more or less persistent ring with some short bristly processes inside it. *Flowers* crowded, to the number of 4 or 5, in a multibracteate solitary glomerulus borne at the apex of a short branch between two leaves; the branch bearing in its lower third a pair of lanceolate bracts about ·5 in. long. *Female* glomerulus quite sessile, about ·3 in. long and ·4 in. broad; the male glomerulus somewhat larger than the female, borne on a short compressed peduncle ·4 to ·75 in. long and enveloped for the lower two-thirds of its length in a loose sheath formed of two acuminate partly conjoined bracts. The outer bracteoles of each glomerulus longer and thicker than the inner, broad, very concave, and forming a persistent involucre; the middle bracteoles broadly ovate-rotund with terminal caudate appendages; the inner ones narrower and embracing the flowers by pairs, appendiculate. *Flowers* sessile, about ·25 in. long. *Calyx* ·1 in. long, coriaceous, campanulate, the mouth truncate and with 4 or 5 minute distant acute teeth. *Corolla* salver-shaped, about ·2 in. long; the tube short and wide; the limb longer than the tube, with 4 broad blunt spreading lobes; anthers 4 to 6, linear-oblong. *Fruit* sessile, sub-globular, smooth, crowned by the small annular calyx, ·3 to ·35 in. in diam.; pericarp thick; seed solitary, sub-globular, hard.

PERAK: *Scortechini*; *Ridley* 9835; *King's Collector* 783, 6031, 8166. SINGAPORE: *Ridley* 10931. JOHORE: *Ridley* 4213.

The fruit when ripe is said to be blue, and the flowers variously pale-green or white.

VAR. *angustifolia*, *King & Gamble*: leaves rather more coriaceous than in the typical form, ovate-lanceolate, acuminate, 3 to 4 in. long and 1·25 to 1·4 in. broad.

MALACCA: *Goodenough* 1856. NEGRI SEMBILAN: *Ridley* 1856.

Flowers are absent in both the specimens cited here. When these are obtained, they may afford characters to separate this as a good species.

2. *SAPROSMA SCORTECHINII*, *King & Gamble*, n. sp. A shrub, glabrous except the midrib and nerves of the leaves on the lower surface; young branches thicker than a crow-quill, with pale-brown spongy bark. *Leaves* thinly coriaceous, elliptic, shortly and bluntly acuminate, the base cuneate; both surfaces brown when dry; the upper glabrous; the

lower puberulous on the midrib, otherwise glabrous, laxly reticulate; midrib bold on both surfaces; main-nerves 6 or 7 pairs, oblique, bold on the lower surface, faint on the upper; length 3·5 to 5·5 in.; breadth 1·5 to 2·5 in.; petiole ·2 to ·25 in. *Stipules* very short, connate into a sheath; mouth with short bristles. *Cymes* one to three at the apices of the branches, about 1 in. long (longer in fruit), laxly 3-flowered, the peduncle angled, puberulous, with small lanceolate bracteoles in whorls. *Flowers* ·5 in. long; their pedicels about the same. *Calyx* funnel-shaped; the mouth with 4 deep linear-lanceolate spreading lobes. *Corolla* twice as long as the calyx, tubular, expanding at the mouth; lobes 4, oblong, blunt; throat with a ring of hairs. *Stamens* 4, included. *Anthers* curved, oblong; their filaments attached to the tube. *Disk* conical. *Ovary* 2-celled, 2-ovuled. *Fruit* ellipsoid, smooth, ·65 in. long; the remains of the calyx ·2 in. long, blue when ripe. *Seed* solitary.

PERAK: *Scortechini* 511, 670; *Kings Collector* 4138, 5020.

3. *SAPROSMA TERNATUM*, Hook. fil. in Bth. & Hook. fil. Gen. Plant. II. 131; Fl. Br. Ind. III. 193. A glabrous shrub; young branches rather thinner than a goose-quill, pale when dry, compressed. *Leaves* often in whorls of three, thickly membranous, elliptic or elliptic-lanceolate, rarely oblanceolate-elliptic, shortly and rather abruptly acuminate, the base cuneate; both surfaces pale-brown when dry, the upper shining; the lower dull and paler; main-nerves 7 to 9 pairs, oblique, little curved, pale and prominent on the lower surface, the reticulations transverse and rather distinct on the lower surface only; length 4 to 8 in.; breadth 1·5 to 3·25 in.; petioles ·4 to ·6 in. long, with many short unequal bristles at their bases and inside the connate setosely-toothed stipules. *Cymes* solitary or fascicled, from 1·5 to 3·5 in. long, (longer in fruit) axillary, pedunculate, or branching from the base; the branches lax, spreading, sparsely flowered; the bracteoles few, linear. *Flowers* ·4 in. long, on pedicels varying from ·2 to ·6 in. long. *Calyx* ·1 in. long, shortly campanulate, the mouth wide and with 4 broad blunt teeth. *Corolla* ·3 in. long, salver-shaped, puberulous; the tube wide; the limb ·35 in. across with 4 or 5 broad reflexed lobes. *Fruit* ovoid or subglobular, crowned by the rather large calyx-teeth, ·35 in. in diam.; 1-seeded; seeds ellipsoid. Kurz. For. Fl. Burma II. 29. *Paederia ternata*, Wall. Cat. 6248 Roxb. Fl. Ind., ed. Carey & Wall., II. 520; DC. Prod. IV. 471. *Mephitidea* sp., Griff. Notul. IV. 267; Ic. Pl. Asiat. t. 476.

PERAK: *Scortechini* 1163; *Wray* 2262, 2907, 2929, 3943; *King's Collector* 1975, 2764, 3052, 4006, 4069, 6760, 8491. PAHANG: *Ridley* 2225. SELANGOR: *Ridley* 8236.—DISTRIB. Andaman Islands, Burma, Khasia Hills, Sumatra, Java.

4. *SAPROSMA RIDLEYI*, King & Gamble. A shrub? Young branches

compressed, thicker than a crow-quill, pale, glabrous below, pubescent or tomentose towards the apices. *Leaves* membranous, oblanceolate to elliptic, shortly and rather bluntly acuminate, the base much narrowed; both surfaces pale-brown when dry and minutely pitted; the upper glabrous and with the midrib channelled; the lower sparsely pubescent, the midrib densely so and prominent; main-nerves 7 to 10 pairs, spreading but curving upwards at their apices, thin but prominent below; length 3 to 3.75 in.; breadth 1 to 1.5 in.; petiole .1 to .15 in. *Stipules* connate, pale, coriaceous, forming a narrow cup pubescent outside at first, but ultimately glabrous, from less than .1 to .15 in. deep, irregularly toothed, persistent. *Cymes* axillary and terminal, less than half as long as the leaves, trichotomous, the branches 3- or more-flowered, often with 2 elliptic acute involucre bracts at the base. *Flowers* .25 in. long, their pedicels .1 in. *Calyx* salver-shaped, .15 in. long; the tube narrow, tomentose externally; the limb with 5 deep oblong blunt spreading or deflexed lobes; disk large. *Ovary* 2-celled, 2-seeded. *Corolla* and *Fruit* unknown.

SINGAPORE: Ridley 6474, only one specimen seen.

#### 48. HYDNOPHYTUM, Jack.

Glabrous epiphytic shrubs, with a dilated tuberous fleshy stem, simple or lobed and perforated by ants. *Leaves* coriaceous, elliptic, obtuse. *Flowers* small, sessile, axillary, solitary or in fascicles, white. *Calyx-tube* ovoid-cylindric, the limb truncate. *Corolla* salver or funnel-shaped; tube short, hairy inside; limb 4-lobed, valvate. *Anthers* 4, oblong, subsessile on the corolla-throat. *Ovary* 2-celled; stigma 2-lobed; ovules one in each cell, basal, erect. *Fruit* containing two coriaceous pyrenes surrounded by pulp. *Seeds* oblong, plano-convex, testa thin with dark lines, embryo in the centre of the fleshy albumen.—  
DISTRIB. 3 or 4 species in Malaya, N. Australia, Fiji.

HYDNOPHYTUM FORMICARIUM, Jack in Trans. Linn. Soc. XIV. 124. All parts glabrous. *Stem* tuber-like, smooth, several inches to a foot in diameter, bearing roots from its base and from its apex a few short branches as thick as a goose-quill and compressed near the nodes, pale and striate when dry. *Leaves* elliptic or elliptic-oblong, sometimes obovate, the apex obtuse, the base cuneate; both surfaces pale-brown when dry; the midrib distinct on both; the 6 or 7 pairs of ascending little-curved main-nerves slender on both surfaces and the reticulations obsolete; length 2.5 to 3.5 in.; breadth 1 to 2.5, petioles .1 to .2 in. *Flowers* few, .25 in. long, sessile in axillary fascicles. *Calyx* widely campanulate with rounded base and truncate apex. *Corolla-tube* nearly twice as long as the calyx, wide, with 4 tufts of hair in the throat; limb about

half as long as the tube, with 4 broad oblong acute lobes, thickened at the apex. *Anthers* elliptic, on very short filaments inserted at the base of the tube. *Fruit* broadly ovoid, crowned by the cup-like remains of the calyx, glossy orange-red when ripe, about .2 in. long. Blume Bijdr. 956: DC. Prod. IV. 451; Kurz For. Flora Burma, II. 8; Hook. fil. Fl. Br. Ind. III. 194; Beccari Malesia II. t. XLVII. f. 1 to 11; XLVIII. f. 1 to 8. *H. montanum*, Blume and DC. ll. cc. *Lasiostoma formicarium*, Spreng. Syst. I. 423; Wall. Cat. 9055.

MALACCA: *Griffith* (K.D.) 2975; *Maingay* (K.D.) 864. PENANG: *Curtis* 2164. PERAK: *Scortechini* 934; *Wray* 2673; *King's Collector* 4994. JOHORE: *Ridley* 335, 2840. SINGAPORE: *Ridley* 1617.—DISTRIB. Cochin-China, Sumatra, Borneo.

#### 49. GEOPHILA, Don.

Small, slender, usually perennial, creeping herbs, glabrous or pubescent, the stems rooting. *Leaves* orbicular, reniform, ovate, often cordate, on long petioles. *Stipules* ovate, entire. *Flowers* small, solitary and sessile or in pedunculate, bracteate, axillary or terminal umbels. *Calyx-tube* obovoid; its segments from 5 to 7, slender, persistent, spreading or reflexed. *Corolla* rather long, funnel-shaped, the throat hairy; lobes 4 to 7, valvate in bud. *Stamens* equal in number to the lobes. *Anthers* dorsifixed, linear; filaments thin. *Ovary* 2-celled; style slender, with 2 long or short branches: ovules erect, one in each cell. *Fruit* fleshy, with two plano-convex pyrenes. *Seeds* plano-convex, without any ventral groove; embryo minute, basal; radicle inferior.—DISTRIB. about 16 species, all tropical.

Leaves with broad, usually cordate bases:—

Flowers solitary, axillary:—

Leaves glabrous, .5 in. long ... .. 1. *G. humifusa*.

Leaves hairy, .6 to 1 in. long ... .. 2. *G. pilosa*.

Peduncles with 1 to 3 flowers; leaves reniform to ovate-cordate, glabrous, .5 to 1.75 in. in length and breadth 3. *G. reniformis*.

Peduncles with 6 to 9 flowers in an umbel; leaves glabrous, 1.75 to 3 in. long ... .. 4. *G. melanocarpa*.

Leaves with narrow bases never cordate, sparsely and minutely adpressed hairy, 1 to 1.5 in. long, peduncles few-flowered ... .. 5. *G. Scortechinii*.

1. *GEOPHILA HUMIFUSA*, King & Gamble, n. sp. Stems very slender, glabrous, rooting at the nodes, often several feet long. *Leaves* thickly membranous, glabrous, in distant pairs, ovate-cordate, acute, the edges undulate when dry, .4 in. long and .25 in. broad, the petiole as long as the blade, main-nerves about 3 pairs, one pair basal; stipules

broad-ovate, .1 in. long. *Flowers* solitary, axillary, sub-sessile. *Fruit* as large as a currant, fleshy, bright-red.

PERAK: *Scortechini* 412.—DISTRIB. JAVA: on the Gedeh Volcano, *King*. SUMATRA: *Beccari* 44; *Forbes* 2059.

2. *GEOPHILA PILOSA*, H. H. W. Pearson in *Hook. Ic. Plant.*, t. 2691. More slender than *G. reniformis*, the stem, leaves, peduncles and calyx with much stiff pubescence. *Leaves* broadly ovate-cordate, with sub-acute apices and slightly waved edges, both surfaces and petioles with pale stout curved hairs, the upper olivaceous, the lower paler green; main-nerve 3 pairs, much curved, spreading and ascending, rather distinct (when dry) on the lower; length .6 to 1 in.; breadth .35 to .65 in.; petioles .5 to 2 in. *Stipules* ovate, .1 in. long. *Peduncles* terminal, .5 to .8 in. long, tomentose. *Flowers* solitary, or 2 to 3 in an umbel with 2 lanceolate hairy bracts at its base. *Flowers* .25 in. long, sub-sessile. *Calyx*-tube cylindric, densely hairy, its lobes linear. *Corolla* tubular, with 5 deep ovate-acute teeth, pilose externally. *Fruit* sub-globular, black, crowned by the sub-coherent calyx-lobes, .3 in. in diam.

SINGAPORE: *Ridley* 9516.—DISTRIB. BORNEO: *Barber* 249.

3. *GEOPHILA RENIFORMIS*, Don. *Prodr.* 136. *Stem* as thick as a crow-quill, 6 to 18 in. long, glabrous, the branches short. *Leaves* broadly ovate-cordate to reniform, the apex sub-acute or obtuse; upper surface brown when dry, the lower paler, both glabrous, the main-nerve mostly radiating from the base of the midrib, 3 or 4 pairs, not prominent; length .5 to 1.5 in.; breadth .5 to 1.75 in.; petioles .35 to 2 in., often puberulous. *Stipules* small, semilunar, the apex reflexed. *Peduncles* slender, .5 to 2 in. long, slender, 1- to 3-flowered. *Flowers* .6 in. long, without pedicels, with lanceolate bracts at their bases. *Calyx*-lobes deep, narrowly lanceolate. *Corolla* much exceeding the calyx, its lobes lanceolate, glabrous or pubescent externally. *Berry* red, crowned by the calyx-lobes, sub-globular, .35 in. in diam. DC. *Prod.* IV. 537; W. & A. *Prod.*, 436; *Wight Icon.* t. 54; *Dalz. & Gibs. Fl. Bomb.* 111; *Miq. Fl. Ind. Bat.* II. 311; *Hook. fil. Fl. Br. Ind.* III. 178. *G. diversifolia*, DC. l.c., *Wall. Cat.* 8325. *Psychotria herbacea*, *Linn. Sp. Pl.* 245; *Roxb. Fl. Ind.* I. 533. *Cephaelis herbacea*, *Kurz in Journ. As. Soc. Beng.* 1877, II. 140. *C. diversifolia*, *Bl. Bijdr.* 1004.

MALACCA: *Maingay* (K.D.) 927; *Goodenough* 1526. PERAK: *Scortechini* 130, 2183; *Wray* 3368; *King's Collector* 265, 905. PENANG: *Curtis* 1930; *Deschamps*. POONGAH: *Curtis* 3235. KEDAH: *Curtis*.—DISTRIB. Malayan Archipelago, Ceylon, British India, Andaman Islands, Polynesia, S. China, tropical America and Africa.

4. *GEOPHILA MELANOCARPA*, *Ridley* in *Trans. Linn. Soc.* (2) III. 313, t. 62. *Stems* 6 to 18 in. long, compressed, as thick as or thicker

than a crow-quill, glabrous. *Leaves* thickly membranous, oblong-ovate; slightly cordate at the base, the apex sub-acute, the edges slightly waved; both surfaces glabrous, pale olivaceous-brown, the reticulations, midrib, and 3 to 5 pairs of ascending main-nerves prominent; length 1·75 to 3 in.; breadth ·75 to 1·5 in.; petiole 1 to 2·5 in.; puberulous. *Stipules* lanceolate, 1 in. long. *Peduncle* terminal, slender, ·75 to 3 in. long, compressed, bearing an umbel of 6 to 9 flowers with an involucre of linear blunt bracts at its base. *Flowers* ·6 in. long, on glabrous pedicels much shorter than themselves. *Calyx-tube* ·25 in. long; its lobes longer, oblong, obtuse. *Corolla-tube* about ·25 in. long, its lobes shorter, oblong, blunt. *Stamens* included. *Fruit* fleshy, broadly ovoid, black when ripe, shining, ·35 in. in diam. and (including the persistent calyx-teeth) slightly longer; pyrenes ·25 in. long, plano-concave with a ridge on each side.

PERAK: *Scortechini* 129; *King's Collector* 10134. MALACCA: *Ridley* 1608. SELANGOR: *Ridley* 8569.

5. *GEOPHILA SCORTECHINII*, King, n. sp. *Stem* prostrate, rather thicker than a crow-quill, obscurely 4-angled, 1 or 2 feet long; the branches short, erect. *Leaves* sub-fleshy, ovate or ovate-elliptic, base narrowed or rounded; both surfaces with sparse very minute white adpressed hairs; upper (when dry) pale-brown, the nerves indistinct; lower yellowish, the midrib and the 3 or 4 pairs of much curved ascending nerves slightly prominent; length 1 to 1·5 in.; breadth ·6 to ·9 in.; petioles ·35 to ·75 in. *Peduncles* terminal, about as long as the leaves, slender, compressed, bracteate, dichotomous near the apex and bearing two small linear bracts at each bifurcation. *Flowers* few, on short bracteolate pedicels, ·6 in. long (to the end of the long style). *Calyx* with a long narrow tube, and 5 long linear acuminate lobes puberulous outside. *Style* very long, filiform.

PERAK: *Scortechini*.

#### CEPHAELIS, Swartz.

Undershrubs or perennial herbs, usually erect. *Leaves* oblanceolate, obovate or oblong; stipules usually solitary, connate at the base (in the Malayan species) *Flowers* in involucrate heads. *Calyx* with a funnel-shaped tube and (in the Malayan species) an entire persistent limb. *Corolla* funnel-shaped or salver-shaped, its throat naked or hairy; lobes of the limb 4 or 5, erect or spreading, valvate. *Stamens* 4 or 5, inserted in the mouth of the corolla-tube, usually shortly exserted. *Anthers* oblong or linear, dorsifixed. *Ovary* 2-celled (rarely 3- or 4-celled. *Style* long or short. *Ovules* 1 in each cell, basal, erect. *Fruit* dry or fleshy, of two plano-convex pyrenes. *Seeds* plano-convex, their

testa membranous, albumen horny. *Embryo* small, basal, the cotyledons leafy.—**DISTRIB.** Species about 70, all tropical.

Stipules coriaceous, their bases coriaceous and leaving bold scars on the stem :—

Capitula sessile, 1 to 3 in. across; leaves 3 to 5 in. broad;  
stipules broadly ovate, '8 in. long ... 1. *C. Griffithii*.

Capitula pedunculate, '75 to 1 in. across; leaves '5 to 3.5  
in. broad; stipules coriaceous, broadly ovate with dis-  
coloured edges, '1 to '5 in. long ... 2. *C. cuneata*.

Stipules not coriaceous, leaving no scars on the stem ... 3. *C. Ridleyi*.

1. **CEPHAELIS GRIFFITHII**, Hook. fil. Fl. Br. Ind. III. 178. Young branches thicker than a swan-quill, lenticellate. *Leaves* membranous, oblong-oblancoolate, shortly and rather abruptly acuminate, gradually narrowed from above the middle into the long slightly winged petiole, both surfaces glabrous, brown when dry, the lower the paler; main-nerves 12 to 20 pairs, curving upwards, prominent like the midrib on the lower surface, rather faint on the upper surface when dry; length 10 to 16 in.; breadth 3 to 5 in.; petioles 2.5 to 3 in. *Stipules* coriaceous, sub-orbicular, their apices sub-acute, '8 in. long, the margins entire, thin, and discoloured. *Capitulum* sub-globular, from 1 to 2 in. in diam., sessile or shortly stalked, bearing numerous orbicular bracts like the stipules, but smaller. *Flowers* '75 in. long, on short pedicels. *Calyx* '15 in. long, the tube narrow-cylindric; the mouth abruptly campanulate, entire, truncate. *Corolla* funnel-shaped, '65 in. long, mouth with 5 ovate-acute reflexed lobes. *Fruit* '35 in. long, compressed, slightly grooved along the edges, with a broad dorsal rib on each side, crowned by the calyx-limb. *Seed* thin.

MALACCA: *Griffith* (K.D.) 3032; *Maingay* (K.D.) 928. NEGRI SEMBILAN: *Ridley* 10109. PERAK: *King's Collector* 746, 2534, 6251, 6399, 10782; *Wray* 1197, 1338, 3027; *Ridley* 9755; *Scortechini*.—**DISTRIB.** SUMATRA: *Forbes*, 2511.

Differs from *C. cuneata* in the longer and sessile capitulum and somewhat larger leaves and stipules.

2. **CEPHAELIS CUNEATA**, Korth. in Ned. Kruidk. Arch. II. 248. A shrub; young branches thinner than a goose-quill, glabrous, the nodes sometimes close together and always marked by the pale coriaceous bases of the deciduous stipules. *Leaves* thickly membranous, oblanceolate or elliptic-oblancoolate, gradually narrowed from above the middle into the slightly winged petiole; both surfaces glabrous, olivaceous when dry, the lower the paler; main-nerves 10 to 18 pairs, curved, spreading and ascending, indistinct on the upper surface when dry but distinct on the lower, the midrib broad; length from 5 to 10 in.; breadth 1 to 2.5 in.; petioles narrowly winged, '5 to 1.5 in. long. *Stipules*

coriaceous, broadly ovate and about .5 in. long or forming small shallow, cups .1 in. deep always with more or less broad discoloured edges. *Capitulum* pedunculate, from .8 to about 1.25 in. in diam. enveloped in thickly membranous, veined, involucrel bracts, the inner being mostly orbicular-oblong but the two or three lower (external) elongate-oblong and connate; the peduncle from 1 to 3 in. long, ebracteate. *Flowers* .75 in. long. *Calyx* only .15 in. long, cylindric but widening slightly at the truncate apex. *Corolla* .65 in. long, infundibuliform, the mouth with 5 short triangular reflexed lobes. *Anthers* linear-oblong, their apices slightly exerted. *Disk* large and deep. *Style* longer than the anthers; stigma fleshy, 2-lobed, exerted. *Fruit* .4 in. long, compressed, deeply grooved on the edges and with a stout dorsal ridge on each side, crowned by the calyx.

MALACCA: *Griffith* (K.D.) 3085; *Goodenough* 1979; *Derry* 609; *Main-gay* (K.D.) 929; *Hullett* 790. SINGAPORE: *Ridley* 4966. JOHORE, *King*; *Ridley* 3733, 6405. PAHANG: *Ridley* 2198. PERAK: *Scortechini* 343; *Ridley* 2924; *King's Collector* 1104, 6218; *Wray* 1497, 1977.

Sir Joseph Hooker considers *C. cuneata*, Korth. to be a species, and in deference to his opinion we have kept it up. The two chief characters, on which he relies to separate it from *C. Griffithii* are the pedunculate inflorescence and the narrower leaves. But, in a large suite of specimens, these break down, for there are specimens in which distinct peduncles are associated with the broadly oblanceolate leaves of *C. Griffithii*. A third and minor character used to separate the two is the size of the stipules,—those of *C. Griffithii* being 1 in. in diam., and those of *C. cuneata* only .25 in. But, here again, there are numerous variations which do not fit in as distinctive marks with the other two characters. I think it might be better to treat *C. cuneata* as a variety of *C. Griffithii*, referring to it (amongst the specimens cited above) only *Griffith* 3085, *Maingay* 929 and *Hullett* 796.

3. CEPHAELIS RIDLEYI, King, n. sp. Like *C. Griffithii*, but with rather narrowly elliptic leaves, tapering to each end, the main-nerve faint and only 8 to 10 pairs, 8 or 9 inches in length and from 2.5 to 3 in. in breadth; stipules lanceolate not coriaceous, the capitules shortly trichotomous, 2.5 to 3 in. in diam. on thick peduncles 1 in. long, subtended by two boat-shaped bracts 1.35 in. long, flowers shorter than the lanceolate inner bracteoles.

SINGAPORE: *Ridley* 9515; *Yapp* 433. PENANG: *Curtis*. SELANGOR: *Ridley* 7417.

### 51. LASIANTHUS, Jack.

Shrubs or small trees, often foetid, with terete branches often compressed at the nodes. *Leaves* distichous, more or less acuminate (often very much so), the veins transverse and often distinct; stipules usually broad. *Flowers* small, in axillary, often bracteate, sessile (rarely pedun-

clad), fascicles on condensed cymes. *Calyx-tube* short; the limb with 3 to 5 long or short persistent teeth, sometimes truncate. *Corolla* funnel- or salver-shaped, its throat villous; the limb with 3 to 7 valvate lobes. *Stamens* 4 to 6, inserted by short filaments on the throat, often apiculate, included. *Style* long or short, stigmas 3 to 9, short, blunt; ovules 1 in each cell, basal, erect, usually linear. *Drupe* small, containing 3 to 9 triquetrous 1-seeded pyrenes. *Seeds* narrow, with membranous testa; embryo terete; radicle slender, inferior.—**DISTRIB.** About 50 species, mostly tropical Asiatic.

A genus resembling in *facies* *Urophyllum*; but distinguished from that by its 1-seeded pyrenes and deeply-lobed, not truncate, calyx-limb; also by its larger stipules, and shorter corolla-tube.

Flowers 4-5-merous:—

Glomeruli hemispheric, sessile, not longer than the petioles; bracts and flowers numerous:—

Glomeruli partially or entirely covered (at least when young) by the persistent, often coriaceous, stipules; leaves usually more than 8 in. long; bracts longer than the flowers (except in No. 43, VAR.):—

- |                                                                                                  |                           |
|--------------------------------------------------------------------------------------------------|---------------------------|
| Leaves elliptic-oblong, hispidulous on both surfaces                                             | 1. <i>L. scabridus</i> .  |
| Leaves oblanceolate, glabrous on the upper surface, pubescent (usually minutely so) on the lower | 2. <i>L. Griffithii</i> . |
| Leaves oblong-lanceolate, glabrous on both surfaces                                              | 3. <i>L. stipularis</i> . |

Glomeruli not covered by the more or less deciduous stipules, bracts longer than the flowers:—

- |                                                                                                                                                                     |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Bracts unequal, diminishing in size inwards; the outer ovate-lanceolate often 1 in. long; the inner lanceolate or linear; pubescence of leaves rusty                | 4. <i>L. cyanocarpus</i> .  |
| Bracts uniform, all linear and densely hispid; leaves oblong-lanceolate, thickly coriaceous, rugulose and glabrous on the upper surface; the lower softly pubescent | 5. <i>L. rhinocerotis</i> . |
| Bracts uniform, all broad; leaves membranous; pubescence of leaves yellowish                                                                                        | 6. <i>L. inæqualis</i> .    |

Cymes twice as long as the petioles with few flowers and few linear hirsute bracts shorter than the flowers; leaves coriaceous, elliptic-lanceolate acute, glabrous above (except the midrib), softly hairy and reticulate below, main-nerves 11 to 13 pairs; pyrenes 5 to 7

7. *L. pilosus*.

Cymes not much longer than the petioles with few flowers but many linear softly hairy bracts longer than the flowers; leaves membranous, narrowly elliptic, somewhat oblanceolate, quite glabrous above; main-nerves 8 or 9 pairs

8. *L. Ridleyi*.

Cymes about as long as the petioles with few flowers and many linear pubescent bracts shorter than the flowers; leaves thinly membranous, narrowly elliptic acuminate, glabrous above and minutely pubescent beneath; main-nerves 5 or 6 pairs; pyrenes 4 ... .. 9. *L. flavicans*.

Cymes shorter than the petioles, few-flowered, bracts few:—  
Leaves 8 to 10 in. long:—

All parts quite glabrous; bracts small, fimbriate  
leaves 4.5 to 6 in. long ... .. 10. *L. longifolius*.

Leaves pubescent at least below, more or less  
oblanceolate, bracts linear:—

Main-nerves of leaves 4 pairs ... .. 11. *L. constrictus*.

Main-nerves of leaves 6 to 8 pairs—

Stipules linear, hirsute, as long as the petioles;  
calyx .1 in. long; corolla .3 in. long, its lobes  
narrow ... .. 12. *L. singaporensis*.

Stipules triangular, sub-acute or bifid; calyx  
.25 in. long; corolla shorter than the calyx, its  
lobes oblong, blunt ... .. 13. *L. ellipticus*.

Leaves elliptic-ovate, tapering to each end, nearly  
glabrous; main-nerves 4 to 6 pairs, faint like the  
reticulations; bracts linear; flowers under .1 in. long ... .. 14. *L. subspicatus*.

Leaves oblong-lanceolate; main-nerves 5 pairs, as-  
cending, the reticulations horizontal, strong, puberulous  
on the under surface; bracts broad; flowers .15  
in. long ... .. 15. *L. Wrayi*.

Leaves oblong, acute at both ends, under surface pu-  
bescent everywhere; main-nerves 6 or 7 pairs, as-  
cending; bracts oblong, acuminate, flowers .3 in. long ... .. 16. *L. Kurzii*.

Leaves 2 to 4 in. long, much narrower than long:—

Bracts of cymes large, broadly ovate to elliptic ... .. 17. *L. sub-inaequalis*.

Bracts of cymes linear:—

Upper surfaces of leaves quite glabrous; calyx-lobes  
crowning the fruit, .25 in. long; pyrenes 5 ... .. 18. *L. coronatus*.

Upper surfaces of leaves glabrous except for a few  
hairs on the midrib; calyx teeth on the fruit short;  
pyrenes 8 ... .. 19. *L. appressus*.

Upper surfaces of leaves glabrous except the cinereous-  
tomentose midrib; under surfaces minutely pi-  
lose; bracts of cyme lanceolate or oblanceolate, taper-  
ing to each end; flowers 4-merous ... .. 20. *L. attenuatus*.

Both surfaces of the leaves and all parts of the plant  
with coarse flexuose hairs with bulbous bases; bracts  
of cyme linear, hispid; flowers 5-merous ... .. 21. *L. densifolius*.

Cymes ebracteate, sessile, shorter or rarely a little longer  
than the leaf-petioles:—

Leaves quite glabrous on both surfaces:—

Leaves 7 to 12 in. long and 2.5 to 3.5 in. broad:—

Lower surfaces of leaves at first puberulous, afterwards quite glabrous, their main-nerves 16 to 20 pairs: stipules .4 in. long, coriaceous, sagittate; calyx shortly campanulate, .1 in. long, obscurely 4- or 5-toothed; fruit sub-globular, glabrous, 6-ridged; pyrenes 5 or 6 ... .. 22. *L. robustus.*

Lower surfaces of leaves always quite glabrous; main-nerves of leaves 10 to 12 pairs; stipules .2 in. long, triangular, acuminate; calyx .15 in. long, widely tubular, the mouth truncate, fruit hairy; pyrenes 4 ... .. 23. *L. coriaceus.*

Main-nerves of leaves 10 pairs; stipules .15 in. long, broadly triangular with abrupt oblong apices: calyx .25 in. long, tubular, the mouth truncate but obscurely 4-toothed ... .. 24. *L. pergamaceus.*

Leaves 3.5 to 6 in. long:—

Leaves elliptic or oblanceolate-elliptic, 1.35 to 2.5 in. broad; main-nerves 5 pairs; fruit ellipsoid, 4-ridged, .45 in. long; pyrenes 4, rugulose ... .. 11. *L. constrictus.*

Leaves oblong-lanceolate, 1 to 1.4 in. broad; main-nerves 8 or 9 pairs; fruit sub-globose, .2 in. in diam.; pyrenes 4, smooth ... .. 25. *L. malaccensis.*

Leaves quite glabrous on both surfaces except for a few adpressed hairs on the lower part of the midrib on each, elliptic-oblong, sharply acuminate, 5 to 6.5 in. long and 1.5 to 2 in. broad; main-nerves 8 or 9 pairs... 26. *L. chinensis.*

Leaves glabrous on both surfaces except the midribs and 10 to 13 pairs of main-nerves, adpressed-puberulous on both, elliptic-oblong, 3 to 4.25 in. long and 1.25 to 1.5 in. broad ... .. 27. *L. Wightianus.*

Leaves quite glabrous above, minutely sub-strigose below, elliptic or oblong-elliptic, bluntly acuminate or sub-acute:—

Leaves with 10 or 12 pairs of main-nerves ... 28. *L. pterospermus.*

Leaves with 3 or 4 pairs of main-nerves... .. 11. *L. constrictus.*

Leaves glabrous on the upper surface, the lower sparsely pilose everywhere ... .. 7. *L. pilosus*  
VAR. *angustifolius*

Leaves glabrous on the upper surface, the lower hairy on the midrib and main-nerves:—

Leaves 6 to 10 in. long, elliptic or obovate-elliptic; main-nerves 7 or 10 pairs ... .. 29. *L. perakensis.*

Leaves 3 to 7 in. long:—

Leaves narrowly oblong-lanceolate, five or six times longer than broad, their apices caudate-acuminate:—

Neither surface of leaves scaly; main-nerves 12 to 14 pairs; cymes 2-to 3-flowered; mouth of

- calyx with 5 triangular acuminate lobes; corolla tubular, its lobes pubescent; pyrenes 4 or 5 ... 30. *L. angustifolius*.
- Both surfaces of leaves minutely scaly; main-nerves about 7 pairs; cymes 5-to 7-flowered; mouth of calyx truncate, entire; corolla salver-shaped, the lobes densely hirsute; pyrenes 7 or 8 ... 31. *L. oblongus*
- Leaves 5 or 6 in. long, oblong, sub-acute or shortly and bluntly acuminate; under surfaces sub-glabrous between the 9 to 11 pairs of adpressed-tomentose main-nerves and veins; calyx cupular-campanulate with 5 triangular teeth ... 7. *L. pilosus*.
- Leaves 3 to 4.5 in. long, ovate-lanceolate, shortly acuminate; under surface glabrous except the pubescent midrib and 5 or 6 pairs of pubescent main-nerves; calyx with 5 long unequal linear-lanceolate lobes ... 32. *L. montanus*.
- Leaves 2.5 to 3.5 in. long, lanceolate or elliptic-lanceolate, long-acuminate; under surface softly pubescent on the 4 to 6 pairs of main-nerves; calyx with 5 sub-equal linear-lanceolate lobes; fruit sub-globular, sparsely pilose; pyrenes 5 ... 33. *L. Curtisii*.
- Leaves never more than 3 in. long, elliptic-lanceolate, acuminate, glabrous above, reticulate beneath and adpressed-puberulous on the 6 or 7 pairs of bold main-nerves; calyx-lobes 5, linear-lanceolate, unequal ... 34. *L. pseudo-lucidus*.
- Leaves never more than 1.5 in. long, oblong-lanceolate, acute or sub-acute, glabrous except the lower surfaces of the 6 to 8 pairs of minutely adpressed-puberulous main-nerves; calyx-teeth short triangular; pyrenes 4 ... 35. *L. nervosus*.
- Leaves scaberulous on the upper surface, the lower scabrid-puberulous between the softly puberulous 4 to 6 pairs of main-nerves, elliptic or ovate-elliptic, 4 to 5 in. long; calyx narrowly campanulate ... 36. *L. Harveyanas*.
- Leaves sparsely clothed with stiff bulbous hairs on the upper surface, the lower with more numerous shorter hairs, oblong-lanceolate, much acuminate; main-nerves 16 to 18 pairs; calyx with 5 deep lanceolate lobes ... 37. *L. ferrugineus*.
- Leaves sparsely and minutely strigose on the upper surface, pilose on the lower, but the 7 to 10 pairs of main-nerves and the midrib tomentose on the latter surface; length 2.5 to 3.5 in.; calyx campanulate with sub-truncate obsolete toothed mouth ... 38. *L. tomentosus*.
- Inflorescence solitary, on peduncles much exceeding the petioles in length:—

Peduncles rather short, 3- to 5-flowered; leaves

- narrowly elliptic-oblong, coriaceous, 4 to 5 in. long; almost glabrous, the reticulations bold and horizontal ... 39. *L. scalariformis*.  
 Peduncles filiform, 1- to 2-flowered; leaves 2 to 3 in. long, sessile or nearly so, broad and unequal at the base; both surfaces more or less hispidulous-pubescent ... 40. *L. filiformis*.  
 Peduncles filiform, 1-to 3-flowered, leaves under 1 in. long, petiolate, sub-rhomboidal or ovate; glabrous except sometimes the midrib at its base on the lower surface ... 41. *L. gracilis*.

Flowers 3-merous:—

- Calyx and corolla 3-cleft; anthers and pyrenes each 3:—  
 Leaves 5·5 to 8·5 in. long, narrowly elliptic or sub-ovate-elliptic, usually glabrous; reticulations distinct, especially below, as are the 5 or 6 pairs of main-nerves; flowers puberulous; fruit obliquely elliptic ... 42. *L. Maingayi*.  
 Leaves 3·5 to 6 in. long, oblong-elliptic or lanceolate, everywhere glabrous; reticulations and 7 to 10 pairs of main-nerves faint; fruit depressed-trigonal or subdidymous; pyrenes with a transverse partition and thus falsely 2-celled ... 43. *L. lucidus*.

1. *LASIANTHUS SCABRIDUS*, King & Gamble, n. sp. Young branches about as thick as a goose-quill, glabrous, black when dry. *Leaves* coriaceous, oblong or oblong-elliptic, shortly acuminate, the base narrowed and usually slightly unequal; both surfaces pale-brown when dry, rugulose reticulate, scaberulous from numerous short stiff hairs with large bulbous bases, the midrib prominent and hirsute, the main-nerves and veins depressed, under surface with non-bulbous hairs longer and softer than those of the upper; the midrib and 10 to 13 pairs of curved spreading main-nerves hirsute like the midrib; length 4·5 to 8 in.; breadth 1·35 to 2·35 in.; petiole ·5 to ·7 in.; hirsute; stipules broadly triangular-acute or obtuse, thickly coriaceous, glabrous, ·4 or ·5 in. long, and nearly as broad, persistent. *Glomeruli* somewhat shorter than the petioles, sessile, dense, many-flowered, partly covered by the stipules when young, bearing very numerous linear obtuse bracts, black, glabrous and shining on their posterior surface, but on the edges and in part covered with coarse bristly hairs. *Flowers* few, sessile, much shorter than and concealed amongst the bracts. *Calyx* narrowly campanulate with a glabrous tube, and 5 lanceolate pubescent lobes. *Fruit* glabrous, except the persistent calyx-lobes, about ·2 in. long; pyrenes 5, rugulose.

JOHORE: *Ridley* 6463, 11170, 7112.

2. *LASIANTHUS GRIFFITHII*, Wight in Calc. Journ. Nat. Hist. VI, 505. Young branches as thick as a swan's-quill, terete below but compressed in the very young parts, sparsely and deciduously pubescent, ultimately sub-glabrous, dark-coloured when dry. *Leaves* large, thickly

coriaceous, oblanceolate-elliptic, shortly acuminate, the base acute; both surfaces pale-brown tinged with olivaceous; the upper quite glabrous, often rugulose from the depression of the nerves and reticulations; the midrib not depressed but channelled near the base; under-surface paler, the bold midrib, nerves and veins, and their interspaces in a less degree pubescent; length 8 to 12 inches; breadth 3 to 4 in.; petioles .3 to .5 in., winged above; stipules broadly triangular, obtuse or acute, coriaceous, partly covering the inflorescence when young, more or less persistent. *Glomeruli* somewhat longer than the petioles, hemispheric, condensed, many-flowered; flowers sessile, .2 in. long, imbedded amongst numerous linear densely hirsute bracts somewhat longer than themselves. *Calyx* tubular-campanulate or campanulate, narrowed to the base, glabrous except the hirsute ovate or lanceolate lobes. *Corolla* in the perfect flowers .3 in. long, salver-shaped, the tube narrow, glabrous except the villous throat; the limb with 5 narrowly lanceolate hirsute reflexed lobes. *Anthers* 5, exerted beyond the dense villous hairs of the throat, linear-oblong; filaments short. In *cleistogamic flowers* (which are numerous) the corolla smaller than the calyx but resembling it, 5 or 6 lobed. *Fruit* glabrous, ovoid, crowned by the slightly accrescent calyx-lobes, about .2 in. long; pyrenes 5. Hook. fil. Fl. Br. Ind. III. 179.

MALACCA: Griffith (K.D.) 2935. JOHORE: Ridley 11177, 11179. SINGAPORE: Ridley 4121. PERAK: King's Collector 496.—DISTRIB. Borneo; Haviland 84.

VAR. *latibracteata*, King & Gamble; bracts of inflorescence broad, obtuse, glabrous outside, hirsute inside, shorter than the flowers, often becoming thick, white and polished when old, persistent.

SELANGOR: Ridley 10196. PERAK: Ridley 9528; Scortechini 612.

3. *LASIANTHUS STIPULARIS*, Blume Bijdr. 997. A slender shrub 3 to 6 feet high; all parts except the bracts and lobes of corolla inside glabrous: young branches half as thick as a goose-quill, dark-coloured when dry, smooth. *Leaves* membranous, oblong-lanceolate, shortly and rather abruptly cordate-acuminate, narrowed from below the middle to the short petiole; both surfaces pale-brown when dry, glabrous, the upper shining; main-nerves 9 to 12 pairs, curved, rather distinct on both surfaces, the midrib grooved on the upper, prominent on the lower surface; the main-nerves distinct on both; length 5 to 7 in.; breadth 1.5 to 2 in.; petioles .25 to .35 in. long. *Stipules* broadly ovate-cordate, sub-acute, .5 to .6 in. long, completely covering the inflorescence. *Flowers* nearly .3 in. long, on very short flat pedicels, surrounded by numerous unequal narrowly lanceolate densely hirsute bracts longer than themselves. *Calyx* campanulate, ridged; the mouth with 4 or 5 broadly triangular acute teeth. *Corolla* thrice as long as the calyx; the tube

cylindric; the lobes 4 or 5, oblong, blunt, villous inside. *Stamens* 4 or 5, on short compressed filaments; anthers oblong, their tips exerted. *Fruit* ovoid-glabose, sub-ligneous, glabrous, with 8 to 10 vertical ridges, crowned by the calyx-lobes, .25 in. long, and .2 in. in diam., 4- or 5-celled, with a single compressed erect seed in each cell. Kurz Fl. Burm. II. 32. Hook. fil. Fl. Br. Ind. III. 179. *Mephitidia stipularis*, DC. Prod. IV. 453.

SINGAPORE: *Ridley* 4903, 6559, 10419; *King*. SELANGOR: *Ridley* 8230, 8575. PERAK: *Scortechini* 213; *Wray* 2019; *Ridley* 9743; *King's Collector* 340.—DISTRIB. Malay and Andaman Archipelagos.

4. LASIANTHUS CYANOCARPUS, Jack in Trans. Linn. Soc. XIV. 125. A shrub 6 to 8 feet high; all parts more or less tawny- or rusty-hirsute, the hairs shining and often flexuose; young branches half as thick as a goose-quill. *Leaves* coriaceous, oblong, oblong-elliptic or oblanceolate-oblong, shortly acuminate, the base somewhat narrowed, unequal-sided; upper surface dark olivaceous-brown when dry, the lower paler with the transverse veins distinct; main-nerves 7 to 10 pairs, curved, spreading and ascending, bold on the lower surface, depressed on the upper when dry; length 4.5 to 6.5 in.; breadth 1.65 to 2.25 in.; petioles .15 to .25 in. *Stipules* narrowly triangular, acuminate, .2 in. long. *Cymes* sessile, shorter than the petioles, enveloped by a number of densely hirsute bracts diminishing in size inward; the outer ovate-lanceolate acuminate and often 1 in. or more in length; the inner much smaller, lanceolate or linear. *Flowers* only 3 or 4, sessile, concealed amongst the numerous bracts, only about .25 in. long and shorter than even the innermost bracts. *Calyx* longer than or about as long as the corolla, campanulate, with 4 or 5 long narrow hirsute lobes. *Corolla* tubular, glabrous inside; its lobes oblong, blunt. *Anthers* oblong, blunt, almost sessile. *Fruit* ovoid-globular, glabrous, but crowned by the long hirsute calyx-lobes, .2 to .25 in. long, separating into 4 or 5 three-sided, one-seeded pyrenes. Kurz For. Fl. Burma, II. 32; Hook. fil. Fl. Br. Ind. III. 179. *L. bracteatus* and *L. Roxburghii*, Wight in Calc. Journ. Nat. Hist. VI. 501, 502. *L. oculus-Cati*; Miq. Fl. Ind. Bat. II. 315. *L. laevicaulis*, Kurz in Trimen's Journ. Bot. 1875, p. 327. *Lasianthus?* Wall. Cat. 8440. *Mephitidia cyanocarpa*, DC. Prod. IV. 452. *M. rhinozerotis*, Kurz in Andaman Report, Append. A. 40; (not of Blume?). *Triosteum hirsutum* Roxb. Fl. Ind. I. 538. *Rubiacea*, Wall. Cat. 8305.

In all the Provinces, common.—DISTRIB. British India, Malay Archipelago.

VAR. *subsessilis*; petioles only about .1 in. long, bases of leaves oblique.

PERAK: *Ridley* 9730; *King's Collector* 472; *Scortechini* 1207.

Wall. Cat. 8440 belongs here.

5. *LASIANTHUS RHINOCEROTIS* Blume Bijdr. 996. A shrub or small tree; young branches rather thinner than a goose-quill, covered like the petioles with dense short rusty-tomentum. *Leaves* coriaceous, narrowly oblong-lanceolate, acute, the base rounded; upper surface glabrous, the midrib depressed when dry, the nerves depressed, the veins inconspicuous; lower surface everywhere hairy, the 10 to 12 bold oblique ascending little-curved main-nerves and the stout midrib tomentose; the prominent transverse veins pubescent and the interspaces puberulous; length 4 to 7 in.; breadth 1·5 to 2·25 in.; petioles ·25 in. long; stipules broadly triangular acute, pilose, 1 to ·2 in. long. *Glomeruli* sessile or on short pedicels, axillary, bearing very numerous narrow bracts, the outer linear, the inner subulate, all softy rusty-pilose, mostly ·5 or ·6 in. long, the inner sometimes shorter. *Flowers* much shorter than the bracts and concealed by them, few, sessile or subsessile. *Corolla* with 5 deep concave lobes, pilose outside. *Fruit* ovoid, pointed, blue, about ·15 in. long, separating into 5 three-cornered pyrenes. Miq. Fl. Ind. Bat. II. 315. *Mephitidia rhinocerotis* DC. Prod. 453; Korthals in Ned. Kruidk. Arch. II. 220.

PERAK: at elevations of 4500 feet and upwards. *Scortechini* 532, 537; *Wray* 237; *King's Collector* 3209, 3809. SELANGOR: *Kelsall* 1993. —DISTRIB. Java.

Closely allied to *L. crinitus* Jack, but differing in the characters of the hairs and bracts. In that species the outer bracts are much longer than the inner; in this the outer bracts are not longer and only slightly broader than the inner.

6. *LASIANTHUS INAEQUALIS*, Blume Bijdr. 996. A shrub; young branches twice as thick as a crow-quill, densely tawny-pilose like the petioles. *Leaves* membranous, olivaceous-green when dry, elliptic, oblanceolate-elliptic or oblong, shortly acuminate, more or less narrowed to the rounded, sometimes slightly oblique, base; upper surface shining, glabrous, except the bold pilose midrib and puberulous nerves, minutely reticulate; lower surface softly and sparsely pilose; length 3 to 5·5 in.; breadth 1 to 2 in.; petiole ·2 to ·25 in.; stipules linear, pilose, ·6 or ·7 in. long, deciduous. *Glomeruli* axillary, twice as long as the petioles, few-flowered, the bracts broadly ovate, abruptly acuminate, bearing much yellow hair, especially externally, ·7 in. in length. *Flowers* ·35 in. long, sessile. *Calyx* campanulate, with 4 deep unequal lanceolate spreading lobes. *Corolla* shorter than the calyx, with a short tube and 4 oblong lobes, glabrous inside, but outside covered like the calyx with long yellow hair. *Anthers* ovate, almost sessile. *Fruit* narrowly ovoid, sparsely hairy, crowned by the accrescent connivent calyx-lobes; length ·35 in. (of which nearly half is calyx); pyrenes 4, three-sided, rugose.

PENANG: at 1500 feet; *Curtis* 760. PERAK: *Ridley* 9726.

A very distinct species and not resembling *L. cyanocarpus* Jack, to which some authors have reduced it. It is much more nearly allied to *L. subinæqualis*, King & Gamble.

7. *LASIANTHUS PILOSUS*, Wight in Calc. Journ. Nat. Hist. VI. 506. A shrub or small tree; young branches about as thick as a goose-quill; covered like the petioles and undersurfaces of the leaves (and often the stipules and inflorescence) with very dark short rusty tomentum, sometimes tinged with green. *Leaves* coriaceous, dark olivaceous-brown when dry, oblong or elliptic-lanceolate, the apex sub-acute or shortly and abruptly acuminate, the base sub-cuneate or rather rounded; both surfaces boldly and transversely reticulate when dry; the upper sparsely pilose or glabrous except sometimes the depressed faint midrib, hirsute; the lower sub-glabrous or sparsely hairy between the prominent adpressed-tomentose main-nerves, the midrib bold on the lower surface, depressed and glabrous on the upper; main-nerves 9 to 13 pairs, curved, ascending; length 4.5 to 6 in.; breadth 1.25 to 2.5 in.; petiole .1 to .3 in.; stipules triangular-lanceolate, acute, hairy, about .1 in. long. *Cymes* glomerulate, sessile, few-flowered, longer (sometimes shorter) than the petioles. *Flowers* sessile; bracts shorter than the calyx, hirsute. *Calyx* about .2 in. long, cupular-campanulate, hirsute outside, with about 5 triangular teeth. *Corolla* 5- to 7-cleft, dirty purple, shortly campanulate. *Fruit* blueish-black and ultimately glabrous, sub-globular, not longer than the persistent calyx-lobes; pyrenes 5 to 7. Hook. fil. Fl. Br. Ind. III. 182. *L. setosus*, Wight in Calc. Journ. Nat. Hist. VI. 506; Hook. fil. Fl. Br. Ind. 1.c. 181.

MALACCA: *Griffith* (K.D.) 2918; *Maingay* (K.D.) 869; *Cuming* 239; *Hervey*. PERAK: at elevations of about 5000 feet; *Wray* 876. JOHORE: *Ridley* 11180. SELANGOR: *Ridley* 8231.

VAR. *angustifolia*, King & Gamble; branches more hirsute and with greenish-brown tomentum; leaves rather membranous, their lower surfaces sparsely and shortly pilose between the nerves, 4 or 5 in. long and 1 to 1.15 in. broad; stipules lanceolate.

MALACCA: *Griffith*; *Maingay*. PERAK: *Scortechini* 374?—DISTRIB. Burma.

VAR. *glabra*, King and Gamble; leaves with only 9 to 11 pairs of nerves, their upper surfaces quite glabrous even on the midrib, the reticulations not depressed and not very distinct.

SELANGOR: *Ridley* 7424.

8. *LASIANTHUS RIDLEYI*, King & Gamble, n. sp. A shrub; young branches, petioles and under surfaces of the midribs of the leaves densely and softly pubescent. *Leaves* membranous, narrowly elliptic, somewhat

oblanceolate, sub-acute, tapering in the lower third to the slightly rounded base; both surfaces olivaceous when dry; the upper glabrous, shining, with the midrib and nerves slightly prominent; the lower paler with prominent transverse reticulations, downy between the veins; main-nerves 8 or 9 pairs, slightly curved, ascending, thin but distinct on the lower surface like the midrib; length 7 to 8 in.; breadth about 2.5 in.; petiole about .2 in.; stipules linear, hirsute. *Glomeruli* shorter than the petioles, bearing a few flowers hidden amongst numerous linear bracts with many pale spreading hairs. *Calyx* sessile, .15 in. long, narrowly campanulate; the tube glabrous; the lobes 5, acuminate, erect, covered outside with long stiff white hairs. *Corolla* and fruit unknown.

SINGAPORE: *Ridley* 3620a.

9. *LASIANTHUS FLAVICANS*, King & Gamble, n. sp. Young branches thinner than a goose-quill, clothed with dense short yellowish-brown deciduous tomentum like the petioles. *Leaves* thickly membranous, narrowly elliptic, the apex acuminate, the base cuneate; upper surface olivaceous-green, glabrous except the lower part of the midrib, the nerves indistinct, shining; lower surface darker and with much short minute pubescence, especially on the 5 or 6 pairs of sharply ascending bold main-nerves and conspicuous transverse veins; length 5 to 7 in.; breadth 1.25 to 2 in.; petiole .3 to .35 in. short; stipules shorter than the petioles while in flower (longer in fruit), oblong, blunt or acute, adpressed to the stem, pubescent. *Glomeruli* about as long as the petioles, few flowered, bearing numerous linear very pubescent bracts shorter than the flowers. *Flowers* few, sessile or nearly so, .3 in. long. *Calyx* narrowly campanulate, glabrous, constricted below the 4 large triangular, spreading sparsely hirsute teeth. *Corolla* twice as long as the calyx and exceeding the bracts, clavate in bud, glabrous outside except for a few hairs on the back of the lobes, villous inside, salver-shaped, the limb with 4 broad triangular teeth. *Anthers* 4, broadly ovate, on short filaments; style as long as the corolla. *Fruit* elliptic, pointed towards each end, the apex crowned by the small calyx-teeth, glabrous, .45 in. long, and .25 in. diam.; pyrenes 4, rugulose.

SINGAPORE: in the Botanical Garden jungle; *Ridley* 4394, 6927.

PERAK: *Scortechini*. PAHANG: *Ridley* 2223; *King's Collector* 10974.

VAR. *subylabra*, King, hairs short, often deciduous.

PERAK: *Curtis* 1334. SELANGOR: *Ridley* 4895.

10. *LASIANTHUS LONGIFOLIUS*, Wight in Calc. Journ. Nat. Hist. VI. 514. Shrub or small, tree? All parts quite glabrous; young branches as thick as a goose-quill, black when dry. *Leaves* coriaceous, broadly or narrowly elliptic, sometimes oblong or oblanceolate-elliptic, sub-acute or shortly and bluntly acuminate, much narrowed to the petiole,

both surfaces shining, boldly and transversely reticulate, the lower scaberulous; main-nerves 11 to 13 pairs, curved, spreading and like the midrib very prominent and minutely hispid on the lower, less prominent and glabrous on the upper; length 8 to 10 in.; breadth 2 to 3·5 in.; petioles ·3 to ·4 in.; stipules nearly as long as the petioles, coriaceous, triangular, sub-acute or blunt, partly covering the inflorescence, deciduous. *Cymes* shorter than the petioles, sessile. *Flowers* 4 to 6, sessile, surrounded at their bases by small rufescent fimbriate bracts much shorter than themselves. *Calyx* ·2 in. long, sessile, coriaceous, tubular, with 4 small blunt teeth, slightly puberulous outside. *Corolla* not seen. *Ovary* 4-celled, 4-seeded. Hook. fil. Fl. Brit. Ind. III. 187.

MALACA: *Griffith* (K.D.) 2936; *Maingay* (K.D.) 867. PERAK: *Wray*; *Ridley* 7190. SELANGOR: *Ridley* 4904.

11. LASIANTHUS CONSTRICTUS, Wight in Calc. Journ. Nat. Hist. VI. 515. A shrub; young branches twice as thick as a crow-quill, compressed or sub-terete, like the petioles sparsely and deciduously strigose. *Leaves* membranous or thinly coriaceous, narrowly elliptic or elliptic-oblong, sometimes oblanceolate-elliptic, the apex rather bluntly acuminate, the base cuneate or rounded; both surfaces pale-olivaceous, minutely reticulate, and more or less shining when dry; the midrib on the lower surface minutely and sparsely strigose, otherwise both glabrous; main-nerves only 3 to 5 pairs, ascending and little curved, thin but distinct; length 3·5 to 5·5 in.; breadth 1·25 to 2·5 in.; petioles ·15 to ·2 in., corrugated, sparsely pubescent; stipules shorter than the petioles, lanceolate, adpressed-hairy, deciduous. *Cymes* sessile, shorter than the petioles (sometimes slightly longer) condensed, 4- to 6-, rarely 10-flowered; bracts minute or more usually absent, *Flowers* small, sessile or sub-sessile. *Calyx* ·1 to ·15 in. long, thick, narrowly campanulate, constricted below the 4- (rarely 3- to 5-) toothed mouth; teeth triangular, spreading, sparsely hairy. *Corolla* longer than the calyx, funnel-shaped, glabrous outside, the tube ·25 in. long, villous inside, the limb as long as the tube and with 5 sub-acute lobes. *Fruit* obliquely ellipsoid, tapering to each end, somewhat compressed, 4-ridged, rugulose, crowned by the small calyx, glabrous, ·35 in. long; and ·3 in. in diam.; pyrenes 4, sub-cylindric. Hook. fil. Fl. Br. Ind. III. 188 (excl. syn. Kurz Fl. Burm.) *Mephitidea* sp. Griff. Notul. IV. 267 t. 474, fig. 4.

SINGAPORE: *Ridley* 4902. SELANGOR: *Ridley*. BURMA: *Griffith*. PERAK: *King's Collector* 2564, 2780, 3591, 6065; *Scortechini*. PAHANG: *Ridley* 2222. JOHORE: *Ridley* 11183, 11189.—DISTRIB. Sumatra, *Beccari* P.S. 952; Borneo, *Haviland*.

12. LASIANTHUS SINGAPORENSIS, King & Gamble n. sp. A shrub?

Young branches, petioles and under surfaces of the leaf-midribs cinereous-pilose. *Leaves* thinly coriaceous, narrowly elliptic, more or less oblanceolate, tapering to each end, the apex obtusely acuminate; upper surface olivaceous when dry, glabrous, shining, the midrib distinct and channelled, the nerves rather faint; under surface pale-cinereous, minutely and softly pubescent, the 6 or 7 pairs of spreading ascending main-nerves bold like the transverse veins; length 5 or 6 in.; breadth 1.75 in.; petiole .2 in.; stipules linear, hirsute, about as long as the petioles. *Cymes* sessile, shorter than the petioles, 4- to 6-flowered; bracts 2 or 3 at the base of each flower, linear-hirsute, about as long as the calyx. *Flowers* .4 in. long, sessile. *Calyx* .1 in. long, campanulate, the tube narrow, the limb wide with 5 deep triangular acute spreading teeth. *Corolla* funnel-shaped, .3 in. long, outside glabrous except for a few hairs near the mouth, inside villous; lobes of the mouth 5, narrow. *Anthers* 5, narrowly oblong. *Fruit* unknown.

SINGAPORE: Ridley 9095.

13. *LASIANTHUS ELLIPTICUS* Wight in Calc. Journ. Nat. Hist. VI. 507. A tall shrub; young branches half as thick as a goose-quill, cinereous or sub-rusty adpressed-pilose like the petioles and under surfaces of the leaves. *Leaves* thinly coriaceous, olivaceous-brown when dry, narrowly elliptic or oblanceolate-elliptic, shortly acuminate, much narrowed to the base; upper surface glabrous, shining, the midrib, nerves and transverse veins rather distinct; main-nerves 7 or 8 pairs, slightly curved, ascending, bold on the under surface like the midrib; length 4.5 to 6.5 in.; breadth 1.5 to 2 in.; petioles .15 to .25 in.; stipules broadly triangular-lanceolate, sub-acute or sometimes bifid, almost glabrous, shorter than the petioles. *Glomeruli* shorter than the petioles, few-flowered, sessile, bearing (mostly on the outside) a few hirsute lanceolate bracts. *Calyx* .25 in. long, widely campanulate, tapering much to the base, deeply divided into 5 triangular acuminate spreading lobes, densely hirsute externally, sparsely so internally. *Corolla* half as long as the calyx, divided almost to the base into 5 oblong blunt lobes, hirsute outside and glabrous inside. *Anthers* 5, short, sessile. *Fruit* unknown. Hook. fil. Fl. Br. Ind. III. 182.

PENANG: at an elevation of 2000 feet; Curtis 1594.

14. *LASIANTHUS SUBSPICATUS*, King & Gamble, n. sp. A small tree; young branches rather thinner than a goose-quill, 2-grooved like the petioles, under surfaces of the leaves and the inflorescence with minute, usually pale, flocculent deciduous pubescence. *Leaves* membranous, ovate-elliptic, much acuminate, the base cuneate; both surfaces brown when dry, the upper quite glabrous, the nerves and reticulations faint; the lower glabrous, except the midrib and nerves, the reticulations

distinct; main-nerves 4 to 6 pairs, oblique rather straight; length 3·5 to 5 in.; breadth 1·25 to 1·85 in.; petioles ·25 in.; stipules elongated triangular, acute, about as long as the petioles, the midrib keeled. *Cymes* spiciform, usually about as long as the petioles, their axes somewhat elongated, bearing a few broadly lanceolate, acute or acuminate bracts much shorter than the 6 to 12 flowers, all parts except the inside of the calyx and the corolla-tube on both surfaces covered with short rather thick hair. *Flowers* sessile, broadly clavate in bud, under ·1 in. long. *Calyx* as long as the corolla-tube, campanulate, with 5 small, spreading, triangular teeth. *Corolla-tube* much shorter than the sub-globular bluntly 5-lobed limb. *Anthers* 5, linear, embedded in the dense white hair which lines the inside of the lobes. *Fruit* unknown.

PENANG: *Curtis* 2476. PERAK: *Wray* 863.

15. *LASIANTHUS WRAYI*, King & Gamble, n. sp. A small tree; young branches twice as thick as a crow-quill, slightly compressed, densely adpressed-pubescent. *Leaves* thinly coriaceous, oblong-lanceolate, tapering much and about equally to each end; upper surface quite glabrous, shining, faintly reticulate, olivaceous-brown; lower surface darker, adpressed-pubescent on the midrib and 5 pairs of rather bold ascending little-curved nerves, the connecting veins bold, horizontal, puberulous, the areolæ glabrous; length 3·5 to 5 in.; breadth ·75 to 1 in.; petioles about ·3 in.; stipules triangular, acuminate, much shorter than the petioles. *Flowers* ·15 in. long, two or three on a very short axillary tubercle having a few short broad pubescent bracts at its base. *Ovary* ·05 in. long; sessile, campanulate, with 4 small acute teeth, adpressed-hirsute like the tubular corolla; teeth of corolla blunt. *Anthers* 4, linear-oblong, inserted by short filaments in the villous ring in the throat. *Fruit* unknown.

PERAK: at an elevation of 4500 feet; *Wray* 257.

16. *LASIANTHUS KURZII*, Hook. fil. Fl. Br. Ind. III. 183. A shrub? Young branches twice as thick as a crow-quill, densely olivaceous-tomentose like the petioles, stipules, and under surfaces of the midribs and main-nerves of the leaves. *Leaves* thinly coriaceous, oblong, acute at both ends: upper surface dark olivaceous-brown, glabrous, shining, the midrib somewhat depressed (when dry); lower surface dark-olivaceous, pubescent on the distinct horizontal veins and on the 6 or 7 pairs of ascending main-nerves, also on the veins and on the interspaces; length 3·5 to 4·5 in.; breadth ·75 to 1·25 in.; petioles ·15 to ·2 in.; stipules lanceolate with broad bases, shorter than the petioles. *Cymes* sessile, condensed, few-flowered, without the corolla shorter than the petioles, with the corolla longer; bracts oblong, acuminate, few. *Flowers* ·3 in.

long, sessile. *Calyx* sparsely pilose, ovoid, tapering to the small 4-toothed mouth. *Corolla* pilose outside, white, longer than the calyx, salver-shaped, the tube narrowly funnel-shaped; its limb with 4 broad blunt hairy teeth each bearing near its base an oblong anther on a short filament. *Fruit* (*vide* Curtis) blue, .5 in. long.

PENANG: at an elevation of 2000 feet; *Curtis*. SINGAPORE: *Ridley* 140.

We refer this to *L. Kurzii* with some hesitation, for it does not absolutely agree with specimens from the Andamans so named by Sir Joseph Hooker.

17. *LASIANTHUS SUB-INEQUALIS*, King & Gamble, n. sp. A shrub 3 to 5 feet high: young branches rather thicker than a crow-quill, densely rusty-tomentose like the short petioles. *Leaves* membranous, oblong-lanceolate, shortly acuminate, very little or not at all narrowed to the rounded sub-cordate, slightly oblique base; both surfaces pale, olivaceous-brown when dry; the upper sparsely pilose, densely so on the midrib; lower surface more or less pilose everywhere, densely so on the prominent midrib and 8 to 10 pairs of spreading curved main-nerves; length 2 to 3.5 in.; breadth .75 to 1 in.; petiole under .1 in.; stipules ovate to elliptic, sometimes tapering to each end, pilose, .35 to .5 in. long. *Glomeruli* few-flowered, axillary, not so long as the stipules, their bracts like the stipules but smaller. *Flowers* few, about .3 in. long, sessile. *Calyx* deeply divided into 4 unequal lanceolate lobes. *Corolla* about .15 in. long, divided into 4 short lobes, hairy outside like the calyx, concave and glabrous inside. *Anthers* 4, oblong, sessile. *Fruit* .35 in. long, of which half is formed by the persistent calyx-lobes, globular, blue, sparsely hirsute; pyrenes 4, three-sided, smooth.

PERAK: *King's Collector* 157, 3358; *Wray* 2588, 3451; *Ridley* 9715; *Scortechini* 189.—DISTRIB. Sumatra: *Forbes* 2457: Java; on Mounts Salak and Pangerango.

Allied closely to *Lasianthus inaequalis* Bl.; King & Gamble, but with narrower subsessile leaves and much more conspicuous stipules, which are ovate or elliptic not linear.

18. *LASIANTHUS CORONATUS*, King & Gamble, n. sp. Young branches rather thicker than a crow-quill, covered like the petioles, stipules and lower surfaces of the leaf-midribs and main-nerves with soft brown tomentum. *Leaves* coriaceous, oblong-lanceolate, much acuminate, the base cuneate; both surfaces pale-brown when dry; the upper quite glabrous, except the tomentose lower fourth of the midrib, finely reticulate, the midrib and main-nerves depressed; lower surface darker than the upper, the reticulating veins transverse, bold and pubescent, the enclosed spaces almost glabrous; main-nerves 5 or 6 pairs, bold,

spreading, tomentose; length 3 to 3.5 in.; breadth .75 to 1 in.; petioles about .1 in.; stipules linear, twice as long as the petioles. *Oymes* longer than the petioles, few-flowered, bearing a few linear tomentose bracts as long as the stipules and resembling them. *Calyx & corolla* unknown. *Fruit* sub-globular, somewhat narrowed at the base, the apex truncate, the sides deeply 5-grooved, the interspaces pubescent and rugulose, about .25 in. long, crowned by the equally long or longer erect linear pubescent calyx-lobes; pyrenes 5, bony.

PERAK: *Scortechini* 329.

A plant known only from *Scortichini's* imperfect specimens; named from the long conspicuous calyx-lobes on the apex of the fruit.

19. *LASIANTHUS APPRESSUS*, Hook. fil. Fl. Br. Ind. III. 181. A shrub; young branches thinner than a goose-quill, softly and densely hirsute like the petioles, stipules and bracts. *Leaves* sub-coriaceous, oblong-lanceolate, shortly acuminate, the base cuncate (often rather abruptly so); upper surface pale olivaceous-brown, glabrous, shining, the main-nerves and midrib depressed, the latter with 1 or 2 lines of adpressed hairs; lower surface paler and bearing many sub-adpressed yellowish hairs; especially on the main-nerves and rather prominent transverse veins; main-nerves 6 or 7 pairs, curved, ascending, bold and prominent on the lower surface; length 2 to 3 in.; breadth .5 to .75 in.; petiole .1 to .15 in. long; stipules oblong, blunt, adpressed to the stem, rather shorter than the outer flower-bracts. *Flowers* about .15 in. long, sessile, sub-solitary, surrounded by linear-lanceolate, acuminate, hirsute bracts, the outer of which are .25 in. long, the inner being smaller. *Calyx* campanulate, sparsely pilose, the limb with 4 short triangular rather blunt teeth. *Corolla* minute. *Fruit* depressed-globular, crowned by the short calyx-lobes, .15 in. in diam., sparsely pilose; pyrenes 8, three-sided, smooth. *Lasianthus*, Wall. Cat. 8443 and 8442 partly.

MALACCA (on Mount Ophir) *Griffith* (K.D.) 2927. PENANG: *Wallich*; *King*; *Deschamps*. JOHORE: *Ridley* 2925, 11183 and 4. PERAK: *Scortechini*.

20. *LASIANTHUS ATTENUATUS*, Jack in Trans. Linn. Soc. XIV. 126. A shrub; young branches not much thicker than a crow-quill, covered like the petioles, and upper surfaces of the leaf-midribs with dense short cinereous-olivaceous tomentum. *Leaves* membranous, oblong, lanceolate, shortly acuminate, the base rounded and somewhat oblique upper surface (except the midrib) glabrous, dark-olivaceous; the lower paler, minutely pilose, especially on the midrib and 7 or 8 pairs of spreading ascending rather bold main-nerves; the reticulations faint; length 2 to 3.5 in.; breadth .75 to 1 in.; petioles about .1 in.; stipules

lanceolate, closely adpressed to the stem, as long as the flower-bracts and hirsute like them. *Flower-bracts* lanceolate or oblanceolate, tapering to each end, .25 to .3 in. long. *Flowers* 1 to 3, sessile. *Calyx* .2 in. long, cleft to the base into 4 lanceolate acuminate hirsute lobes. *Corolla* shorter than the calyx, narrowly campanulate, with 4 short lobes, densely hirsute outside, but glabrous within. *Anthers* 4, oblong, sessile. *Fruit* (fide *Jack*) "ovoid, hairy, dark-blue, pyrenes 4." *Wight* in *Calc. Journ. Nat. Hist.* VI. 504; *Hook. fil. Fl. Br. Ind.* III. 181. *Mephitidia attenuata*, DC. *Prod.* IV. 452.

MALACCA: *Griffith* (K.D.) 2926. PERAK: *King's Collector* 237, SINGAPORE: *Ridley* 6517, 6830, 9224.

Allied to *L. appressus*, *Hook. fil.*, but with different pubescence and bracts and rather more nerves in the leaves.

21. LASIANTHUS DENSIFOLIUS, *Miq. Fl. Ind. Bat.* II. 321. A shrub; all parts more or less clothed with coarse flexuose pale-olivaceous hairs with bulbous bases. Young branches slightly thicker than a crow-quill. *Leaves* membranous, nearly sessile, narrowly oblong-lanceolate, somewhat oblique and emarginate, but not narrowed at the base, the apex shortly acuminate; both surfaces olivaceous-brown when dry; main-nerves 8 to 10 pairs, ascending, slightly curved, thin but prominent on the lower surface, faint on the upper; length 1.75 to 2.75 in.; breadth .6 to .8 in.; petioles under .1 in.; stipules lanceolate, densely hirsute, .25 to .3 in. long. *Cymes* axillary, sessile, few-flowered, rather more than twice as long as the petioles; bracts linear, hispid. *Flowers* few, sessile. *Calyx* .2 in. long, with 4 or 5 deep very unequal, lanceolate hispid lobes. *Corolla* much smaller than the calyx with oblong and less hairy lobes. *Anthers* 5, sessile, oblong, opposite the lobes. *Fruit* blue, sub-globular, sparsely hispid, surmounted by the calyx-lobes, .2 or .25 in. in diam.; pyrenes 4. *Hook. fil. Fl. Br. Ind.* III. 182. *Lasianthus?* *Wall. Cat.* 8441 in part.

This is very closely allied to the Indian species *L. Wallichii*, *Wight*.

MALACCA: *Maingay* (K.D.) 868. JOHORE: *King*. SINGAPORE: *Wallich*; *Anderson* 88; *Morton* 142; *Ridley* 4898, 5679. SELANGOR: *Ridley* 7421.

VAR. *latifolia*, *King*. *Leaves* broadly oblong with a short broad abrupt acumen, the base broad, oblique, sub-cordate, and more than 1 in. broad; young branches and inflorescence densely covered with coarse hair, 2.25 in. long.

JOHORE: *Ridley* 10948. SELANGOR: *Ridley* 7423.

VAR. *calycina*, *King*. *Leaves* glabrous on the upper surface except

for a very few scattered adpressed hairs and for the strigose midrib; main-nerves not more than 8 pairs; fruit crowned by calyx-lobes as long as itself.

SINGAPORE: *Ridley* 5679.

22. *LASIANTHUS ROBUSTUS*, King & Gamble, n. sp. Young branches terete, sub-glabrous, about as thick as a goose-quill. *Leaves* large, coriaceous, pale-olivaceous on both surfaces (when dry) and glabrous, oblanceolate, much narrowed but not acute at the base; upper surface corrugated from the depression of the nerves and veins, the midrib thin but prominent; under surface with bold large reticulations and stout midrib, the 16 to 20 pairs of curved ascending main-nerves thin but prominent length 8 to 12 in.; breadth 2.5 to 3.25 in.; petioles .4 in., stout, channelled; stipules coriaceous, sagittate, pale, about .4 in. long (measured to the end of the basal lobes). *Cymes* shorter than the petioles, condensed, ebracteate, few-flowered. *Calyx* shortly campanulate, glabrous, about .1 in. long, the mouth with 5 or 6 obscure teeth. *Corolla* unknown. *Fruit* sub-globular, 6-ridged, glabrous, crowned by the short calyx-tube, .15 in. in diam., pyrenes 5 or 6.

MALACCA: (at Ayar Pannas) *Ridley* (without number).

Only a single specimen seen by me, and that a poor one.

23. *LASIANTHUS CORIACEUS*, King & Gamble, n. sp. A small foetid shrub; young branches terete or somewhat compressed, minutely puberulous, the bark thick, pale and rugulose when dry. *Leaves* very coriaceous, oblong-elliptic, gradually and bluntly acuminate, the base cuneate; upper surface pale-brown when dry, everywhere glabrous, shining, the stout midrib and the main-nerves depressed; lower surface pale cinereous-brown, glabrous, dull; the midrib very stout and prominent; main-nerves 10 to 12 pairs, spreading but also ascending, ultimately glabrous, but like the midrib at first minutely adpressed, puberulous; intermediate nerves none, reticulations wide and indistinct; length 7 to 11 in.; breadth 2.5 to 3.5 in.; petiole about .4 in. stout, channelled; stipules triangular acuminate, half as long as the petioles. *Cymes* axillary, rather longer than the petioles, on short peduncles, ebracteate, bearing 3 to 5 sessile flowers. *Calyx* .15 in. long, widely tubular, truncate. *Corolla* unknown. *Fruit* (fide *Scortechini*) deep purple, .25 in. in diam., minutely hairy, crowned by the truncate, entire or faintly 4-toothed calyx-limb; pyrenes 4.

PERAK: *Scortechini* 332. SELANGOR: *Ridley* 10217, 8540 in part.

This is very like *L. pergamaceus* K. & G., which however is a tree with very thick leaves indistinctly veined.

24. *LASIANTHUS PERGAMACEUS*, King & Gamble, n. sp. A tree; young

branches, under surfaces of leaves, and outside of calyx and corolla minutely but deciduously puberulous; all other parts except the corolla quite glabrous. *Leaves* thinly coriaceous, oblong-elliptic, shortly and rather bluntly acuminate, the base cuneate; both surfaces pale hepatic-brown when dry and reticulate, the upper in all stages quite glabrous, the lower ultimately becoming so; the midrib very bold on the lower, less so in the upper surface; main-nerves 10 pairs, thin but distinct, spreading and ascending, many of the intermediate nerves prominent and spreading like the main ones, the reticulating veins delicate and forming square or rhomboidal areolae; length 8 to 10 in.; breadth 2 to 2·75 in.; petiole '3 to '4 in.; stipules '15 in. long with broad bases and abrupt oblong points. *Oxymes* not much exceeding the petioles, ebracteate, 4-or 5-flowered, shortly pedunculate. *Flowers* '5 in. long, sessile. *Calyx* '25 in. long, tubular, the mouth truncate but obscurely toothed. *Corolla* much longer than the calyx, tubular, sub-inflated below the broadly 4-toothed limb, thick (almost fleshy), coarsely pubescent on one side externally, more or less villous everywhere internally. *Anthers* 4, narrowly oblong, on short thick filaments. *Fruit* unknown.

PERAK: at an elevation of 4500 feet on Gunong Batu Pateh, Wray 270.

Mr. Wray describes the whole plant as very foetid when bruised.

25. *LASIANTHUS MALACCENSIS*, King & Gamble, n. sp. A small tree; young branches twice as thick as a crow-quill, terete, puberulous, very dark in colour when dry. *Leaves* coriaceous, oblong-lanceolate, bluntly acuminate, the base rounded but slightly contracted just above its junction with the petiole; the edges somewhat wavy; both surfaces glabrous except for a few minute adpressed hairs on the midrib and nerves, dark olivaceous-brown, reticulate when dry; main-nerves 8 or 9 pairs, curved, ascending abruptly, thin and inconspicuous; length 4 to 5 in.; breadth 1 to 1·4 in.; petiole '3 in. *Stipules* much shorter than the petioles, the base broad, abruptly narrowed into the triangular apex. *Flowers* two or three together in the leaf-axils. *Calyx* sessile, campanulate, tapering to the base, less than '1 in. long, puberulous outside the mouth, wide and minutely 5-toothed. *Fruit* sub-globular, pulpy, surmounted by the 5 or 6 blunt short calyx-teeth, '2 in. in diam.; pyrenes 4, narrow, smooth.

MALACCA: *Ridley* 3219.

26. *LASIANTHUS CHINENSIS*, Benth. Fl. Hongkong 160. A shrub 8 to 12 feet high; young branches rather thinner than a goose-quill, angled, the bark dark-brown when dry, sparsely and minutely adpressed-pubescent. *Leaves* dark olivaceous-brown when dry, thinly coriaceous, elliptic-

oblong, shortly acuminate, narrowed to the base; surface reticulate, glabrous, except for a few adpressed hairs near the base, and on the midrib and longer nerves; main-nerves 8 or 9 pairs, thin, prominent on the lower surface, slightly curved, ascending; length 5 to 6.5 in., breadth 1.5 to 2 in.; petiole stout, adpressed rusty-pubescent, about .15 in. long; stipules triangular, shorter than the petioles. *Cyme*, ebracteate, axillary, few-flowered, sessile, about twice as long as the petioles. *Flowers* .4 in. long, on pedicels much shorter than themselves. *Calyx* adpressed-pubescent, campanulate, deeply divided into 4 or 5 somewhat spreading, lanceolate, acuminate lobes. *Corolla* glabrous outside, longer than the calyx, salver-shaped; the tube densely pilose inside; the lobes oblong, thickened at their apices, reflexed. *Filaments* about as long as the 5 or 6 linear anthers. *Fruit* unknown. Hook. fil. Fl. Br. Ind. III. 187.

PERAK: *King's Collector* 2582, 10100.

The collector, in his field-note, describes the corolla as white and the calyx as blue.

27. *LASIANTHUS WIGHTIANUS*, Hook. fil. Fl. Br. Ind. III. 188. A shrub? Young branches compressed, varying in thickness, some as thick as a goose-quill, all as well as the petioles, the backs of the stipules, the under-surfaces of the main-nerves, and both sides of the midrib of the leaves minutely rusty adpressed-pubescent. *Leaves* dark-brown when dry, elliptic-oblong, the apex shortly acuminate, the base rounded, rarely sub-acute; upper-surface finely reticulate, the veins and nerves sparsely strigose; under-surface strongly reticulate, the veins and nerves pubescent; main-nerves 10 to 13 pairs, very prominent, curved, spreading; length 3.5 to 4.25 in.; breadth 1.25 to 1.5 in., petioles .1 to .15 in.; stipules triangular, acuminate, as long as the petioles. *Cymes* slightly longer than the petioles, few-flowered, ebracteate. *Flowers* clustered, sub-sessile. *Calyx* pubescent, .1 in. long, narrowly campanulate, with 5 small triangular spreading teeth. *Corolla* and *fruit* unknown. *Mephitidea venosa*, Wight in Calc. Journ. Nat. Hist. VI. 514, not of Blume.

MALACCA: on Mount Ophir, *Griffith* (K.D.) 2922.

28. *LASIANTHUS PTEROSPERMUS*, Wight in Calc. Journ. Nat. Hist. VI. 510. A shrub; young branches half as thick as a goose-quill, compressed especially at the nodes, strigose-puberulous, becoming subglabrous. *Leaves* coriaceous, elliptic or oblong-elliptic, shortly and bluntly acuminate or sub-acute, narrowed to the slightly oblique, rarely sub-acute, base; both surfaces when dry reticulate, pale-brown, tinged with olivaceous, the upper glabrous, the lower minutely substrigose,

the midrib and main-nerves depressed on the upper surface (when dry); main-nerves 10 to 12 pairs, spreading, ascending, prominent on the lower surface; length 5 to 7 in.; breadth 1.25 to 2.25 in.; petioles .2 to .25 in.; stipules oblong-lanceolate, blunt, strigose, .35 in. long. *Cymes* only slightly longer than the petioles, 3- to 4-flowered. *Flowers* sessile, with a few minute bracts or without any. *Calyx* sessile, .15 in. long, strigose, the limb with 5 short obtuse triangular teeth. *Corolla*, globose, glabrous. *Drupe* sub-globose, .5 in. in diam. when fresh, only .3 in. when dry, glabrous, black, crowned by the shortly tubular calyx-limb; pyrenes 4 to 5, trigonous, bisulcate on the back and with 3 vertical processes, the middle one thick and rugulose, the two lateral thin and wing-like.

MALACCA: *Griffith* (K.D.) 2929; *Maingay* (K.D.) 866.

29. *LASIANTHUS PERAKENSIS*, King & Gamble, n. sp. A shrub or small tree; young branches half as thick as a goose-quill, deciduously and minutely rusty-puberulous like the petioles, stipules and under surfaces of the midrib and main-nerves. *Leaves* thinly coriaceous, narrowly elliptic or obovate-elliptic, abruptly and shortly acuminate, narrowed in the lower third to the short petiole; upper surface dark-olivaceous, quite glabrous, shining, the midrib and nerves not prominent; under surface paler olivaceous, glabrous except the puberulous midrib and 7 or 8 pairs of prominent ascending, little-curved main-nerves; the veins very bold, transverse; length 6 to 10 in.; breadth 1.75 to 3.25 in., petiole .2 to .25 in.; stipules triangular, acute, shorter than the petioles, adpressed to the stem. *Glomeruli* about as long as the petioles, condensed, ebracteate or with a few small linear hairy bracts shorter than the calyx. *Flowers* sessile, crowded. *Calyx* campanulate, much tapered to the base, the mouth wide and with 5 indistinct blunt, spreading lobes, pubescent. *Corolla* not seen; ovary 5-celled. *Fruit* hemispheric, sub-glabrous, ribbed, crowned by the calyx; pyrenes 5.

PERAK: *King's Collector* 682, 2438, 2838, 10210; *Wray* 4128.

Resembling *L. Maingayi* in leaves but with 5-merous flowers.

30. *LASIANTHUS ANGUSTIFOLIUS*, King & Gamble, n. sp. Small tree; young branches covered with a thin dense layer of adpressed minute pale-brown tomentum. *Leaves* thickly membranous, narrowly oblong-lanceolate, caudate-acuminate, the base cuneate; both surfaces brown when dry; the upper the darker, glabrous except the tomentose midrib; the lower glabrous except the pubescent midrib and nerves; the reticulations transverse strong on the lower surface, faint on the upper; main-nerves 12 to 14 pairs, slightly curved, ascending, thin but distinct on the lower, indistinct on the upper surface; length 5 or 6 in.; breadth

.6 to 75 in.; petiole .15 in.; stipules lanceolate, much shorter than the petioles, their edges ciliate. *Cymes* axillary, 2- to 3-flowered, ebracteate, sessile, shorter than the petioles. *Flowers* about .2 in. long, sessile. *Calyx* adpressed pubescent on both surfaces, tubular-campanulate, with 5 triangular-acuminate, slightly spreading teeth. *Corolla* slightly longer than the calyx, tubular, slightly inflated below the mouth; lobes 5, lanceolate, acuminate, sub-erect; the tube glabrous on both surfaces and the teeth adpressed-pubescent on both. *Anthers* small, narrowly oblong. *Fruit* ovoid-globular, crowned by the spreading calyx-lobes, about .2 in. long; pyrenes 4 or 5, rugulose.

PERAK: on Gunong Batu Patch at 4500 feet, Wray 413.

31. *LASIANTHUS OBLONGUS*, King & Gamble, n. sp. Young branches slightly thicker than a crow-quill, somewhat angled, densely but very minutely adpressed-pubescent. *Leaves* membranous, narrowly oblong-lanceolate, gradually tapering into the caudate-acuminate apex, the base much narrowed; both surfaces dark dull-brown when dry, minutely scaly, puberulous on the nerves and midribs, obscurely transverse-reticulate; main-nerves about 7 pairs, curved upwards, not conspicuous; length 3 to 5 in.; breadth .6 to 1 in.; petiole .15 to .2 in.; adpressed-puberulous. *Stipules* lanceolate-acuminate, about .1 in. long. *Cymes* ebracteate, axillary, sessile, 5- to 7-flowered, twice as long as the petioles. *Flowers* .35 in. long, on very short pedicels, adpressed-puberulous or glabrous. *Calyx* campanulate, shallow, the mouth wide, truncate, entire. *Corolla* more than twice as long as the calyx, salver-shaped; the tube slightly widened near the mouth; the limb densely hirsute on its upper surface, the lobes 5, oblong, obtuse. *Anthers* 5, oblong, sub-acute, on short filaments. *Fruit* depressed-globular, about .2 in. in diam. when dry, glabrous, 7- or 8-ridged, somewhat corrugated, crowned by the small calyx; pyrenes 7 or 8, each with a transverse septum dividing it into two cells, the outer of which is 1-seeded, the inner empty.

PERAK: *Scortechini* 265; *Ridley* 4935, 9702, 9729; *Wray* 2590; *King's Collector* 402, 4128, 4462, 10082; *Curtis* 2018. SELANGOR: *Ridley* 7438.

This closely resembles a specimen in Herb. Kew (Horsfield Rub. 52) doubtfully named *Lasianthus sylvestris* Miq., but in that the calyx has 5 distinct triangular acute teeth.

32. *LASIANTHUS MONTANUS*, King & Gamble, n. sp. A bush 4 to 8 feet high; young branches slightly thicker than a crow-quill, rather minutely adpressed-pilose like the stipules. *Leaves* thickly sub-coriaceous, ovate-lanceolate, shortly acuminate, the base cuneate; both

surfaces olivaceous, somewhat shining, reticulate, the upper quite glabrous, the lower pubescent on the bold midrib and thin but prominent 5 or 6 pairs of curved ascending main-nerves, sometimes also on the transverse veins; length 3 to 4.5 in.; breadth 1 to 1.5 in.; petioles .1 to .15 in., stout, stipules about .15 in. long, pubescent, adpressed to the stem, triangular-acuminate. *Flowers* solitary or in pairs, about .5 in. long, ebracteate. *Calyx* nearly as long as the corolla with a short tube and 5 long unequal linear-lanceolate pubescent lobes. *Corolla* white, salver-shaped; the tube long and narrow, pubescent on both surfaces, but especially inside near the base; lobes broad, spreading, somewhat irregular, with tufts of long hair near their apices. *Anthers* 5, short, sessile near the base of the tube. *Fruit* unknown.

PERAK: at elevations of 3000 to 4000 feet, *Wray* 3932; *King's Collector* 2156.

33. *LASIANTHUS CURTISII*, King & Gamble, n. sp. A shrub; young branches somewhat thicker than a crow-quill, sparsely and deciduously pubescent, ultimately glabrous. *Leaves* thickly membranous, olivaceous-brown when dry, lanceolate or elliptic-lanceolate, much acuminate, the base slightly cuneate; upper surface quite glabrous; lower minutely and softly pubescent on the midrib, bold transverse veins and 4 to 6 pairs of stout spreading ascending curved main-nerves; length 2.5 to 3.5 in.; breadth .35 to 1.25 in.; petioles .15 to .2 in., very pubescent; stipules triangular, adpressed to the stem, hirsute, under .1 in. long. *Cymes* not much longer than the petioles, axillary, sessile, 6- to 8-flowered, ebracteate. *Flowers* sessile, .15 to .2 in. long. *Calyx* cleft to nearly the base into 5 sub-equal, linear-lanceolate sub-erect lobes, hirsute externally. *Corolla* much shorter than the calyx, its upper part with dense long yellow hair; lobes 5, short, blunt. *Anthers* 5, sessile, oblong, blunt. *Fruit* ovoid-globular, sparsely pilose, .1 in. long but crowned by the equally long, persistent calyx-lobes; pyrenes 5, broad, 3-angled.

PENANG: *Curtis* 284, 9355.

34. *LASIANTHUS PSEUDO-LUCIDUS*, King, n. sp. A bush; young branches slender, densely and minutely tawny-tomentose. *Leaves* thinly coriaceous, narrowly elliptic-lanceolate, acuminate, the base cuneate, both surfaces pale olivaceous-brown when dry, the upper glabrous; the lower darker, reticulate, puberulous on the midrib and nerves; main-nerves 6 or 7 pairs curved, ascending, distinct on the lower surface; length 2 to 2.5 in.; breadth .6 to .75 in.; petiole about .1, in., pubescent; stipules narrowly oblong-lanceolate, tomentose, .4 in. long. *Cymes* twice as long as the petioles, on short tomentose peduncles, 3- to 4-flowered. *Flowers* sessile. *Calyx* campanulate, .25 in. long, deeply

divided into 5 slightly unequal, linear-lanceolate lobes, hirsute on both surfaces. *Corolla* and fruit not seen.

PERAK: at 5000 feet, *Wray* 4109.

A species near *L. lucidus*, Blume (not of Hook. fil. in Fl. Br. Ind.), but differing from that species in its thicker, less acuminate and rather fewer-nerved leaves, and thicker twigs which are moreover tomentose instead of glabrous. The calyx of this is moreover hirsute instead of glabrous.

35. *LASIANTHUS NERVOSUS*, King & Gamble, n. sp. A small dense shrub 2 to 3 feet high; young branches and petioles covered with dense short olivaceous tomentum. *Leaves* coriaceous, deep olivaceous-brown when dry, shining and minutely reticulate, oblong-lanceolate, the apex acute or sub-acute and mucronate, the base sub-cuneate; upper surface glabrous, the midrib depressed; lower slightly paler, the stout midrib and 6 to 8 pairs of prominent curved ascending nerves minutely adpressed-pubescent; length 1 to 1.5 in.; breadth .4 to .6 in.; petioles .1 to .15 in. long; stipules triangular, much shorter than the petioles, pubescent, caducous. *Cymes* sessile, while in flower shorter than the petioles, 3-flowered. *Flowers* sessile, about .15 in. long. *Calyx* cupular, very short, with 4 triangular teeth. *Corolla* longer than the calyx (about .1 in. long), the tube cylindric, hairy, white; the lobes 4, short, with moniliform hairs inside. *Anthers* attached to the middle of the tube. *Style* shortly bifid. *Berry* bluish, sparsely hairy, globular, .15 in. in diam., crowned by the calyx-teeth; pyrenes 4.

PERAK: *Scortechini* 342.

36. *LASIANTHUS HARVEYANUS*, King & Gamble, n. sp. A shrub; young branches rather thicker than a crow-quill, minutely rusty-tomentose like the petioles and midribs of the leaves on both surfaces. *Leaves* membranous, elliptic or ovate-elliptic, (oblong-elliptic in var.); narrowed to the rather blunt (acuminate in var.) apex, the base rounded; both surfaces pale-brown when dry; the upper scaberulous and with a few scattered adpressed hairs near the edges; lower surface scabrid-puberulous between the 4- to 6 (8 to 10 in. var.) pairs of slender little-curved ascending minutely pubescent main-nerves; length 4 to 5 in. (up to 7.5 in. var.) breadth 1.65 to 2 in.; petioles .15 to .2 in.; stipules triangular, acute, one-third or one-half as long as the petioles. *Cymes* longer than the petioles, ebracteate, 3- to 5-flowered. *Flowers* .3 in. long, sessile. *Calyx* under .1 in. in length, narrowly campanulate, densely pubescent, the mouth 4-toothed. *Corolla* both outside and inside less pubescent than the calyx, funnel-shaped; the mouth with 4 ovate and acute spreading lobes. *Anthers* 4, narrowly oblong, shortly apiculate, exerted, attached by short filaments to the densely villous throat; style elongate; stigmas 2 or 3, hairy. *Fruit* unknown.

PERAK: at an elevation of 3400 feet, *Wray* 444.

VAR. *longifolia*. *Leaves* elliptic-oblong, shortly acuminate, as much as 7.5 in. long, with 8 to 10 pairs of nerves.

MALACCA: *Harvey*.

37. *LASIANTHUS FERRUGINEUS*, King & Gamble, n. sp. A bush; young branches about half as thick as a goose-quill, rusty-lanate like the outside of the stipules, the petioles and both sides of the leaf-midribs. *Leaves* dark-brown when dry, thinly coriaceous, oblong-lanceolate, much acuminate, the base rounded or sub-cuneate; upper surface reticulate, sparsely covered with stiff flexuose hairs with conspicuous black bulbs at their bases, shining, the nerves thin but distinct; lower surface more densely hairy (the hairs with smaller bulbs), especially dense on the 16 to 18 pairs of bold curved spreading main-nerves; length 5 or 6 in.; breadth 1.25 to 1.5 in.; petioles .15 to .2 in.; stipules triangular, sub-acute, longer than the petioles, deciduous. *Cymes* small, not so long as the petioles, few-flowered, ebracteate. *Flowers* on short hirsute pedicels. *Calyx* .25 in. long, tubular-campanulate, densely hirsute like the corolla, deeply divided into 5 lanceolate acuminate sub-equal lobes. *Corolla* like the calyx but only half as long, white. *Disk* smooth, glabrous, orbicular. *Style* short, glabrous. *Fruit* unknown.

PERAK: at an elevation of 4500 feet; *Wray* 3911.

38. *LASIANTHUS TOMENTOSUS*, Blume Bijdr. 997. A shrub? Young branches varying in thickness, the longer nearly as thick as a goose-quill, densely clothed like the petioles and stipules with dense short rusty tomentum. *Leaves* thickly membranous, oblong-lanceolate, acuminate, the base cuneate or rounded; upper surface blackish-olivaceous when dry, sparsely and minutely strigose; the lower paler, shortly olivaceous-pilose except the 7 to 10 pairs of curved ascending nerves on their lower surfaces, and the bold midrib on both, which are tomentose; length 2.5 to 3.5 in.; breadth .5 to 1 in.; petiole .1 to .2 in.; stipules about as long as the petioles, triangular. *Cymes* when in flower twice as long as the petioles, when not in flower shorter, condensed, few-flowered, ebracteate, sessile. *Flowers* .2 in. long, sessile. *Calyx* under .1 in. long, widely campanulate, hirsute, the mouth sub-truncate, obscurely toothed. *Corolla* salver-shaped; the tube wide, glabrous outside and inside but with a band of stout hairs at the throat; lobes of the limb ovate, sub-acute, sub-erect, sparsely hirsute. *Anthers* 5, ovate-oblong, on short filaments, curving inward, and cohering by their margins and tips. *Style* as long as the tube of the corolla, cylindric, divided into 2 compressed arms. *Ovary* 5-celled, with a single ovule in each.

PERAK: *Yapp* 525. JOHORE: *Ridley* 11181, 11182, 4083.

This resembles No. 17, but has its leaves hairy on the upper surface, thicker young branches and a much wider corolla-tube.

39. *LASIANTHUS SCALARIFORMIS*, King & Gamble, n. sp. A shrub 5 or 6 feet high; young branches thinner than a goose-quill, minutely rusty-puberulous, faintly ridged, dark-coloured when dry. *Leaves* coriaceous, narrowly elliptic-oblong, the apex very shortly acuminate or acute, much narrowed to the base; both surfaces dark olivaceous-brown when dry, glabrous, shining, the veins scalariform, horizontal, close together, very distinct especially on the lower surface, the midrib thin on the upper surface, stout, convex and often faintly puberulous on the lower surface; main-nerves 7 or 8 pairs, little curved, ascending, broad, bold, and when young, minutely puberulous on the lower surface, always faint and glabrous on the upper; length 4 to 5 in.; breadth 1.25 to 1.5 in.; petioles .25 to .3 in.; stipules minute (about .05 in. long) triangular, with broad bases. *Peduncle* solitary, ebracteate, glabrous, about .5 in. long, bearing at its apex a 3- to 5-flowered cyme. *Flowers* sessile. *Calyx* .2 in. long, campanulate, deeply divided into 5 narrowly oblong acute lobes very minutely puberulous. *Corolla* not seen. *Fruit* glabrous, obovoid, 5-ridged; pyrenes 5.

PERAK: *Scortechini* 411; *Wray*, at an elevation of 6700 feet, 332.

40. *LASIANTHUS FILIFORMIS*, King & Gamble, n. sp. A slender shrub 2 to 4 feet high; young branches rather thicker than a crow-quill, clothed like the other parts of the plant with long spreading rather slender hairs. *Leaves* membranous, subsessile, oblong-lanceolate, shortly acuminate; the base rounded, slightly unequal and minutely caudate, both surfaces olivaceous-brown when dry (sometimes pale), dull, more or less hispidulous-pubescent especially on the midrib and main-nerves; the upper when old sometimes almost glabrous; main-nerves 7 to 9 pairs, thin, but pale and rather conspicuous on the lower surface (when dry), inconspicuous on the upper; length 2 to 2.75 in.; breadth .65 to 1 in.; petiole under .1 in. or almost absent; stipules linear-lanceolate, pubescent, .2 or .25 in. long. *Inflorescence* a slender solitary filiform, sparsely pubescent peduncle .75 to 1 in. long, bearing at its apex one or at most two, flowers subtended by a single or double linear bracteole (by two large leaf-like bracts in var. *bracteata*). *Calyx* with a campanulate tube .1 in. long, and 4 linear-lanceolate erect lobes longer than itself. *Corolla* tubular, exceeding the calyx-lobes, white hairy, deeply 4-lobed. *Ovary* 8-celled. *Fruit* baccate, blue, .25 in. in diam., crowned by the long persistent calyx-lobes.

PERAK: *Scortechini* 29; *King's Collector* 851.

VAR. *bracteata*. Flowers subtended by two ovate acute leaf-like bracts from .3 to .5 in. long.

PERAK: *Scortechini* 180, 190; *Ridley* 8578.

41. *LASIANTHUS GRACILIS*, King & Gamble, n. sp. A slender shrub 2 to 3 feet high, young branches as thick as or thinner than a crow-quill, like the petioles and sometimes the under-surfaces of the midribs densely adpressed-pubescent. *Leaves* stiffly membranous, ovate or sub-rhomboidal, the apex acute and minutely apiculate; the base cuneate, sometimes slightly unequal; both surfaces usually glabrous; the 7 to 9 pairs of main-nerves spreading, little curved, pale and conspicuous beneath; length .6 to .75 in.; breadth .35 to .5 in.; petiole under .1 in.; stipules as long as the petioles, caducous. *Inflorescence* a filiform hairy peduncle shorter than the leaves, bearing at its apex 1 or 2 minute bracteoles and (*vide* *Scortechini*) 1 to 3 flowers. *Fruit* depressed-globular, glabrous, shining, .15 in. in diam. with 4 vertical ridges; pyrenes 4.

PERAK: *Scortechini* 39, 617. *Ridley* (in tea gardens) 2904.

42. *LASIANTHUS MAINGAYI*, Hook. fil. Fl. Br. Ind. III. 188. A large shrub or small tree; young branches much thinner than a goose-quill, somewhat compressed, covered with deciduous minute rather stiff rusty hairs or sub-glabrous. *Leaves* thickly membranous, large, sub-coriaceous, pale-brown, often tinged with olivaceous when dry, narrowly elliptic or sub-obovate-elliptic, shortly and abruptly acuminate; upper surface quite glabrous, shining, the midrib and main-nerves and also the reticulations rather prominent when dry; lower surface rather rough from the bold pale transverse veins; main-nerves 5 or 6 pairs, slightly curved, ascending, thin but prominent; the midrib stout, glabrous or with a few minute hairs; length 5.5 to 8.5 in.; breadth 1.75 to 3 in.; petiole .2 to .3 in.; stipules, lanceolate, acuminate, the base broad, shorter than the petioles, pubescent, deciduous. *Glomeruli* lobulate, shorter than the petioles, sessile ebracteate, the flowers crowded on 2 or 3 short thick branches. *Flowers* about .15 in. long, on very short pedicels, puberulous. *Calyx* about as long as the corolla, campanulate, constricted somewhat below the three blunt or acute triangular teeth. *Corolla* tubular with 3 sub-acute triangular teeth. *Anthers* 3, broadly oblong, emarginate at the apex. *Ovary* 3-celled, style cylindric. *Fruit* obliquely elliptic, crowned by the small calyx; pyrenes 3, rugulose.

MALACCA: *Maingay* (K.D.) 871. SINGAPORE: *Ridley* 10737; *King* 89; *Hullett* 528. JOHORE: *Ridley* 6516, 11185, 11186, 11187. SELANGOR: *Ridley* 4895. PERAK: *Scortechini*, 678; *King's Collector* 2964.

This resembles No. 13, but is trimerous, its cymes have thick branches and are ebracteate, and its young stems and leaves are glabrous or nearly so.

43. *LASIANTHUS LUCIDUS*, King & Gamble, n. sp. A glabrous fœtid shrub; young branches rather thicker than a crow-quill, somewhat compressed, especially at the nodes. *Leaves* thinly coriaceous, oblong-

elliptic or lanceolate, the apex caudate-acuminate, the base much narrowed, both surfaces pale-brown when dry, shining, reticulate; main-nerves 7 to 10 pairs, thin, spreading, interarching  $\cdot 15$  in. from the edges, the secondary nerves almost as prominent; length  $3\cdot 5$  to 6 in.; breadth  $1\cdot 15$  to  $1\cdot 8$  in.; petiole  $\cdot 15$  to  $\cdot 2$  in. or  $\cdot 25$  in., slender; stipules minute triangular, much shorter than the petioles. *Cymes* sessile, 4- to 8-flowered, ebracteate. *Flowers*  $\cdot 25$  in. long, on short pedicels, narrow, erect. *Calyx* tubular, with 3 broad teeth much shorter than the corolla, glabrous. *Corolla* narrowly tubular, with 3 long narrow-ovate lobes, hairy inside except at the tip. *Anthers* 3, erect, narrowly oblong, not quite so long as their filaments. *Ovary* 3-celled; style long, slender, clavate. *Fruit* sub-trigonous, or sub-didymous, depressed,  $\cdot 2$  to  $\cdot 35$  in. in diam., shining, blue; pyrenes 2 or 3, oblique sub-pyriform, smooth, each divided into 2 cells by a transverse septum, the anterior cell empty. *Seeds* concave, cupped, fleshy.

PERAK: *Scortechini* 264, 463; *King's Collector* 788, 2797, 2840, 5051; *Ridley* 2928, 5549, 7437, 8574; *Wray* 426, 973, 2807, 3931.

## 52. CHASALIA, Commers.

Characters of *Psychotria* except that the corolla-tube is slender and in one species is usually curved, and the seeds are orbicular plano-concave, the dorsal surface being flat and the anterior deeply concave; almost cupped, albumen uniform.—DISTRIBUTION. About 10 species, tropical Asiatic and African.

In our opinion this genus might with advantage be reduced to *Psychotria*.

Flowers sessile, from  $\cdot 5$  to 1 in. long; corolla-tube slender,

curved                   ...                   ...                   ...                   ...                   1. *C. curviflora*.

Flowers pedicelled,  $\cdot 15$  in. long; corolla-tube wide, straight                   2. *C. rostrata*.

1. CHASALIA CURVIFLORA, Thwaites Enum. Pl. Ceyl. 150, 421. A shrub 2 to 4 feet high; everywhere glabrous. Young branches woody, terete, glabrous, dark-coloured when dry. *Leaves* membranous, elliptic, oblong-elliptic, oblong or oblanceolate, shortly and somewhat abruptly and often bluntly acuminate, narrowed at the base; (narrowly elliptic or linear in VARS.) upper surface olivaceous-brown when dry, the lower paler; main-nerves 5 or 6 pairs, much curved, spreading and ascending, thin but distinct on the lower surface like the wide reticulations; length 6 to 8 in.; breadth 1 to  $2\cdot 75$  in.; petioles  $\cdot 3$  to  $\cdot 75$  in. *Stipules* coriaceous, campanulate-cupular, blunt,  $\cdot 15$  to  $\cdot 35$  in. deep, the upper edge truncate, entire or 2- or 3-cleft. *Cymes* solitary, terminal, from 1 to 2 in. long, and the same in diam., sometimes on naked peduncles  $\cdot 5$  to  $1\cdot 25$  in. or even more in length; branches divergent,

trichotomous, often short, few-flowered. *Flowers* sessile, from .5 to 1 in. long. *Calyx* only .15 in. long, campanulate, the mouth irregularly and shortly toothed. *Corolla* about four times as long as the calyx, the tube long and narrow; its 4 lobes not a quarter of its length, lanceolate, spreading. *Anthers* 4, linear-oblong, deeply cordate at the base, the filaments varying in length. *Style* also varying in length. *Fruit* pisiform, globose sometimes didymous, crowned by the small remains of the calyx, glabrous, pyrenes thin, each with one plano-convex seed. Kurz For. Flora Burma, II. 14; Miq. in Ann. Mus. Lugd. Bat. IV. 202; Hook fil. Fl. Br. Ind. III. 176; Trimen Flora Ceylon III. 363. *C. lurida*, *C. tetrandra*, Miq. Fl. Ind. Bat. 281, 282. *C. Sangiana*, Miq. Fl. Ind. Bat. Suppl. 546. *Psychotria lurida*, Bl. Bijdr. 959; DC. Prod. IV. 521. *P. curvifolia* and *P. ophioxyloides*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 167, 168; Cat. 8360, 8364; DC. Prod. l.c. 520. *P. ambigua*, W. & A. Prod. 433; Wt. Ic. t. 127. *P. tetrandra*, BC. Bijdr. 961; DC. l.c. 521. *Zwaardkronia lurida*, Korth, in Ned. Kruidk. Arch. II. 252. *Ixora attenuata*, Wall. Cat. 6164. *Psychotria*, Wall. Cat. 8361, 8362, 8363, 8364, 8375; (*in part*) 8386, 8390. *Rubiaceae*, Wall. Cat. 8461.

In all the provinces, common.

The corolla varies in length and is moreover dimorphous as regards the respective length of the stamens and pistils. As regards leaves the plant varies greatly. It seems necessary, however, to separate one Malayan variety.

VAR. *linearis* King & Gamble; leaves linear-oblong from 3.25 to 8.5 in. long, and from .35 to .65 in. in breadth.

MALACCA: *Ridley* 1359: *Goodenough* 1606.

2. CHASALIA ROSTRATA, Miq. in Ann. Mus. Lugd. Bat. IV. 203 excl. syn. *Psychotria tetrandra*. A slender glabrous shrub; young branches thicker than a crow-quill, compressed, pale. *Leaves* membranous, greenish when dry, elliptic or elliptic-oblong, the apex acuminate, the base usually much narrowed but sometimes rounded and oblique; both surfaces more or less distinctly fine-reticulate; main-nerves 5 or 6 pairs, curved, spreading, conspicuous beneath when dry; length 3 to 6 in.; breadth 1.5 to 2 in.; petiole .25 to .4 in.; stipules less than .1 in. long, connate into a short tube, the mouth with a few bristles. *Cymes* solitary, terminal, slender, from .75 to 2 in. long (including the peduncle); bracteoles few, broad, coriaceous; branches divergent, trichotomous, few-flowered. *Flowers* .15 in. long, on short pedicels. *Calyx* campanulate; the mouth oblique, irregularly 4- or 5-toothed. *Corolla*-tube wide, only slightly longer than the calyx; the limb about as long as the tube with 4 broad blunt spreading lobes. *Anthers* 3 or 4, ovate, as long as the filaments, included in the corolla-tube. *Fruit* ovoid, smooth, .25 in. long. Hook.

fl. Fl. Br. Ind. III. 177; Miq. Fl. Ind. Bat. II. 281. *Psychotria rostrata* Blume Bijdr. 961. *Polyozus latifolia* (fide Miquel) Bl. Bijdr., 948; DC. Prod. IV. 521, 494.

MALACCA: *Griffith* (K.D.) 3045; *Maingay* (K.D.) 937. JOHORE: *Ridley* 4092. SINGAPOPE: *Ridley* 4890. SELANGOR: *Ridley* 7376. DINDINGS, *Ridley* 7992. PERAK: *Scortechini* 1482. *King's Collector* 2190.

We follow previous writers in putting this plant in the same genus as *Chasalia curviflora*, from which it differs in having a corolla with a short wide perfectly straight tube.









028732

# MATERIALS

FOR A

## FLORA OF THE MALAYAN PENINSULA.

BY

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*Late Superintendent of the Royal Botanic Garden, Calcutta,*

AND

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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.,  
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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. S. GAMBLE, C.I.E., F.R.S., late of the Indian Forest Department.

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

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

Nat. Ord. LIX. RUBIACEÆ.

53. PSYCHOTRIA, Linn.

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

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

## Scandent:—

Flowers 4-merous:—

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

Flowers 5-merous:—

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

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

Leaves ovate to oblong-elliptic, 1·75 to 2·5 in. broad; inflorescence puberulous .. .. 2. *P. morindæflora*.Leaves narrowly elliptic, less than 1·25 in. broad; inflorescence coarsely pubescent .. .. 3. *P. Maingayi*.

Flowers pedicellate in cymosely branched cymes:—

Leaves elliptic-oblong to elliptic, the midrib sometimes pubescent on the lower surface, otherwise glabrous; main-nerves 7 to 10 pairs; petioles ·4 to ·75 in. long; fruit ·25 in. long .. .. 4. *P. sarmentosa*.Leaves narrowly elliptic-oblong, main-nerves 4 to 6 pairs; petioles ·4 to ·8 in. long; fruit ·35 in. long .. 5. *P. Kunstleri*.Leaves broadly obovate or sub-ovate; main-nerves 5 to 10 pairs; petioles ·5 to 1·5 in.; fruit ·4 in. long .. 6. *P. penangensis*.

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

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

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

Leaves and stems glabrous; fruit subglobose, ·2 in. long .. .. 8. *P. pilulifera*.Leaves and stems and inflorescence rusty-pubescent .. 9. *P. ovoidea*.Seeds with more than 4 ridges on both dorsal and ventral surfaces .. .. 10. *P. Ridleyi*.

Seeds faintly ridged on the dorsal surface, the ventral surface with a shallow groove .. .. . 11. *P. polycarpa*.  
 Erect shrubs, usually small:—

Flowers 4-merous:—

Leaves with a strong pale intra-marginal nerve .. 12. *P. calocarpa*.

Flowers 5-merous:—

Flowers shortly pedicellate, in dense globular cymules at the ends of the long-peduncled branches of a terminal umbellate cyme; leaves deciduously puberulous, with 9 to 13 pairs of main-nerves; fruit .3 in. long; seeds 4-ridged on the dorsal surface, slightly concave on the ventral .. .. . 13. *P. multicapitulata*.

Flowers sub-sessile, in short condensed dichotomous sessile axillary cymes; leaves with scurfy pubescence and 8 to 11 pairs of main-nerves; seeds 5-ridged on the dorsal and broadly grooved on the ventral surface .. 14. *P. tortilis*.

Flowers in a terminal umbellately branching cyme:—

Seeds with a single dorsal ridge, the ventral surface plane:—

Leaves quite glabrous:—

Leaves 6 to 10 in. long; main-nerves 12 to 15 pairs .. .. . 15. *P. Griffithii*.

Leaves usually under 6 in. long, main-nerves 8 to 10 pairs .. .. . 16. *P. angulata*.

Leaves adpressed-pubescent, 6 to 12 in. long .. 17. *P. Helfferiana*.

Seeds with a single dorsal ridge, the ventral surface with a groove; leaves 5 to 8 in. long, quite glabrous, main-nerves 7 to 8, rarely 10 pairs .. 18. *P. montana*.

Seeds with 5 ridges on the dorsal surface, the ventral surface plane:—

Leaves glabrous:—

Leaves oblong-elliptic to oblanceolate-elliptic, 3.5 to 8 in. long; fruit .25 in. long .. 19. *P. viridiflora*.

Leaves softly pubescent:—

Leaves elliptic to elliptic-oblong, the bases cuneate rounded or cordate, 3.5 to 5 in. long; fruit .25 to .3 in. long .. .. . 20. *P. Birchiana*.

Leaves elliptic, the upper surface glabrous except the midrib, 5 to 7 in. long; fruit .45 in. long .. 21. *P. fulva*.

Seeds 5-ridged on the dorsal surface and 2-grooved on the ventral; leaves glabrous on the upper surface, their margins crenulate .. .. . 22. *P. fulvoidea*.

Seeds with 5 ridges on the dorsal surface and 1 ridge on the ventral; leaves glabrous, usually oblanceolate 23. *P. stipulacea*.

Seeds 4-ridged on the dorsal surface, plane on the ventral:—

Leaves elliptic, tapering equally to each end, 9- to 10-nerved; calyx-lobes very long caudate-acuminate 24. *P. Curtisii*.

Leaves obovate-oblong or obovate-oblanceolate, 10- to 14-nerved; calyx-lobes short, broad, blunt .. 25. *P. rhinocerotis*.

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

## SPECIES IMPERFECTLY KNOWN.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

nate, much narrowed at the base into the broad petiole; both surfaces brown when dry, the upper slightly olivaceous; the midrib broad, channelled on the upper surface, main-nerves 5 to 10 pairs, spreading, thin, distinct on the lower surface; length 3 to 4.5 in.; breadth 1.5 to 2.5 in.; petiole .5 to 1.5 in. long, slightly winged above. *Stipules* broadly ovate, sub-acute or blunt, sub-tubular, sometimes bifid, .2 to .4 in. long. *Cymes* umbellate, solitary or terminal, pedunculate, as long as or longer than the leaves (including the compressed naked 1 to 2 in. long peduncle); primary branches long, spreading; the ultimate umbels with broad-based subulate unequal bracteoles. *Flowers* .2 to .25 in. long, sessile or on short pedicels; bracts .25 in. long. *Calyx-tube* obconic, its teeth triangular. *Corolla* longer than the calyx, shortly and widely tubular, deeply divided into 5 broad lobes thickened near the apex, the apex itself sharp and inflexed, glabrous inside except for the ring of hair in the throat at the insertion of the short filaments. *Anthers* elliptic, blunt, entire. *Fruit* ellipsoid, compressed, with 10 obtuse vertical ridges (2 of them double), glabrescent, crowned by the rather large calyx; length .4 in.; breadth .25 in. *Seeds* 2, plano-convex, the dorsal surface with 4 blunt ridges, the ventral surface plane.

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

7. *PSYCHOTRIA SCORTECHINII*, n. sp., King & Gamble. A climber, all parts glabrous; young branches pale brown, thicker than a crow-quill, terete, smooth. *Leaves* membranous, ovate-lanceolate or narrowly elliptic, acuminate, the base narrowed or rarely rounded; both surfaces brown when dry (the lower slightly paler), the midrib prominent; main-nerves 5 or 6 pairs, curved, spreading, not prominent; length 2.5 to 4 in.; breadth 1 to 1.5 in.; petiole .15 to .2 in. *Stipules* oblong, acute, connate at their bases, .15 to .2 in. long, caducous. *Cymes* paniculate, solitary, terminal, rarely axillary, spreading, lax, cymosely branched, in flower as long as or nearly as long as the leaves, in fruit longer, the branches bracteolate, angled, divaricating. *Flowers* on the ultimate branchlets in threes, .15 in. long, on short pedicels, each with a bracteole at the base. *Calyx* cupular, with 5 short acute teeth. *Corolla* longer than the calyx, cylindrical, with short triangular lobes, the throat with tufts of yellowish hairs between the 5 stamens. *Anthers* on short filaments. *Style* cylindrical, stigma 2-lobed. *Fruit* narrowly ellipsoid, tapering to each end, sometimes clavate, slightly compressed, 8-ridged (2 being double), crowned by the calyx, .35 in. long and .2 in. in diam. *Seeds* with 3 broad dorsal ridges, ventral surface plane.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

SINGAPORE: *King*.—DISTRIB. Andamans.

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

PERAK: *Wray* 1963.

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

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

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

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

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

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

20. *PSYCHOTRIA BIRCHIANA*, n. sp., King & Gamble. Herbaceous; woody at the base; all parts softly rusty-pubescent; stems 6 to 18 in. high, thinner than a goose-quill, their pubescence crisped, dense, coarse, and entirely or partly deciduous. *Leaves* thickly membranous, elliptic to elliptic-oblong, sometimes sub-obovate, acute, the base rounded or minutely cordate or sometimes cuneate; both surfaces brown when dry, the lower sometimes paler and with fewer hairs; the midrib prominent and very hairy on both sides, the 10 to 12 pairs of rather faint little-curved spreading main-nerves less hairy than the midrib; length 3·5 to 5 in.; breadth 1·5 to 2·25 in.; petiole ·5 to 1 in., covered with coarse tomentum mixed with ovate-acuminate scales. *Stipules* oblong-ovate, acuminate, ·5 to ·75 in. long. *Cymes* pedunculate, solitary, terminal, spreading, 1·5 to 2 in. across, and about as long, the branches spreading, bracteate at the divisions, the bracts lanceolate,

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

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

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

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

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

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

22. *PSYCHOTRIA FULVOIDEA*, n. sp., King & Gamble. A small shrub; young branches thinner than a goose-quill, dark-coloured, glabrous. *Leaves* membranous, narrowly elliptic, acuminate, crenulate, the base cuneate; upper surface glabrous, dark brown when dry, the lower reddish-brown; the midrib, nerves and reticulations rusty-pubescent, otherwise glabrous; midrib prominent on both surfaces, the 10 to 14 pairs of spreading, curving main-nerves slightly prominent on the lower; length 6 to 7 in.; breadth 2 to 2·5 in.; petiole 1 to 1·3 in. *Stipules* membranous, ovate, caudate-acuminate, the edges irregularly serrate, ciliate, length about 1 in. *Cymes* axillary, trichotomous, condensed, about 2 in. broad when in fruit and 1·25 in. long, on deflexed, coarsely but shortly pubescent peduncles 3 in. long; their branches short, spreading, bracteate at the divisions and coarsely pubescent. *Flowers* condensed into globose capitulate cymes at the apices of the branches, sessile. *Calyx* narrowly campanulate, pubescent, with 5 erect acute teeth. *Corolla* unknown. *Fruit* narrowly elliptic, tapering to each end, the apex crowned by the short pubescent lobes, with 12 deep ridges and grooves, glabrous, 4 in. long and 2 in. in diam. *Seed* dorsally 5-ridged, ventrally 2-grooved.

PERAK: *Scortechini* 538.

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

23. *PSYCHOTRIA STIPULACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 164. A shrub, 1 to 2 feet high, all parts except the inflorescence glabrous; stems as thick as a goose-quill, brown when dry. *Leaves* membranous, broadly oblanceolate to elliptic, or oblong, abruptly and shortly acuminate, much narrowed to the base; both surfaces glabrous, when dry brown with a reddish tinge; midrib very stout, main-nerves 11 to 13 pairs, spreading, slightly curved, distinct on both surfaces; length 5 to 9 in.; breadth 2 to 4 in.; petioles 5 to 1·25 in. long, winged near the apex. *Stipules* large, sub-persistent, ovate, sometimes bifid, 75 to 1 in. long, and about 4 in. broad. *Cyme* usually solitary, corymbose, trichotomous, terminal, on a short peduncle, bracteate at the base, about 2 to 3 in. in diam.; its branches puberulous, bracts and bracteoles triangular. *Flowers* 15 in. long, on short pedicels, clustered in dense, cymose, capituliform cymes at the ends of the ultimate branches. *Calyx* campanulate, with 5 broad pubescent lobes, the tube glabrous. *Corolla* longer than the calyx, widely campanulate, 4- or 5-toothed. *Fruit* ellipsoid, sub-compressed, 10-ridged, crowned by the small calyx, 3 in. long, and 15 in. in diam. *Seed* dorsally 5-ridged, ventrally concave, with one central ridge. Wall. Cat. 8329; DC. Prod. IV. 519; Hook. fil. Fl. Br. Ind. III. 167.

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

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

PENANG: Curtis 2695.

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

PERAK: King's Collector 8272; Scortechini.

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

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

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

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

#### SPECIES IMPERFECTLY KNOWN.

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

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

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

28. *PSYCHOTRIA INEQUALIS*, n. sp., King & Gamble. A small unbranched shrub; the stem thinner than a goose-quill, deciduously puberulous, only a foot high, brown when dry. *Leaves* thickly membranous, those of a pair somewhat unequal in size, elongate-obovate, the smaller one oblong-elliptic, all abruptly and shortly acuminate, the base cuneate; upper surface glabrous, minutely pitted when dry; the lower with many coarse pale-brown, crisped, flattened hairs on the midrib and nerves, and a few pale appressed hairs on the interspaces; midrib broad and channelled on both surfaces, as are also the 10 to 13 pairs of pale ascending, slightly curved main-nerves; length 6 to 10 in.; breadth 2.5 to 5 in.; petiole .5 to .75 in., stout. *Stipules* narrowly ovate, acuminate, pubescent, .65 in. long. *Cyme* solitary, terminal, 2 to 3.5 in. long (including the 1 to 2 in. peduncle), pyramidal, everywhere rusty-puberulous, the branches opposite, many-flowered, and with broad abruptly acuminate bracts; the lowest pair exceeding 1 in. in length, reflexed; branchlets divaricate. *Flowers* .1 in. long, on short stout pedicels. *Calyx* small, tubular; its lobes broadly triangular. *Corolla* not much longer than the calyx, its lobes linear with moniliform bluish hairs at their bases and on the throat. *Fruit* unknown.

PERAK: *Scortechini* 279.

29. *PSYCHOTRIA CONDENSA*, n. sp., King & Gamble. A small woody shrub; young branches half as thick as a goose-quill, the nodes close together and slightly thickened, the internodes striate, at first scurfy-puberulous but afterwards glabrous. *Leaves* coriaceous, narrowly elliptic or elliptic-lanceolate, shortly acuminate, the base cuneate; upper surface when dry very dark brown, the lower paler and tinged with olivaceous, the midrib prominent and pale; the 5 or 6 pairs of oblique main-nerves visible beneath but not above; length 1 to 1.25 in.; breadth .3 to .5 in.; petiole .05 in. *Stipules* broadly triangular, acuminate, nearly .1 in. long. *Umbel* cymose, 3-branched, terminal, shorter than the leaves; each branch with 3 unequally pedicellate flowers. *Flowers* not seen. *Fruit* globular-ovoid, with 2 prominent furrowed vertical ridges and several obscure ones between them, crowned by the 5-toothed calyx; length .2 in.; breadth .15 in. *Seeds* with one prominent dorsal ridge, ventral surface flat.

PERAK: *Scortechini*.

## Order LX. VALERIANEÆ.

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

## VALERIANA, Linn.

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

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

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

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

### Order LXI. COMPOSITÆ.

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

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

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

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

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

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

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

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

- |                                         |             |
|-----------------------------------------|-------------|
| Heads ebracteate; florets purple .. ..  | 12. EMILIA. |
| Heads bracteolate; florets yellow .. .. | 13. GYNURA. |

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

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

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

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

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

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

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

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

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

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

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

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

Cypselas not beaked; leaves opposite, simple to pinnatisect .. .. . 19. BIDENS.

Pappus of membranous scales; heads radiate; leaves opposite:—

Scales of pappus feathery, fringed; heads medium-sized .. .. . 20. TRIDAX.

Anthers inappendiculate at the apex; receptacle (in our species) not paleaceous; pappus absent or reduced to a raised rim, rarely scaly and short; leaves usually alternate (*Anthemideæ*):—

Flower-heads discoid, heterogamous; pappus absent:—

Florets of the circumference very numerous; cypselas flat or concave at the top; flower-heads globose or hemispheric, sub-sessile; bracts of involucre in 2 series, spreading in fruit .. .. . 21. CENTIPEDA.

Florets of the circumference few; heads very small, in racemes or panicles; cypselas ellipsoid or obovoid, rounded at the apex .. .. . 22. ARTEMISIA.

Corollas of all the florets flatly expanded from a tubular base, ligulate, their apices 5-toothed; leaves radical or cauline and alternate, never opposite; stem always herbaceous, fistulose; sap milky (*Cichorieæ*):—

Pappus of simple hair-like bristles, at least in the central florets; florets yellow, cypselas fusiform or oblong, with glabrous or puberulous ribs .. .. . 23. CREPIS.

NOTE.—The above key is taken mainly from “Bengal Plants,” by Lieut.-Col. D. Prain, F.R.S., Superintendent, Royal Botanic Garden, Calcutta.

### 1. VERNONIA, Schreb.

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

A large shrub or small tree; leaves sub-coriaceous; involucrel bracts obtuse .. .. . 1. *V. arborea*.

Herbaceous annuals; leaves membranous; involucrel bracts acuminate:—

Heads few, '35 in. in diam., in long-peduncled cymes. . . . . 2. *V. chinensis*.

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

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

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

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

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

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

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

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

## 2. ELEPHANTOPUS, Linn.

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

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

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

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

### 3. ADENOSTEMMA, Forst.

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

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

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

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

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

#### 4. AGERATUM, Linn.

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

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

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

#### 5. MIKANIA, Willd.

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

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

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

#### 6. DICHROCEPHALA, DC.

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

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

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

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

#### 7. MICROGLOSSA, DC.

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

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

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

## 8. BLUMEA, DC.

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

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

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

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

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

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

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

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

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

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

SINGAPORE: *Ridley* 2742.

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

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

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

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

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

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

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

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

6. *BLUMEA MEMBRANACEA*, DC. Prod. V. 440. A rigid erect herb, 1 to 2 feet high; stem at the base half as thick as a goose-quill, minutely pubescent from base to apex, terete, striate. *Leaves* thinly membranous, oblanceolate, much tapered to the base, sub-sessile, the apex acute, the edges coarsely and often irregularly dentate, sometimes lobulate; both surfaces pale olivaceous-brown when dry, the lower paler, sparsely strigose; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; length 2 to 3·5 in.; breadth ·8 to 1·5 in.; the leaves of the upper part of the stem smaller and bract-like. *Heads* ·25 in. in diam., sessile or sub-sessile, in spikes several inches long, from the

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

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

### 9. LAGGERA, Schultz.-Bip.

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

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

PENANG: *Wallich*.—DISTRIB. British India.

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

### 10. PLUCHEA, Cass.

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

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

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

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

### 11. SPHERANTHUS, Linn.

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

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

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

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

## 12. EMILIA, Cass.

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

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

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

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

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

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

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

### 13. GYNURA, Cass.

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

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

1. GYNURA SARMENTOSA, DC. Prod. VI. 298. Stem and branches loosely twining, glabrous except the puberulous peduncles, thinner than a goose-quill, pale brown and striate when dry. *Leaves* succulent, elliptic to elliptic-lanceolate, acute or acuminate, the base cuneate, the edges subentire or slightly dentate, both surfaces brown when dry, glabrous; main-nerves 4 or 5 pairs, spreading, faint on both surfaces; length 1 to 3 in.; breadth  $\cdot 4$  to 1 in.; petioles of the lower leaves  $\cdot 15$  to  $\cdot 4$  in.; the small upper leaves often sessile. *Heads* few,  $\cdot 65$  to  $\cdot 75$  in. long, and as much in diam., on slender puberulous

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

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

2. GYNURA BICOLOR, DC. Prod. VI. 299. Herbaceous, 2 or 3 feet high, glabrous or sparsely and minutely glandular-hairy on the upper part; stems erect, branched, about the thickness of a quill near the base, boldly striate when dry. *Leaves* pinnatisect or pinnatifid, the lobules acutely dentate; the terminal lobe narrow and acuminate, narrowed at the base into a petiole varying in length from  $\cdot 5$  to 1 in.; the upper sessile and often auriculate at the base, or shorter and narrowly obtuse with large teeth; length 2.5 to 5 in.; breadth  $\cdot 4$  to 3 in. *Heads* about  $\cdot 5$  in. long, less in diam. Involucral bracts narrow, with scarious margins and acute often recurved tips. *Cypselas* very slender, much ribbed, sub-glabrous; pappus copious, white, tinged with pink. Hook. fil. Fl. Br. Ind. III. 335. *Cacalia bicolor*, Roxb. Fl. Ind. III. 412; Salisb. Hort. Parad. t. 25; Bot. Regist. t. 110.

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

#### 14. SIEGESBECKIA, Linn.

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

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

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

In all the provinces, near habitations.

#### 15. ECLIPTA, Linn.

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

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

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

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

#### 16. WEDELIA, Jacq.

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

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

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

On the sea coast, common.

### 17. SPILANTHES, Linn.

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

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

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

### 18. SYNEDRELLA, Gaertn.

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

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

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

Near cultivation, common.

### 19. BIDENS, Linn.

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

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

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

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

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

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

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

## 20. TRIDAX, Linn.

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

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

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

In cultivated and waste places : an introduction.

## 21. CENTIPEDA, Lour.

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

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

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

## 22. ARTEMISIA, Linn.

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

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

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

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

### 23. CREPIS, Linn.

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

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

In all the provinces, near or in cultivated ground.

## Order LXII. STYLIDIEÆ.

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

## STYLIDIUM, Sw.

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

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

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

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

## Order LXIII. GOODENOVIÆ.

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

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

### 1. SCÆVOLA, Linn.

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

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

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

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

#### Order LXIV. CAMPANULACEÆ.

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

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

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

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

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

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

### 1. LOBELIA, Linn.

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

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

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

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

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

## 2. CAMPANUMÆA, Blume.

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

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

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

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

### 3. PENTAPHRAGMA, Wall.

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

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

Leaves markedly serrate, very unequal-sided .. .. 1. *P. begoniæfolium*.

Leaves entire or only slightly dentate, nearly or quite equal-sided :—

Stem short, flower spikes from upper axils, calyx and corolla usually 5-lobed .. .. 2. *P. Scortechinii*.

Stem elongate, flower spikes from lower axils, calyx and corolla usually 4-lobed .. .. 3. *P. Ridleyi*.

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

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

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

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

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

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

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

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

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

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

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

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

#### 4. *SPHENOCLEA*, Gaertn.

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

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

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

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

#### Order LXV. VACCINIACEÆ.

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

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

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

1. AGAPETES, D. Don.

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

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

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

## 2. PENTAPTERYGIUM, Klotsch.

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

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

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

## 3. VACCINIUM, Linn.

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

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

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

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

Leaves entire:—

Leaves glabrous:—

Leaves coriaceous:—

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

Leaves pubescent or puberulous beneath :—

Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate, with very long caudate acuminate apices; under surface pubescent or puberulous ..

.. 9. *V. acuminatissimum*.

Leaves serrate (sometimes faintly so) sub-coriaceous, glabrous; flowers .3 in. long; beaks of anthers twice as long as the cells .. .. .

.. 10. *V. malaccense*.

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

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

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

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

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

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

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

PERAK: *Scortechini* (without number).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

## Order LXVI. ERICACEÆ.

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

Fruit capsular:—

Capsule 5-valved, loculicidal:—

Calyx surrounding the capsule succulent in fruit:—

  Anthers with 2 horns at the apex .. .. 1. GAULTHERIA.

  Anthers not horned on the apex .. .. 2. DIPLYCOSIA.

  Calyx not succulent in fruit .. .. 3. PIERIS.

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

  anthers dehiscing by pores .. .. 4. RHODODENDRON.

Fruit baccate .. .. 5. PERNETTYOPSIS.

## 1. GAULTHERIA, Linn.

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

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

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

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

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

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

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

## 2. *DIPLYCOSIA*, Blume.

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

Leaves 2 to 5 in. long:—

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

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

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

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

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

PERAK: *Scortechini*.

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

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

### 3. *PIERIS*, D. Don.

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

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

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

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

#### 4. RHODODENDRON, Linn.

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

Corolla widely campanulate, tubular only at the base:—

All parts glabrous, leaves not glaucous and without scales;

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

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

2. *R. Wrayi*.

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

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

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

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

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

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

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

6. *R. jasminiflorum*.

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

7. *R. longiflorum*.

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

8. *R. malayanum*.

Species imperfectly known .. .. . 9. *R. dubium*.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DISTRIB. Borneo, Sumatra.

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

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

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

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

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

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

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

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

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

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

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

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

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

## Order LXVII. MONOTROPEÆ.

[By D. PRAIN.]

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

## 1. CHEILOTHECA, Hook. fil.

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

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

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

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

#### Order LXVIII. EPACRIDÆ.

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

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

LEUCOPOGON, Br.

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

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

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

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

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

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

### Order LXIX. PLUMBAGINEÆ.

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

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

#### 1. ÆGIALITIS, R. Br.

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

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

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

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

## 2. PLUMBAGO, Linn.

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

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

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

## Order LXXVIII. GENTIANACEÆ.

[By C. B. CLARKE.]

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

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

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

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

1. EXACUM, Linn.

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

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

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

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

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

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

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

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

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

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

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

## 3. CANSORA, Lam.

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

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

|                                            |    |    |                            |
|--------------------------------------------|----|----|----------------------------|
| One stamen only perfect; corolla irregular | .. | .. | 1. <i>C. diffusa</i> .     |
| All stamens perfect; corolla regular       | .. | .. | 2. <i>C. pentanthera</i> . |

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

1. CANSCORA DIFFUSA, R. BROWN, Prodr. (1810) 451 in Obs. Erect annual, 4 to 20 in., much branched upwards. *Leaves* 1·5 by ·5 in., lanceolate or elliptic, 3-nerved, often petioled, upper smaller. *Cyme* diffuse; lower bracts at its divisions ·5 in. long, ovate, upper much smaller. *Calyx*  $\frac{1}{3}$  in. long; teeth lanceolate-linear. *Corolla* rose-coloured; tube  $\frac{1}{3}$  in., lobes  $\frac{1}{6}$  in. *Capsule* oblong, as long as the calyx. DC. Prod. IX. 64; Benth. Fl. Austral. IV. 372; Hook. fil. Fl. Br. Ind. IV. 103; Trimen Fl. Ceyl., III. 184. *Exacum diffusum*, Willd. Sp. Pl. I. 637. *Orthostemon erectum*, R. Br. Prod. 451; DC. l.c. 63. *O. Hugelii*, DC. l.c. 63. *Pladera virgata*, Roxb. Fl. Ind. ed. Carey & Wall. I. 417; Hook. Bot. Misc. III. 88 t. 25.

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

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

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

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

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

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

#### 4. CRAWFURDIA, Wall.

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

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

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

#### 5. VILLARSIA, Vent.

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

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

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

PAHANG: Kwala Pahar, Ridley.

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

#### 6. LIMNANTHEMUM, S. P. Gmel.

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

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

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

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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.*

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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., F.L.S., late Superintendent of the Royal Botanic Garden, Calcutta, and J. SYKES GAMBLE, Esq., C.I.E., M.A., F.R.S., F.L.S., late of the Indian Forest Department.

No. 17.

This contribution embraces the Natural Orders *Myrsinaceæ*, *Sapotaceæ*, *Ebenaceæ*, *Styraceæ*, *Oleaceæ*, which are given under the joint names of the authors, the actual descriptions having been prepared by Sir George King for the *Ebenaceæ* and by Mr. J. S. Gamble for the rest.

The 5 Natural Orders comprise 24 genera and 221 species. There are no new genera, but the number of new species reaches 103.

Order LXX. MYRSINACEÆ.

Trees, shrubs (erect or climbing), or undershrubs, generally evergreen. *Leaves* usually alternate, sometimes opposite, entire dentate or crenate, often dotted with pellucid round or linear resinous glands. *Stipules* none. *Flowers* regular, usually small, white or reddish; hermaphrodite or occasionally polygamo-dicæcious; generally in panicles, racemes or umbels. *Calyx* inferior (in *Mæsa* adnate to the ovary), 4-6-lobed, the lobes valvate or imbricate, sometimes enlarged in fruit, persistent, often marked with glandular dots or lines. *Corolla* 4-5-lobed; the tube usually very short, sometimes wanting; lobes twisted to the left in the bud, usually overlapping to the right, rarely

valvate, often gland-dotted or -striate. *Stamens* opposite to the corolla-lobes and equal to them in number, free or adnate to the lobes or in an inner ring, generally erect; filaments long or short; anthers opening by slits, usually introrsely, sometimes septate as in *Ægiceras* and *Ardisia littoralis*, sometimes with terminal openings as well, free or adherent by their edges; the connective often thickened and produced, sometimes glandular; staminodes sometimes present, though not in Malay species. *Ovary* globose, ovoid or oblong, free (in *Mæsa* adherent to the calyx-tube), 1-celled, narrowed into or surmounted by the style; style filiform or columnar, stigma usually simple; ovules few or many, inserted on or immersed in a free usually globose central placenta. *Fruit* usually small, globose (in *Ægiceras* linear, curved, acuminate); epicarp fleshy, mesocarp crustaceous, endocarp membranous, separable; usually one- rarely several-seeded (as in *Mæsa*), indehiscent. *Seeds* usually globose, hollowed at the base: in *Mæsa* many and angled; albumen pitted or ruminant; embryo transverse, cylindric; radicle usually elongate.—**DISTRIB.** Tropical or sub-tropical regions of both hemispheres, chiefly in Asia and South America; genera 32, species upwards of 900 (according to Mez Monog. *Myrsineæ*).

Calyx-tube adnate to the ovary; fruit many-seeded (Tribe I. **MÆSEÆ**):—

Trees or shrubs; calyx 2-bracteolate; flowers in simple or compound racemes .. .. . 1. **MÆSA.**

Calyx-tube free from the ovary; fruit one-seeded (Tribe II. **EUMYRSINEÆ**):—

Fruit round; anther-cells usually opening by slits, rarely septate:—

Corolla-lobes imbricate in bud:—

Flowers in axillary or lateral fascicles; trees or shrubs .. 2. **MYRSINE.**

Flowers in racemes or panicles; climbing plants, rarely shrubs .. .. . 3. **EMBELIA.**

Corolla-lobes valvate in bud; flowers in paniculate spike-like racemes; small shrubs with parallel-veined leaves .. 4. **LABISIA.**

Corolla-lobes contorted in bud:—

Anthers sagittate, rarely septate; corolla-lobes overlapping to the right .. .. . 5. **ARDISIA.**

Anthers sagittate-lanceolate, the connective produced in a membranous wing; corolla-lobes overlapping to the left .. 6. **ANTISTROPHE.**

Fruit elongate, cylindric, long-pointed; anthers markedly septate 7. **ÆGICERAS.**

### 1. **MÆSA**, Forsk.

Trees or shrubs, erect or straggling. *Leaves* entire, dentate or serrate, usually pellucid-punctate, sometimes with resinous lines. *Flowers* hermaphrodite or unisexual, in terminal or axillary racemes, the pedicels bracteate. *Calyx* bibracteolate, 4–5-lobed; lobes persistent,

imbricate; the tube adnate to the ovary, sometimes with resinous lines. *Corolla* shortly campanulate, 4-5-lobed; the lobes usually as long as the tube or rather shorter, rounded with inflexed tips, sometimes resinous-lineate. *Stamens* 4 or 5, inserted on the corolla-tube; filaments short; anthers introrse, oblong-cordate. *Ovary* adnate to the calyx-tube; style short; stigma small, entire or shortly 3-5-lobed; ovules numerous, placenta globose. *Fruit* small, dry or fleshy, ovoid or subturbinate, crowned with the persistent style, many-seeded. *Seeds* numerous, angular, immersed in hollows of the placenta, and arranged around it with hexagonal surfaces, embryo small, oblique or transverse, cotyledons narrowly ovate.—**DISTRIB.** Species over 100 (according to Mez), chiefly in the tropical regions of the Old World, a few in Australia and the Pacific Islands; all the Malayan species belonging to sub-genus *Eumæsa*, Mez.

Leaves entire :—

- |                                                                                                              |                            |
|--------------------------------------------------------------------------------------------------------------|----------------------------|
| Flowers in large terminal leafy panicles; branches of the inflorescence pubescent .. .. .                    | 1. <i>M. macrothyrsa</i> . |
| Flowers in large axillary or pseudo-terminal panicles of racemes; branches of inflorescence glabrous .. .. . | 2. <i>M. ramentacea</i> .  |

Leaves faintly lobed :—

- |                                                                                                                                                                                   |                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Leaves very slightly dentate, almost coriaceous, under 3·5 in. long, midrib and main-nerves very prominent; inflorescence as long as or only a little shorter than leaves .. .. . | 3. <i>M. impressinervis</i> . |
| Leaves membranous, over 4 in. long :—                                                                                                                                             |                               |

|                                                                                                           |                        |
|-----------------------------------------------------------------------------------------------------------|------------------------|
| Leaves pale when dry, under 3 in. broad, distantly dentate, inflorescence longer than the petiole .. .. . | 4. <i>M. striata</i> . |
|-----------------------------------------------------------------------------------------------------------|------------------------|

|                                                                                                      |                           |
|------------------------------------------------------------------------------------------------------|---------------------------|
| Leaves dull green when dry, over 4 in. broad, inflorescence scarcely longer than the petiole .. .. . | 5. <i>M. pahangiana</i> . |
|------------------------------------------------------------------------------------------------------|---------------------------|

|                                    |                       |
|------------------------------------|-----------------------|
| Leaves prominently dentate .. .. . | 6. <i>M. indica</i> . |
|------------------------------------|-----------------------|

1. *MÆSA MACROTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub reaching 30 to 50 feet in length; branches brown, somewhat angled and flexuose, striate. *Leaves* entire, chartaceous; elliptic, shortly bluntly acuminate at apex, rounded at base; smooth and dull on both surfaces; 3 to 4 in. long, 1·5 to 2 in. broad; midrib prominent, impressed above; main-nerves 5 to 7 pairs, distant, starting from the midrib at about 60° and curving upwards; secondary nerves and reticulations indistinct; petiole ·5 to ·7 in. long, channelled above by the decurrent margins of the blade. *Inflorescence* a large leafy terminal many-flowered tripinnate panicle, the branches rusty pubescent; pedicels about ·025 in. long, supported by a slightly shorter ovate-acute bract, and bearing 2 similar bracteoles below the flowers. *Calyx* superior, cupular; lobes 4, occasionally 5, rounded, denticulate, ·04 in. long, gland-dotted; tube very short. *Corolla* dull white or pink, longer than calyx; tube as long as lobes; lobes 4 or 5, rounded, often with

small lobules between, denticulate, with about 3 to 4 glandular lineoles. *Stamens* inserted near the base of the corolla-tube; anthers globose; filaments about twice as long as anthers. *Ovary* rounded, depressed, crowned with a short cylindric style and obtusely 3-4-lobed stigma. *Fruit* very small, .05 in. in diam., globose, glabrous, faintly striate, crowned about one-third of the way down with the persistent calyx-teeth. *Seeds* very minute, angled. Scheff. Myrs. 29; Mez Monog. Myrs. 49. *M. floribunda*, Scheff. Myrs. 18. *M. Korthalsiana*, Scheff. Myrs. 18 (?)

PERAK: Wray 2684; *Scortechini* 122, 1655; *King's Collector* 725, 2722, 3777, 4968, 5326.—DISTRIB. Sumatra, *Korthals*, *Beccari* 887; Borneo, *de Vriese*, *Teysmann*.

We have always found the flowers tetramerous, as described by Miquel and Scheffer. Mez describes them as either 4- or 5-merous. This is a well-marked species on account of its large terminal inflorescence, whose pubescent branches easily distinguish it from those occasional forms of *M. ramentacea* which have part of the inflorescence pseudo-terminal.

2. *MESA RAMENTACEA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 231 (1824). A large shrub or small tree, usually branched from the base and sending out many straggling or climbing branches often 30 to 40 feet long or more; branchlets smooth, somewhat striate when dry. *Leaves* entire, chartaceous; ovate-lanceolate or elliptic, acuminate at apex, rounded or cordate at base; 3 to 8 in. long, 1.5 to 4 in. broad; smooth on both surfaces and generally shining above; midrib prominent, often impressed above; main-nerves slender, distant, 5 to 10 pairs, starting at 45° with the midrib and curved upwards; secondary nerves and reticulations not apparent: petiole .3 to .5 in. long, slightly winged by the decurrent margins of the blade, which are often connivent above. *Inflorescence* axillary or sometimes pseudo-terminal, glabrous, many-flowered, consisting of more or less closely packed racemes arranged in bipinnate panicles, shorter or longer than the leaves; pedicels .1 to .15 in. long, slender, supported by a minute lanceolate bract and with 2 very minute ovate-lanceolate bracteoles below the flower; buds minute, globose, depressed at top. *Calyx* superior, cupular; tube very short, about .025 in. long; lobes 5, ovate, faintly ciliate, as long as the tube. *Corolla* .075 in. long; lobes half the length, ovate or ovate-reniform, edges undulate, with a few brown glandular lineoles. *Stamens* short, longer in ♀ flowers, inserted a little below the top of the tube; anthers rounded, filaments as long as the anthers, dorsifixed. *Ovary* in ♀ flowers adnate to the base of the calyx-tube, style short, stigma minutely 4-lobed, ovules many. *Fruit* globose, .1 to .15 in. long, crowned with the persistent teeth of the calyx; seeds minute, angled,

albuminous, embryo small, transverse. A. DC. in Trans. Linn. Soc. XVII. 133, Prod. VIII. 77; Scheff. Myrs. 15; Miq. Fl. Ind. Bat. II. 1006; Kurz in Journ. As. Soc. Beng. XLVI. ii. 220; For. Fl. II. 99; Clarke in Hook. f. Fl. Br. Ind. III. 508; Koord. & Val. Bijdr. V. 218; Mez Monog. Myrs. 27; Prain Beng. Pl. 642. *M. ovata*, A. DC. l.c. 133, t. 4, Prod. l.c. 77; Scheff. Myrs. 14. *M. lanceolata*, Don Prod. 148. *M. acuminata*, *missionis*, and *glabra*, DC. Prod. l.c. 77, 78, 82. *M. sumatrana*, Scheff. Myrs. 15. *Baobotrys ramentacea*, Roxb. Hort. Beng. 16, Fl. Ind. I. 558; Wall. Cat. 2322. *B. ovata*, Wall. Cat. 2324. *B. glabra*, Roxb. Fl. Ind. I. 560. *B. fragrans*, Wall. Cat. 2323. *B. (?) missionis*, Wall. Cat. 6523.

KEDAH: Langkawi, Curtis 2554, 3409. PENANG: Wallich 2324; Maingay (K.D.) 1001; J. Scott; G. King; Phillips; Deschamps. PERAK: Scortechini 382A, 606B, 628; Wray 1286, 1291, 1912, 2363, 2787; King's Collector 171, 1222, 1909, 2788, 3883, 4144, 4281, 4497, 4915, 5088, 5113; Curtis. PAHANG: Ridley 2175. SELANGOR: Ridley; Goodenough 10554. NEGRI SEMBILAN: Ridley 10067. MALACCA: Griffith (K.D.) 3552; Cuming 2286; Miller 9; Hervey; Goodenough 1036, 1742; Derry 37, 1063; Ridley 10099. JOHORE: Lake & Kelsall 4035; G. King. SINGAPORE: Schomburgk 91; Lobb 324; T. Anderson 126; Ridley 2064, 2805; Goodenough 1644; Hullett 38, 56, 885, 887.—DISTRIB. Eastern Bengal and Burma, Andaman and Nicobar Islands, Sumatra, Java, Borneo.

We follow Mez in not keeping up the var. *ovata*. The large mass of material available shows clearly that in shape of leaf and in inflorescence the variation is regular, and that the form with cordate long-acuminate leaves passes gradually into that with ovate broad short-acuminate leaves, and that similarly the inflorescence changes. A monstrous form with moss-like inflorescence similar to those often seen in India on *M. Chisia* and other species, is not uncommon.

3. MESA IMPRESSINERVIS, King & Gamble, n. sp. A bush or small tree; branches half as thick as a goosequill, glabrous, pale brown, and prominently longitudinally wrinkled when dry. Leaves thinly coriaceous; elliptic, shortly acuminate at apex, cuneate at base; entire or very faintly dentate only near the apex, margins recurved when dry, reticulate and shining above, dull and paler beneath; 3 to 3.5 in. long, 1.25 to 1.75 in. broad; midrib prominent, impressed above; main-nerves 7 or 8 pairs, also prominently impressed above and prominently raised on the lower surface, arching upwards to meet near the margin; secondary nerves few, inconspicuous as are the reticulations; petiole .2 to .25 in. long, bordered by the decurrent edges of the blade, which are almost connivent above. Inflorescence an axillary raceme, simple or with one short branch near the base, 1.5 to 2.5 in. long, and so shorter

than the leaves; pedicels slender, .1 in. long, with a .06 in. long subulate bract at the base and 2 similar bracteoles beneath the flower; buds nearly globose. *Calyx* superior, .05 in. in depth, cupular, with 5 imbricate broad incurved concave glabrous lobes. *Corolla* rotate with 5 imbricate rounded broad lobes, .1 in. deep; tube rather longer than lobes. *Stamens* 5, inserted on the base of the corolla; anthers globular; filaments flattened, longer than the anthers. *Ovary* inferior, depressed, surmounted by a flattened lobed stigma, 1-celled; ovules many, cuneate, on a central basal placenta. *Fruit* unknown.

PERAK: Gunong Bubu, at 5,000 feet elevation; Wray 3850, 3886.

4. *MESA STRIATA*, Mez Monog. Myrs. 42 (1901). A shrub or small tree; branches smooth, reddish, with scattered lenticels. *Leaves* membranous; rather variable, elliptic or elliptic-oblong, rounded or acuminate at apex, bluntly acute and sometimes unequal at base; entire or undulate or broadly dentate, especially on the upper half, pale green when dry, glabrous except for a few occasional stiff hairs on the midrib beneath, striate with many faint very slender lineoles; 4 to 7 in. long, 2.5 to 3 in. broad; midrib angular, prominent beneath, main-nerves 7 to 8 pairs, slender; secondary nerves and reticulations faint and irregular; petiole slender, .4 to 1 in. long, channelled above. *Inflorescence* of axillary racemes, simple or joined in a sub-sessile panicle, rarely over 2 in. long; pedicels very slender, .05 to .1 in. long, with a subulate bract at base, half their length, and 2 acute bracteoles under the flower. *Calyx* superior, about .1 in. deep; lobes 5, imbricate, ovate, rounded, about 4-striate, edges hyaline; tube as long as lobes. *Corolla* as long as calyx, rotate, .1 in. in depth; lobes 5, imbricate, rounded, crenate, glabrous. *Stamens* 5, inserted near the base of the corolla; anthers ovate, slightly divaricate; filaments 2 to 3 times as long as anthers. *Ovary* inferior, depressed, rounded; style short cylindrical, stigma 4-lobed; ovules many, cuneate, on a central basal placenta. *Fruit* round, .1 to .15 in. in diam., smooth, faintly ribbed, crowned by the persistent calyx-lobes and style.

PENANG: at Paya Trobong, Curtis 2857. PERAK: King's Collector 2287.—DISTRIB. Sumatra, Forbes 1260, 1287, 1315, 1376.

5. *MESA PAHANGIANA*, King & Gamble, n. sp. Apparently a shrub; branches round, smooth, dark brown when dry. *Leaves* membranous; rhomboid-obovate, acuminate at the apex, rounded cuneate at base; faintly crenate especially in the upper half; glabrous on both dull surfaces; 7 to 8 in. long, 4 to 4.5 in. broad; midrib slender, prominent beneath; main-nerves distant, 8 to 9 pairs, at about half a right angle with the midrib, sometimes branched; secondary nerves few and like the reticulations indistinct; petiole slender, .8 to 1 in. long. *Inflores-*

cence a simple axillary raceme, as long as or slightly longer than the petiole; pedicels slender, about .1 in. long, supported by a minute subulate bract below and with two similar bracteoles below the flower. *Calyx* superior, cupular, with a very short tube and 5 triangular imbricate teeth .6 in. long, glabrous, hyaline at the edges and very faintly brown-glandular. *Corolla* as long as calyx; lobes 5 imbricate, glabrous, rounded, somewhat crenate, with 2 to 3 prominent brown glandular lineoles; tube half the length. *Stamens* nearly as long as corolla, inserted near its base; filaments about twice as long as the anthers; anthers emarginate, cells somewhat divaricate. *Fruit* globose with a conical tip surrounded by the remains of the corolla and the persistent calyx, and surmounted by the short persistent style, ribbed, .125 in. in diam., glabrous.

PAHANG: at Tanjong Antan, Ridley 2175A.

Only one specimen is unfortunately available, and that in fruit, with only remains of flowers.

6. *MÆSA INDICA*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 230 (1824). A shrub reaching 4 to 6 feet in height; branchlets brown, smooth, lenticellate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate, rounded or acute at the base; repand-dentate, about 3 teeth to each main-nerve; 3 to 7 in. long, 2 to 3 in. broad; midrib very prominent, often broad; main-nerves 8 to 12 pairs, others closely reticulate; glandular striæ long, prominent; petiole .5 to 1 in. long, channelled above by the decurrent bases of the blade. *Inflorescence* of simple or compound axillary racemes, much shorter than the leaves, usually 1 to 3 in. long; pedicels slender, .05 to 1 in. long, longer in fruit; bracts subulate, in flower as long as pedicels; bracteoles 2, minute. *Calyx* superior, with 5 imbricate lobes, which are ovate, ciliate, striate, about .04 in. long, almost acute or rounded at apex. *Corolla* as long as calyx; lobes denticulate, glandular-striate; tube as long as lobes. *Stamens* inserted at base of corolla-tube; anthers ovate, cells divaricate; filaments dorsifixed, rather longer than anthers. *Ovary* rounded; style short cylindrical, stigma obtuse; ovules many. *Fruit* round, smooth, striate, .15 in. long, crowned at the summit by the persistent calyx-lobes and the remains of the stigma. *Seeds* angular. A. DC. in Trans. Linn. Soc. XVII. 134, Prod. VIII. 80 (*in part*); Wall. Cat. 2318 E.; Clarke in Hook. f. Fl. Br. Ind. III. 509 (*in part*); Koord. & Val. Bijl. V. 222; Mez Monog. Myrs. 29. *Bæobotrys indica*, Roxb. Hort. Beng. 16, Fl. Ind. I. 557.

PERAK: Wray 3314, 3349; Scortechini 16, 733; Ridley 3007, 9741; King's Collector 7712.—DISTRIB. Burma, Java.

## 2. MYRSINE, Linn.

Trees or shrubs. *Leaves* entire or serrate, often thick, usually pellucid-punctate. *Flowers* polygamous or diœcious, fascicled, axillary or on very short branches, pedicels short with many imbricate bracts. *Calyx* small, lobes 4 to 5 persistent. *Corolla* 4-5-lobed, the lobes imbricate in bud, recurved in flower. *Stamens* 4 to 5; filaments short, inserted at the base of the corolla-lobes; anthers short, ovate; staminodes none. *Ovary* free, globose or ovoid; style usually short, cylindric or angular; stigma capitate or 2-5-lobed; ovules few or many, immersed in the placenta. *Fruit* a small, dry or somewhat fleshy, berry, 1-seeded. *Seed* solitary, globose, sessile, hollowed at the base; albumen pitted; embryo elongate, cylindric or curved, horizontal.—**DISTRIB.** Species about 80, chiefly tropical, a few in Japan, extra-tropical Africa, Australia and New Zealand. All our species belong to Mez' genus *Rapanea*.

Arrested branches bearing the umbels very short, .1 in. long or under:—

- |                                                                                              |                           |
|----------------------------------------------------------------------------------------------|---------------------------|
| Leaf-nerves and reticulations obscure, leaves small, under 2.5 in.                           | 1. <i>M. arenis</i> .     |
| Leaf-nerves and reticulations visible, leaves usually over 2.5 in:—                          |                           |
| Leaves under 4 in. long, chartaceous, blackish when dry; pedicels short, .1 in. long .. .. . | 2. <i>M. Porteriana</i> . |
| Leaves over 4 in. long, coriaceous, reddish when dry; pedicels over .15 in. long .. .. .     | 3. <i>M. perakensis</i> . |

Arrested branches bearing the umbels .3 in. long or more:—

- |                                                          |                            |
|----------------------------------------------------------|----------------------------|
| Leaves rounded at apex; berry .2 in. in diam. .. .. .    | 4. <i>M. Wrayi</i> .       |
| Leaves emarginate at apex; berry .3 in. in diam. .. .. . | 5. <i>M. umbellulata</i> . |

1. **MYRSINE AVENIS**, A. DC. in Trans. Linn. Soc. XVII. 107 (1834). A small tree; branches pale, rounded; branchlets wrinkled when dry, faintly ferruginous-tomentose, leaf-buds long acuminate. *Leaves* entire, chartaceous; oblong-lanceolate, bluntly acute at apex, acutely narrowed at base, glabrous, marked with resinous often very conspicuous lineoles and dots along the margin especially near the apex, margins usually recurved; 1 to 2.5 in. long, .5 to .75 in. broad; midrib prominent, impressed above; main-nerves very obscure as are the reticulations; petiole .2 in. long, slender, edged with the ciliate margins of the decurrent blade. *Flowers* in compact sessile 2-5-flowered umbels on very short thick arrested branches; bracts oblong acute; pedicels about .1 in. long, angular; flower-buds ovate, flowers 5-merous. *Calyx-lobes* triangular, acute, ciliate, with few round glandular dots; tube as long as lobes. *Corolla-lobes* imbricate, elliptic, pubescent on the margins, sparsely round-gland-dotted, connate for about one-third of their length. *Stamens* as long as corolla-lobes; anthers

ovate, apiculate, pubescent at tip; filaments and lower part of anthers attached about half-way up the corolla-lobes. *Ovary* rounded, conical; style short in ♂, oblique and with long channelled stigma in ♀. *Berry* globose, .1 in. in diam., glandular, smooth, tipped with the persistent style. DC. Prod. VIII. 96; Miq. Pl. Jungh. 189, and Fl. Ind. Bat. II. 1015; Scheff. Myrs. 47; Koord. & Val. Bijdr. V. 234. *Myrsine capitellata*, Wall. var. *avenis* Clarke in Hook. f. Fl. Br. Ind. III. 512 (in part); Stapf in Trans. Linn. Soc. Ser. 2, IV. 199. *Ardisia avenis*, Blume Bijdr. 691. *Rapanea avenis*, Mez Monog. Myrs. 357.

SINGAPORE: *Ridley* 253.—DISTRIB. Java, Celebes, Borneo.

2. MYRSINE PORTERIANA, Wall. Cat. 6525 (1829). A shrub or small tree; branches grey, rough; branchlets slender, angled when dry, leaf-buds lanceolate. *Leaves* chartaceous, entire; oblong-lanceolate, bluntly acute and slightly emarginate at apex, cuneately narrowed at base, glabrous, glandular dotted, especially along the margin, and often glandular-lineolate, black or greyish when dry; 1.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerve 8 to 12 pairs, the lowest pair running parallel to the midrib and there joined by the rest, not always easily seen; secondary nerves few, slender, reticulations minute; petiole slender, .2 to .4 in. long, channelled above by the decurrent and almost connivent, slightly fimbriate, edges of the blade. *Flowers* in compact sessile umbels on the summit of a short thick cone-like bracteate arrested branch about .1 to .3 in. long; bracts ovate, bracteoles oblong, blunt, ciliate; pedicels angled .1 in. long; flower-buds ovate, flowers greenish-white, usually diœcious, 5-merous. *Calyx-lobes* ovate acute, .05 in. long, ciliate, marked with prominent dark round or lineolate glands; tube as long as lobes. *Corolla-lobes* oblong obtuse, .1 to .15 in. long, minutely pubescent on the margins, marked by prominent dark rounded and lineolate glands, connate to one-fourth of their length, revolute in flower. *Stamens* inserted on the corolla, the filaments and lower half of the anthers adnate with it, those of ♂ flowers ovate apiculate, those of ♀ flowers sagittate; in open flowers exsert, longer than the revolute lobes. *Ovary* ovoid, glabrous, ♂ flowers with a short straight style, ♀ flowers with an oblique style and oblique folded stigma. *Berry* globose, glabrous, .1 in. in diam., dark blue when fresh, pale when dry, striate from the elongated vertical glands. A. DC. in Trans. Linn. Soc. XVII. 106, Prod. VIII. 95. *M. capitellata* var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (in part). *Rapanea Porteriana*, Mez Monog. Myrs. 358.

PENANG: *Porter* in *Wallich* 6525; *Maingay* (K.D.) 1005; *Curtis* 1013, 3728, on Government Hill, road to Crag. PERAK: *Ridley* 2992; *Wray* 678, 1537; *King's Collector* 5001, usually at 5,000 feet eleva-

tion. PAHANG: *Ridley* 1669A. SELANGOR: *Ridley* 8208. MALACCA: *Griffith* (K.D.) 3543; *Ridley* 10076, on Mount Ophir.

3. MYRSINE PERAKENSIS, King & Gamble, n. sp. A tree; branchlets thick, smooth, wrinkled when dry, terminal leaf-buds lanceolate. *Leaves* entire, coriaceous; oblong, bluntly acute at apex, narrowed at the base, glabrous, shining above, margins recurved, glandular dots many, inconspicuous; 4 to 5 in. long, 1.5 to 2 in. broad; midrib thick, very prominent; main-nerves 20 to 26 pairs, prominent above, at about two-thirds of a right angle with the midrib, parallel at first, arching afterwards to meet near the margin; secondary nerves similar but more slender, reticulations prominent; petiole .3 in. long, very thick, winged by the decurrent margins of the blade. *Flowers* in compact sessile umbels on the summit of a thick, cone-like, bracteate, arrested branch about .1 in. long, in the axils of the leaves or below them on the current year's wood, so forming a thick cluster below the terminal leaves: umbels 5-8-flowered, pedicels .15 to .2 in. long, thick and angular when dry; bracts ovate, scaly, sometimes ciliate. *Calyx-lobes* ovate acute, glandular-ciliate, about .05 in. long, ciliæ jointed. *Corolla* and *Stamens* unknown. *Berry* globose, sometimes conical at top, .1 to .15 in. in diam., pericarp pale brown when dry, striate with obscure oblong glands.

PERAK: *Wray* 3856; *Scortechini*, 766, at 5,000 feet elevation.

4. MYRSINE WRAYI, King & Gamble, n. sp. A tree; branchlets stout, striate when dry. *Leaves* entire, coriaceous; elliptic-oblong, rounded at the apex, narrowly cuneate at base; 3 to 5 in. long, 1 to 1.75 in. broad, glabrous; midrib slender; main-nerves very obscure, about 12 pairs, meeting in an intramarginal nerve near the edge, reticulations many, somewhat raised beneath when dry; petiole .5 to .7 in. long, bordered above by the decurrent margins of the blade, wrinkled at the base. *Flowers* in peduncled axillary few-rayed umbels; bracteoles minute, triangular; peduncles .3 to .5 in. long; rays of umbel 3 to 4, pedicels about .35 in. long, clavately thickened above. *Calyx-lobes* triangular-ovate, glandular-ciliate, acute, .05 in. long. *Corolla* and *Stamens* unknown. *Fruit* round, .2 in. in diam., crowned by the persistent base of the style; pericarp rugosely striate.

PERAK: *Wray* 232, at 4,500 feet.

5. MYRSINE UMBELLULATA, A. DC. in Trans. Linn. Soc. XVII. 135 (1834). A small tree; branchlets thick, glabrous, reddish-brown. *Leaves* entire, coriaceous; elliptic-obovate, obtuse and emarginate at apex, acute at the base; glabrous above, rusty beneath, black glandular dots frequent, margins often recurved; 2 to 3.5 in. long, .75 to 1.25 in. broad; midrib prominent, slender; main-nerves inconspicuous, slender, raised on upper surface, depressed on lower, reticulations obscure;

petiole .3 to .5 in. long, rugose, bordered above by the decurrent margins of the blade. *Flowers* in axillary scattered umbels on thick cone-like bracteate arrested branches, about .15 in. long; pedicels very slender, .3 to .4 in. long, glabrous. *Calyx-lobes* ovate, acute, very shortly ciliate, minute, recurved in fruit. *Corolla* and *Stamens* unknown. *Berry* globose, .3 in. in diam., smooth, pale when dry, crowned with the persistent style. A. DC. Prod. VIII. 95; Miq. Fl. Ind. Bat. II. 1014. *M. capitellata*, var. *avenis*, Clarke in Hook. f. Fl. Br. Ind. III. 512 (in part). *Embelia umbellulata*, Wall. Cat. 2312. *Rapanea umbellulata*, Mez. Monog. Myrs. 362.

SINGAPORE: *Wallich* 2312.—DISTRIB. Sumatra, Borneo.

### 3. EMBELIA, Burm.

Small trees or shrubs, usually climbing, often extensively. *Leaves* alternate, entire, dentate or serrulate, usually glandular, petiole often margined. *Flowers* in axillary or terminal racemes, simple or paniculate, white or pink, hermaphrodite or polygamo-dioecious. *Calyx* free, 4-5-lobed, persistent, the lobes rounded or ovate. *Corolla* 4-5-lobed, the lobes imbricate or contorted, tube none or short. *Stamens* 4 to 5; filaments short or elongate, inserted on the corolla; anthers ovate-oblong, obtuse or acute; staminodes none. *Ovary* ovoid, globose or conical; style short; stigma capitate; ovules few, inserted on a subglobose placenta. *Fruit* a small drupe, globose, 1-seeded, crowned by the persistent style. *Seed* ovoid, hollowed at the base, albumen pitted, embryo transverse, curved.—DISTRIB. About 60 species, in the tropical regions of the Old World.

Inflorescence terminal or terminal and axillary, paniculate:—

Petals free (Sect. I. EUEMBELIA):—

Leaves membranous or chartaceous:—

Main-nerves of leaves slender, not prominent:—

Petals sparingly villous, anthers with a cluster of black warts behind .. .. . 1. *E. Ribes*.

Petals densely villous, anthers with only small glandular warts behind:—

Leaves elliptic, 1.5 to 2 in. broad, shortly acuminate.. 2. *E. canescens*.

Leaves oblong, .75 in. broad, long but obtusely acuminate 3. *E. dasythyrsa*.

Main-nerves of leaves prominent:—

Branches slender, leaves lanceolate acuminate, flowers densely villous .. .. . 4. *E. Scortechinii*.

Branches stout, leaves suddenly acuminate, flowers glabrous or slightly pubescent only .. .. . 5. *E. penangiana*.

Leaves coriaceous:—

Panicles long, leaves moderately thick:—

Leaves acute or cuneate at base, main-nerves conspicuous, bracteoles as long as the pedicels .. .. . 6. *E. pergamea*.

- Leaves rounded or cordate at base, main-nerves very prominent, bracteoles shorter than the pedicels .. .. 7. *E. coriacea*.
- Panicles short, stout, leaves very thick .. .. 8. *E. angulosa*.
- Petals joined at the base into a tube (Sect. II. GRENACHERIA):—
- Leaves rusty-villous beneath, bracts of the inflorescence short, inconspicuous .. .. 9. *E. Lampani*.
- Leaves pubescent or nearly glabrous beneath, bracts of the inflorescence long, often leafy, conspicuous .. .. 10. *E. amentacea*.
- Inflorescence axillary:—
- Inflorescence paniculate, axillary, 1 to 2 in. long (Sect. III. PATTARA) .. .. 11. *E. Ridleyi*.
- Inflorescence much shorter than the leaves, on very short racemose branchlets with many bracts (Sect. IV. MICREMBELIA):—
- Flowers tetramerous, leaves coriaceous .. .. 12. *E. Myrtilus*.
- Flowers pentamerous, leaves chartaceous .. .. 13. *E. parviflora*.
- SPECIES IMPERFECTLY KNOWN: 14. *E. lucida*. 15. *E. macrocarpa*.

1. *EMBELIA RIBES*, Burm. Fl. Ind. 62. t. 23 (1768). An evergreen climbing shrub; branches pale brown, with thick bark studded with conical protuberances; branchlets pale brown, smooth, lenticellate. *Leaves* entire, chartaceous; elliptic or elliptic-lanceolate, obtusely acuminate at apex, cuneate at base; glabrous above, glabrous or minutely pubescent beneath, glandular dots scattered, sometimes obscure; margin generally recurved; 2 to 3 in. long, 1 to 1.5 in. broad; midrib slender, prominent below, generally impressed above; main-nerves obscure, irregular, slender, 12 to 14 pairs, parallel at first then curved upwards to join near the margin; secondary nerves many faint, reticulations very obscure; petiole .3 to .5 in. long, bordered by the crisped edges of the decurrent blade. *Inflorescence* a large terminal leafy 3-pinnate grey- or rusty-pubescent panicle of racemes, the branches at first turning upwards, afterwards nearly at right angles with the rachis; bracts leafy, smaller by degrees upwards; bracteoles subulate, shorter than the slender pedicels, .05 in. long; buds small, globose; flowers white. *Calyx-lobes* very minute, about .025 in. long, triangular-acute, ciliate, with few glandular dots; tube as long as lobes. *Corolla-lobes* free, elliptic, rounded at top in ♀, more acute in ♂, .05 in. long, ciliate, sparingly villous-pubescent, apex incurved, with few prominent glandular dots. *Stamens* inserted on the corolla-lobes, about half-way up in ♂, lower down in ♀, shorter than the lobes; anthers short, ♂ with parallel, ♀ with divaricate, cells, both with a long black mass of glandular warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous; style short, stigma capitate in ♂, peltate and larger in ♀. *Berry* globose or sometimes pyriform, red or black, glabrous, succulent, wrinkled when dry, aromatic, .1 to .15 in. diam., crowned with the persistent style and

stigma. Retz. Obs. iv. 24; Lamk. Ill. t. 133; Roxb. Fl. Ind. i. 586; Wall. Cat. 2304; A. DC. in Trans. Linn. Soc. XVII. 129, Prod. VIII. 85 (part); Scheff. Myrs. 38; Miq. Fl. Ind. Bat. II. 1011; Dalz. & Gibs. Bomb. Fl. 137; Brandis For. Fl. 284; Kurz For. Fl. II. 101; Clarke in Hook. f. Fl. Br. Ind. II. 513; Trimen Fl. Ceyl. III. 69; Cooke Bomb. Fl. II. 84; Mez Monog. Myrs. 303; Prain Beng. Pl. 643. *E. Burmannii*, Retz Obs. IV. 23. *E. garciniaefolia*, Wall. Cat. 2304c and e; Miq. l.c. 1011; Scheff. Myrs. 40. *E. sumatrana*, Miq. l.c. 1012. *E. glandulifera*, Wight Ic. 1207; Dalz. & Gibs. Bomb. Fl. 137. *Samara Ribes*, Kurz in Journ. As. Soc. Beng. XLVI. 222. *Ardisia tenuiflora*, Bl. Bijdr. 687.

PENANG: *Deschamps, Curtis*. PERAK: *Wray* 420; *Scortechini*; *King's Collector* 928, 1150, 6999 (abnormal state, most of the flowers converted into leafy bracts). MALACCA: *Griffith* (K.D.) 3550; MAINGAY (K.D.) 1002; *Cuming* 2320. JOHORE: *Native Collector* 3749. SINGAPORE: *Ridley* 10643, 2803 (fruits converted into insect galls); *Kurz* 2965.—DISTRIB. India, Burma and Ceylon; Malay Islands and eastwards to South China.

VAR. *rugosa*, King & Gamble. Branchlets dark brown, much wrinkled and with oblong lenticels. *Leaves* 4 to 5 in. long, 1.5 to 2 in. broad, usually thicker than the type. *Racemes* less pubescent than in type, the flowers often collected near the ends of the ultimate branches of the inflorescence. *Stamens* of ♂ flowers exsert. *Stigma* of ♀ much larger than that of ♂ flowers, peltate. *Berry* rugose, conically tipped; pericarp thick, fleshy, with cavities.

PERAK: *Wray* 2278, 2576, 3069; *King's Collector* 2512, 3001, 4040. SINGAPORE: *Ridley* 10384.

We find no Malay specimens with the large glandular pits so well marked in South Indian specimens (*Embelia glandulifera*, Wight Ic. 1207). Wight's figure is not well drawn in several respects, and especially as to the nervation of the leaves, so it is not very easy to make sure about it, but there seems no reason to separate *E. glandulifera* from *E. Ribes* unless perhaps as a variety. It has usually a much shorter and fewer-flowered inflorescence.

2. *EMBELIA CANESCENS*, Jack; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 292 (1824). A climbing shrub with slender, villous, subflexuose branches. *Leaves* entire, chartaceo-membranous; elliptic, shortly acuminate at apex, rounded or sub-cordate at base, glabrous or slightly pubescent and shining above, canescent beneath; glandular dots many, not prominent, in the areoles of the reticulations; 2 to 3.5 in. long, 1.5 to 2 in. broad; midrib prominent, impressed above, villous beneath; main-nerves about 10 pairs, irregular, curving upwards to join at some distance from the margin; secondary nerves many, slender,

reticulations irregular; petiole .3 to .4 in. long, bordered above by the prominently crispate edges of the decurrent blade, rugose beneath. *Inflorescence* a slender terminal 3-pinnate leafy panicle of distant comparatively few-flowered racemes, 4 to 8 in. long; rachis and its branches densely rusty-villous; bracts leafy below, spatulate above, bracteoles subulate, deciduous, about half as long as the .05 to .1 in. long pedicels which are longer in fruit; buds very minute, globose. *Calyx-lobes* very small, triangular, pubescent; tube as long as lobes. *Corolla-lobes* oblong, free, blunt, .06 in. long, densely villous without, papillose within and glandular-dotted. *Stamens* shorter than the corolla-lobes, inserted near their base; anthers rounded, warted with inconspicuous glands behind at the insertion of the dorsifixed filaments. *Ovary* in ♂ flower rudimentary. *Berry* globose, somewhat conical above, rugose when dry, crowned with the remains of the persistent style, .2 in. in diam. Wall. Cat. 2311; A. DC. Prod. VIII. 85; Scheff. Myrs. 42; Miq. Fl. Ind. Bat. II. 1012; Clarke in Hook. f. Fl. Br. Ind. III. 514; Mez Monog. Myrs. 305.

PENANG: *Jack; Porter*. PERAK: *Ridley 7172 (part)*. MALACCA: *Maingay (K.D.) 1004*. SINGAPORE: *Goodenough 2804; Hullett 115*.

3. *EMBELIA DASYTHYRSA*, Miq. Fl. Ind. Bat. Suppl. 573 (1862). A slender climbing shrub; branches minutely pubescent, striate, with prominent raised lenticels; branchlets dark, slender, rusty-villous. *Leaves* entire, chartaceous; oblong or elliptic-oblong, bluntly acuminate at apex, rounded at base; glabrous above, glabrous except on the midrib beneath, glandular dots scattered, obscure; 1.5 to 2 in. long, about .75 in. broad; midrib prominent beneath, villous, impressed above, main-nerves 10 to 12 pairs, irregular, arching upwards to meet near the margin; secondary nerves few, slender, reticulations obscure; petiole .1 to .2 in. long, channelled above. *Inflorescence* a long, 3-pinnate, leafy panicle of long slender many-flowered racemes, rachises minutely pubescent; bracts leafy, bracteoles subulate, minute, much shorter than the .1 in. long very slender pedicels; buds globose shaggy, flowers grey. *Calyx-lobes* minute, about .03 in. long, triangular, ciliate; tube shorter than lobes. *Corolla-lobes* free, ovate-spatulate, about .06 in. long, black-gland-dotted, densely covered with short moniliform hairs. *Stamens* less than half the length of the corolla-lobes, inserted at the base; anthers reniform, with inconspicuous glandular warts on the back at the insertion of the dorsifixed filaments, which are almost shorter than the anthers. *Ovary* ovoid, style very short, stigma in ♂ small capitate, in ♀ peltate, large. *Berry* red or black, .15 in. in diam., globose or slightly pyriform, wrinkled when dry, tipped by the persistent style and stigma. Scheff. Myrs. 42; Mez Monog. Myrs. 305.

PERAK: *Wray* 1924; *Scortechini* 498; *King's Collector* 776, 4103, 4375, 5102, 5762, 6640, 8583, 10024, 10701, clinging to trees in dense jungle at low levels. SELANGOR: *Ridley* 7572. SINGAPORE: *Hullett* 118.—DISTRIB. *Bangka*, *Teysmann Hort. Bogor.* No. 3189, at *Djeboes*.

Only one very poor specimen of the type (*Teysmann's*) is available, but from an examination of it and from *Miquel's* description it seems to be right to refer the Peninsular plant, which we had considered new, to this species.

4. *EMBELIA SCORTECHINII*, King & Gamble, n. sp. A climbing shrub (?); branches slender; ultimate branchlets reddish, rusty-villous. *Leaves* entire, chartaceous; elliptic-lanceolate, long acuminate at apex, narrowed at base; glabrous above, grey-pubescent on the nerves beneath and with minute white scales, glandular dots obscure; 4 to 5 in. long, 1.5 to 2 in. broad; midrib very prominent, impressed above; main-nerves about 8 pairs, prominent, slender, curving upwards to and along the margin; reticulations many, prominent on the upper surface; petiole .2 in. long, pubescent. *Inflorescence* of slender rusty-villous panicles of long racemes, the panicles 7 to 10 in. long, racemes 3 to 6 in.; rachis hirsute, somewhat angular; bracts deciduous, bracteoles very minute, subulate; buds very small, globose. *Calyx-lobes* ovate, rounded, very minute, the edges ciliate with long moniliform hairs, tube very short. *Corolla-lobes* oblong, acute, .05 in. long, shaggy with long moniliform hairs. *Stamens* shorter than the corolla-lobes; anthers ovate, cordate, with two prominent papillose warts behind at the insertion of the dorsifixed very short filaments. *Ovary* ovoid, style conical. *Berry* not known.

PERAK: *Scortechini*.

This interesting species is characterised by the abundant moniliform hairs on the flowers, longer and more conspicuous than in other species.

5. *EMBELIA PENANGIANA*, Mez Monog. Myrs. 311 (1901). A climbing shrub, stem reaching about 1 in. in diam.; branches stout; ultimate branchlets red, striate, lenticellate. *Leaves* entire, chartaceous; elliptic, shortly acuminate at apex, narrowly cuneate at base; glabrous, not gland-dotted; 3.5 to 4.5 in. long, 1.5 to 2 in. broad; midrib prominent, impressed above; main-nerves 10 to 12 pairs, irregular, slender, at about two-thirds of a right angle with the midrib at first then arching upwards to join near the margin; secondary nerves similar but less prominent, reticulations many; petiole .5 in. long, slender, edged by the crispate decurrent margins of the blade which are often connivent above. *Inflorescence* a terminal 3-pinnate leafy panicle, 6 to 9 in. long, of slender racemes; rachis slightly pubescent, main branches at about half a right angle with rachis; peduncles about 1 in. long, upper branches and branchlets usually at right angles; bracts lanceolate spatulate, leafy, deciduous;

bracteoles subulate, as long as or rather longer than the very short, under .05 in. long pedicels; buds very small, globose, flowers red. *Calyx-lobes* orbicular, glandular-ciliate, .05 in. long, connate to the middle, not gland-dotted. *Corolla-lobes* 5, free, ovate, rounded at apex, .075 to .1 in. long, slightly pubescent without, papillose within, not gland-dotted. *Stamens* of ♂ flowers equal to or longer than the corolla-lobes, of ♀ flowers shorter than them, inserted near the base of the lobes; anthers oblong, emarginate, with minute black warts behind at the insertion of the dorsifixed filaments. *Ovary* ovoid, glabrous, style very short, stigma peltate. *Berry* globose, red, tuberculate and corrugate, .1 in. in diam., fruiting pedicels as long as berry. *Embelia Ribes* var. *penangiana*, Oliv. in Hook. Ic. Pl. t. 1597.

PENANG: *Curtis* 306. PERAK: *Wray* 1375, 1409; *Scortechini*; *King's Collector* 3637, 10739.

A well-marked species, distinguished by the fairly prominent nerves of the leaves, the very short pedicels, and the absence of glandular dots.

6. EMBELIA PERGAMACEA, A. DC. Prod. VIII. 85 (1844). A slender climbing shrub; branches rather thick, branchlets wrinkled and angular when dry. *Leaves* entire, coriaceous; oblong-lanceolate, acuminate at apex, cuneate or acute at base; glabrous, shining above, pale beneath, margins recurved, glandular dots many, hardly prominent; 3 to 5 in. long, 1.5 to 2 in. broad, midrib thick, impressed above; main-nerves slender 12 to 14 pairs, parallel but irregular, raised and conspicuous on the upper surface, leaving the midrib at about two-thirds of a right angle and joining near the edge in an intramarginal nerve; secondary nerves many, parallel to the main-nerves, reticulations obscure; petiole .3 in. long, angular, channelled above when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal, pyramidal, 4-pinnate, nearly glabrous, leafy panicle with racemose branchlets and very numerous flowers; main rachis thick, flattened above, branches nearly at right angles to rachis as again are the branchlets, all angular; bracts ovate spatulate, leafy, bracteoles subulate acuminate as long as the pedicels; pedicels .05 in. long, somewhat longer in fruit; buds very small, globose, flowers light red. *Calyx-lobes* minute, about .04 in. long, broadly triangular, acute, glandular-ciliate, papillose on both sides, dotted with few large and small brown and black glands, tube as long as lobes. *Corolla-lobes* free, ovate-oblong, glandular-ciliate, glabrous without, papillose within, dotted in upper part only, .07 in. long. *Stamens* as long as or shorter than corolla-lobes, inserted half-way up; anthers ovate cordate, emarginate, black-warted behind at the insertion of the dorsifixed filaments. *Ovary* glabrous, ovoid; style thick very

short; stigma capitate. *Berry* globose, blue when ripe, wrinkled when dry, .06 in. in diam., crowned with the persistent style, gland-dotted. Miq. Fl. Ind. Bat. II. 1012; Scheff. Myrs. 34; Mez Monog. Myrs. 310. *Ardisia pergamacea*, Bl. *vide* A. DC.

PERAK: Curtis 2029; Wray 2001; King's Collector 3658, 4678, 6412.—DISTRIB. Java; Borneo.

This species closely resembles *E. coriacea*, but differs in the acuminate leaves, very shining above and prominently nerved; in the papillose calyx-lobes, petals dotted only in the upper part and bracteoles as long as the pedicels.

7. *EMBELIA CORIACEA*, Wall. Cat. 2314 (1829). A climbing shrub; branches reaching 1.5 in. in diam.; branchlets reddish, twisted, somewhat angular, roughly lenticellate. *Leaves* entire, coriaceous; oblong or oblong-lanceolate, obtusely acute at apex, rounded or almost cordate or auricled at base; glabrous, more or less shining above, brownish beneath, glandular dots scattered, not prominent, margin sometimes incurved; 3 to 10 in. long, 1.5 to 4 in. broad; midrib thick, impressed above; main-nerves many, slender, not prominent, irregularly parallel, at about two-thirds of a right angle with the midrib, joining in an intramarginal faint nerve; secondary nerves many, slender, reticulations faint; petiole thick, .3 to .7 in. long, channelled when dry by the crispate edges of the decurrent blade. *Inflorescence* a large terminal 4-pinnate spreading leafy rusty-pubescent panicle with racemose branchlets and very numerous flowers; main rachis thick, somewhat flattened, branches nearly at right angles to rachis as again are the branchlets; bracts leafy, decreasing upwards; bracteoles minute, subulate, about half the length of the pedicels; pedicels .05 in. long; buds very small, globose, flowers grey. *Calyx-lobes* 5, minute, triangular, glabrous, dotted with very few (3 to 5 per lobe) brown or black glands; tube as long as lobes. *Corolla-lobes* free, 4-5, ovate, blunt, recurved, glabrous without, slightly papillose within, gland-dotted all over. *Stamens* shorter than the corolla-lobes, inserted on them about half-way up; anther-cells oblong, somewhat divaricate, with about 4 black warts behind at the insertion of the short filaments. *Ovary* ovoid, style very short, stigma capitellate. *Berry* globose, smooth, .075 to .1 in. in diam., pale, prominently gland-dotted, wrinkled when dry, crowned with the persistent base of the style. A. DC. in Trans. Linn. Soc. XVII. 135, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 513; Mez Monog. Myrs. 313. *E. oblongata*, Miq. Fl. Ind. Bat. Suppl. 573; Scheff. Myrs. 34. *E. macrophylla*, Bl.; Scheff. Myrs. 36.

PENANG: Wallich 2314; Curtis 1047. PERAK: Curtis 1307; Derry 11712; Wray 2001, 2579, 3238; Scortechini 117, 255; King's Collec-

tor 2278, 3481, 4976, 5056, 5254, 5323, 6231, 6766, 7857, 10015, 10543. PAHANG: *Ridley* 5828. SELANGOR: *Ridley* 7562. MALACCA: *Maingay* (K.D.) 1018; *Ridley* 11135. SINGAPORE: *Ridley* 2812.—DISTRIB. Sumatra; Java; Borneo, *Beccari* 767, 878, 1189, 2561, 3922; *Haviland & Hose* 3469.

8. *EMBELIA ANGULOSA*, King & Gamble, n. sp. A climbing shrub; branches thick, branchlets wrinkled when dry, lenticels few. *Leaves* entire, coriaceous; ovate, obtuse, emarginate, glabrous, shining above, dull beneath, glandular dots pitted on both surfaces; 2 to 3·5 in. long, 1 to 2 in. broad; midrib very thick and prominent, impressed above; main-nerves 14 to 16 pairs, slender, irregular, leaving the midrib at nearly a right angle, then curved and joining near the margin, raised on upper surface; secondary nerves many, slender, reticulations obscure; petiole ·2 in. long, channelled above and bordered by the crispate edges of the decurrent blade. *Inflorescence* a dense terminal glabrous stiff panicle about 4 in. long and broad, of racemes, the rachises sharply angled; bracts leaf-like, spatulate, bracteoles very small, subulate; pedicels ·05 in. long, thick, angular, glabrous or minutely pubescent, equal to or shorter than the bracteoles; buds globose. *Calyx-lobes* ovate, ciliate, minute, ·03 in. long, not gland-dotted. *Corolla-lobes* free, ovate, acute, ·075 in. long, nearly glabrous outside, papillose within. *Stamens* shorter than corolla-lobes, inserted one-third up, reniform, with inconspicuous black dots at the insertion of the short dorsifixed filaments. *Ovary* ovoid glabrous; style very short; stigma peltate. *Berry* red, ovoid, somewhat pyriform, ribbed and gland-dotted, glabrous, crowned with the remains of a cylindric style and capitate stigma. *E. coriacea*, Stapf in Trans. Linn. Soc. Ser. ii. IV. 200 (not of A. DC.)

PERAK: *Wray* 1524—on Ulu Batang Padang at nearly 5,000 ft.—DISTRIB. Borneo, *Haviland* No. 1152, on Mt. Kinabalu at 7,600 to 8,800 feet.

The description of the flowers is taken from *Haviland's* Borneo specimen, the rest from *Wray's*.

9. *EMBELIA LAMPANI*, Scheff. Myrs. 37 (1867). A slender climbing shrub, clinging to trees; branches reddish-brown, rough with strigose hairs, lenticellate; branchlets rusty-villous-hairy. *Leaves* chartaceous; oblong, obtuse or emarginate at apex, rounded or cordate at base; margins recurved, upper surface glabrous except on the midrib, lower surface rusty-villous, glandular dots many, scattered; 1·5 to 3·5 in. long, 1 to 1·5 in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves many (up to 24 pairs), irregular, at about two-thirds of a right angle with the midrib, straight at first then curving

upwards to meet in a nerve more or less parallel to the margin; secondary nerves similar, reticulations many; petiole  $\cdot 1$  to  $\cdot 2$  in long, rusty-villous. *Inflorescence* of terminal panicles of pedunculate racemes 6 to 12 in. long, the branches often leafy, rachis and peduncles all rusty-villous; peduncles  $\cdot 5$  to  $\cdot 7$  in. long, pedicels slender, about  $\cdot 05$  in. long; bracts few, leaf-like; bracteoles rather longer than the pedicels, lanceolate to spatulate; flowers small, buds globose, petals white, striate, tube red. *Calyx-lobes* 5-6, ovate, acute, ciliate on the edges, villous, dotted with few glands; tube as long as lobes, both together  $\cdot 05$  in. long, longer in fruit. *Corolla* gamopetalous from one-third to one-half of its length; lobes oblong, obtuse, recurved,  $\cdot 1$  in. long, sparsely gland-dotted. *Stamens* as long as or a little shorter than the corolla-lobes, inserted about half-way up, anthers oblong, dehiscent longitudinally, the back with black conspicuous glandular warts; filaments adnate to the corolla below point of insertion, slender, dorsifixed. *Ovary* rounded, glabrous, style cylindrical, stigma peltate in ♀, slightly lobed in ♂. *Berry* globose,  $\cdot 1$  to  $\cdot 15$  in. in diam., black when dry, crowned with the persistent style, rugosely glandular. Clarke in Hook. f. Fl. Br. Ind. III. 514. *E. villosa*, Wall. Cat. 2313 (*in part*). *Grenacheria Wallichiana*, Mez Monog. Myrs. 293, fig. 49. *G. Lampani*, Mez l.c. 294.

PENANG: *Curtis* 305; *G. King*. PERAK: *Wray* 95, 2784; *Scortechini* 231; *King's Collector* 2483, 4210, 6849, 8134. SELANGOR: *Ridley* 10224. MALACCA: *Maingay* (K.D.) 1003. SINGAPORE: *Ridley* 10417.—DISTRIB. Sumatra, *Korthals*; Borneo, *Haviland & Hose*.

Haviland and Hose's Borneo specimens have rather larger flowers than, and pedicels about twice as long as, those from the Peninsula (No. 2280).

10. EMBELIA AMENTACEA, Clarke in Hook. f. Fl. Br. Ind. III. 514 (1882). A slender climbing shrub; branches pale brown, velvety; branchlets cinnamomeous or rusty-villous. *Leaves* chartaceous; oblong or obovate-oblong, obtuse and sometimes emarginate at apex, rounded at base; upper surface sparsely pilose, under surface pubescent, pale bluish-green, glandular dots many prominent; 2 to 3 in. long,  $\cdot 75$  to  $\cdot 1$  in. broad; midrib impressed above, prominent below, villous on both sides; main-nerves few, 6 to 10 pairs, irregular, at about two-thirds of a right angle with the midrib, arching upwards, branching and joining in a nerve near the margin; secondary nerves similar but more slender, reticulations not prominent; petiole  $\cdot 15$  in. long, villous, winged by the decurrent base of the blade. *Inflorescence* of terminal panicles of pedunculate racemes, the branches leafy, the leaves passing gradually into oblong or spatulate conspicuous bracts; peduncles 1 to 1.5 in. long, enlarged at base; pedicels  $\cdot 1$  in. long, supported by linear subulate bracteoles twice their

length, so that when in bud the racemes have the appearance of catkins; flowers very small, buds globose. *Calyx-lobes* 5, acute, ciliate on the edges, gland-dotted, tube as long as lobes, both together .05 in. long. *Corolla* very shortly gamopetalous; lobes 5, ovate, obtuse, glabrous within, .05 in. long. *Stamens* very short, shorter than corolla-lobes, inserted about half-way up; anthers oblong, rounded, with black papillose warts on the back; filaments as long as anthers, dorsifixed. *Ovary* rounded, glabrous, conical above, style slender, stigma peltate. *Berry* globose, wrinkled when dry, .1 to .125 in. in diam., crowned with the persistent style and stigma, black when dry. *Grenacheria amentacea*, Mez Monog. Myrs. 294.

PERAK: *Scortechini* 802; *Ridley* 7172 (part); *King's Collector* 5055, 6280, 6817, 8692—in open ground and in bamboo forests. SELANGOR: *Ridley* 7561, *Native Collector* 2802A, *Goodenough* 10555. MALACCA: *Griffith* (K.D.) 3548.

Mez suggests that this may be a young state of *Grenacheria Wallichiana*. He apparently saw only Griffith's specimen. The abundant material now available clearly shows that Clarke correctly considered it as separate. The curious catkin-like young inflorescence and the more sparse leaf-venation distinguish it.

11. *EMBELIA RIDLEYI*, King & Gamble, n. sp. A climbing (?) shrub; branchlets light brown, wrinkled. *Leaves* chartaceous; oblong, acute at apex, rounded at base; glabrous, glandular dots scattered obscure, margin somewhat recurved; 4 to 7 in. long, 1.5 to 3 in. broad; midrib thick, prominent below; main-nerves prominent below, about 12 pairs, curving upwards and meeting in a looped intramarginal nerve; secondary nerves and reticulations faint; petiole .5 in. long, thick. *Inflorescence* an axillary panicle of racemes, the branches curved, distant; rachis .5 to 1 in. long, that of racemes shorter, bracteoles minute, triangular; racemes about .5 in. long. *Calyx-lobes* 4 or 5, ovate, gland-dotted, very small. *Corolla* and rest not seen.

SINGAPORE: *Ridley* 6324. It seems to come near to *E. floribunda*, Wall.

*E. Tsjeriam-Cottam*, A. DC. is quoted by Mez as extending from India southwards to Singapore, but we have seen no specimens from our region.

12. *EMBELIA MYRTILLUS*, Kurz in Journ. As. Soc. Beng. XL. ii. 67 (1871), and For. Fl. II. 104. A small climbing shrub (Wray); branches rough, somewhat corky, with large lenticels; ultimate branchlets densely rusty-villous. *Leaves* coriaceous; bifarious, broadly elliptic to almost orbicular, acute at apex with usually 3 terminal teeth, narrowed truncate or cordate at base; glabrous above, slightly villous on nerves beneath; glandular dots black, numerous, small, fewer large, scattered, especially

near the apex and along the margin, which is often recurved;  $\cdot 4$  to  $\cdot 7$  in. long,  $\cdot 3$  to  $\cdot 6$  in. broad; midrib prominent; main-nerves 6 pairs, arched upwards and joining in an intramarginal nerve; secondary nerves similar, reticulations prominent; petiole  $\cdot 1$  in. long, villous. *Flowers* tetramerous, very small, in umbels or very short racemes on short axillary arrested branches,  $\cdot 1$  to  $\cdot 15$  in. long, shorter than the leaves; bracts minute, subulate. *Calyx-lobes* ovate, glandular ciliate, densely papillose within,  $\cdot 05$  in. long, tube very short. *Corolla-lobes* free, oblong, rounded at apex,  $\cdot 1$  in. long, glandular-ciliate on the edges, conspicuously marked with black, oblong or linear glands. *Stamens* longer than the corolla-lobes in  $\sigma$  flowers, shorter in  $\rho$ ; anthers oblong, often cordate, with conspicuous warts at the insertion of the dorsifixed filaments which spring from the base of the petals. *Ovary* ovoid; style slender; stigma capitate, 4-cleft. *Berry* globose, red or black,  $\cdot 15$  to  $\cdot 2$  in. in diam., prominently gland-dotted, tipped with the persistent style and stigma. Clarke in Hook. f. Fl. Br. Ind. III. 516; Mez Monog. Myrs. 322. *Myrsine Myrtillus*, Hook. Ic. Pl. t. 825. *Samara Myrtillus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223.

PERAK: *Scortechini* 762; *Wray* 1565, 3818, on Gunong Bubu and Gunong Brumber, at 5,000 to 7,000 feet. MALACCA: summit of Mount Ophir, *Griffith* (K.D.) 3542; *Lobb*; *Ridley*.—DISTRIB. Burma, *Griffith*.

13. EMBELIA PARVIFLORA, Wall. Cat. 2307 (1829). A slender climbing shrub reaching 60 feet in length; branches and branchlets densely rusty-villous, slender. *Leaves* chartaceous; distichous, ovate, obtusely acute at the apex, truncate at base; glabrous except on the midrib beneath; margin slightly recurved; glandular dots many, prominent, scattered, more numerous towards the apex;  $\cdot 7$  to  $1\cdot 5$  in. long,  $\cdot 5$  to  $\cdot 75$  in. broad; midrib prominent beneath, impressed above; main-nerves 8 to 10 pairs, slender, curving upwards towards the margin; secondary nerves slender, many, reticulations prominent; petiole scarcely  $\cdot 05$  in. long, rusty-villous, channelled above. *Inflorescence* of very short axillary few-flowered subumbellate racemes,  $\sigma$  4–6-flowered with  $\cdot 15$  in. long slender pedicels,  $\rho$  1–3-flowered with  $\cdot 05$  in. slender pedicels; bracts in both minutesubulate; flowers pentamerous; buds globose. *Calyx-lobes* oblong, fimbriate-ciliate,  $\cdot 05$  in. long, with few (about 6) large brown glands, glandular-villous without, tube very short, ciliæ moniliform. *Corolla-lobes* ovate, rounded, ciliate,  $\cdot 075$  in. long,  $\cdot 05$  in. broad, with few unequal-sized prominent brown glands. *Stamens* in  $\sigma$  flowers longer than corolla-lobes, in  $\rho$  much shorter; anthers reniform, in  $\sigma$  apiculate and warted at back at the insertion of the dorsifixed, rather long filaments which spring from near the base of the corolla-lobes. *Ovary*

rounded, glabrous; style slender, curved, stigma peltate, at any rate in ♀. *Berry* globose, red, black when dry, smooth, .15 to .2 in. in diam., surmounted by the remains of the style and stigma. A. DC. in Trans. Linn. Soc. XVII. 130 (excl. var.  $\beta$ ), Prod. VIII. 86; Scheff. Myrs. 44; Kurz For. Fl. II. 104; Clarke in Hook. f. Fl. Br. Ind. III. 515; Mez Monog. Myrs. 324. *Samara parviflora*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 223. *Celastrinea*, Griff. Itin. Notes 85, n. 1226.

PERAK: *Scortechini*; *Wray* 4194—at Maxwell's Hill, Larut, 3,500 feet; *Curtis* 2059—on Hijan Range; *King's Collector* 2342, 6992—from dense forests on high hills at 3,000 to 5,000 feet.—DISTRIB. Khasia and Naga Hills; Upper Burma, *Griffith* (K.D.) 3545, &c.; Sumatra.

#### IMPERFECTLY KNOWN SPECIES.

14. *EMBELIA LUCIDA*, Wall. Cat. 2315. *Leaves* 3 in. long, 1.25 in. broad, broadly oblong, suddenly narrowed at both ends, entire, glabrous, coriaceous. *Racemes* 1 in. long, axillary, simple, solitary or paired, rusty-villous. A. DC. Trans. Linn. Soc. XVII. 134, Prod. VIII. 87; Clarke in Hook. f. Fl. Br. Ind. III. 517; Mez Monog. Myrs. 396.

SINGAPORE: *Wallich* 2315.

15. *EMBELIA MACROCARPA*, King & Gamble, n. sp. A strong climber, branchlets thick, nearly black, rough. *Leaves* coriaceous; elliptic, obtuse or shortly acuminate at apex, almost rounded at base, glabrous, margin reflexed; 6 in. long, 3 to 4 in. broad; midrib rather slender; main-nerves irregular, distant, not prominent, about 8 pairs; secondary nerves slender, obscure as are the reticulations; petiole .7 to 1 in. long, thick, bordered above by the decurrent margins of the leaves. *Flowers* apparently on rather short, thick racemes from the branches. *Calyxlobes* 4, triangular, acute, gland-dotted, under .1 in. long. *Berry* large, .5 to .7 in. in diam., smooth, wrinkled when dry, globose, crowned with the short remains of the persistent style. *Seed* with many conspicuous pits. Rest not seen.

PENANG: at Marriot's Road, 1,500 feet, *Curtis* 1229.

The following Burmese species is here inserted, as it is found in Tenasserim and may occur further south in the Malay Peninsula.

*EMBELIA GALLATLYI*, King & Gamble, n. sp. Apparently a shrub; branchlets rounded, dark brown, lenticellate. *Leaves* ovate, acuminate at apex, truncate at base; prominently crenate dentate with blunt teeth and glands in the crenatures; glabrous on both surfaces, glandular dots few, chiefly near the margin; 1 to 1.4 in. long, .5 to .7 in. broad; midrib slender, impressed above; main-nerves 10 to 12 pairs; arching upwards to the crenatures; secondary nerves many, slender, reticulations prominent; petiole .1 to .2 in. long, channelled above, crispately edged. *Inflorescence* of axillary corymbose racemes, 10-12-flowered, rachis about 2 in. long, bracts minute subulate

the whole minutely rusty-pubescent, pedicels slender. *Calyx-lobes* triangular acute .03 to .05 in. long, ciliate; tube as long as lobes or somewhat shorter. *Corolla-lobes* oblong-spathulate, .1 in. long, ciliate, minutely pubescent, sparsely gland-dotted. *Stamens* longer than corolla-lobes, .15 in., anthers oblong, cells parallel, not warded behind at the insertion of the long exsert filaments which spring from close to the base of the corolla-lobes. *Ovary* ovoid-conical, style short curved, stigma minute. *Berry* unknown.

TENASSERIM: at Moolyett, 5,000 feet, *G. Gallatly* No. 407. *Gamble* No. 7906 from Mianimukh, Chittagong Hill Tracts, without flowers or fruit, is probably this species.

4. LABISIA, Lindl.

Small shrubs, with a creeping rhizome and erect stem, resembling *Pothos* in appearance. *Leaves* few, coriaceous, entire or denticulate, sessile or petiolate, the petiole often dilated, main leaf-nerves very many, at right angles to the midrib. *Flowers* hermaphrodite, minute, pink, in axillary spike-like panicles, bracts very small. *Calyx* minute, 5-lobed. *Corolla* 5-lobed, lobes ovate, induplicato-valvate in bud; tube very short. *Stamens* 5, wrapped in the corolla-lobes; filaments very short; anthers ovoid, introrsely dehiscent, no staminodes. *Ovary* globose, attenuated into a short style; stigma small; ovules few, immersed in a globose central placenta. *Fruit* small, globose, red, 1-seeded. *Seed* globose, hollowed at the base; albumen smooth; embryo cylindric transverse.—DISTRIB. About 4 species, all of the Malay Peninsula and Archipelago.

Leaves petiolate without decurrent wings:—

- |                                                                       |                                              |
|-----------------------------------------------------------------------|----------------------------------------------|
| Leaf-blades elliptic-lanceolate, much longer than broad               | 1. <i>L. pumila</i> var. <i>lanceolata</i> . |
| Leaf-blades ovate or ovate-orbicular, nearly as broad as long .. .. . | 2. <i>L. paucifolia</i> .                    |

Leaves with winged petioles or sessile:—

- |                                                                        |                                           |
|------------------------------------------------------------------------|-------------------------------------------|
| Wings very narrow, blade of leaf acuminate at both ends .. .. .        | 1. <i>L. pumila</i> .                     |
| Wings broad:—                                                          |                                           |
| Leaves crenate, thin, main-nerves rather distant ..                    | 1. <i>L. pumila</i> , var. <i>alata</i> . |
| Leaves entire, coriaceous, main-nerves very close and regular ... .. . | 3. <i>L. longistyla</i> .                 |

1. LABISIA PUMILA, Benth. & Hook. f. Gen. Pl. II. 645 (1876). A semi-herbaceous undershrub, with rooting stems and leaves not jointed at their insertion but decurrent into them. *Leaves* bluish-green, elliptic-lanceolate, acuminate, narrowed at the base, and more or less decurrent on the petiole; crenately toothed, or sometimes nearly entire; blade 5 to 8 in. long by 1 to 2.5 in. broad; midrib thick, often rusty-pubescent; main-nerves extremely numerous, nearly at right angles to the midrib, parallel, slender, anastomosing towards the margin, and

then producing an elegant network; under-surface with brown glandular scales; petiole 1 to 3 in., enlarged at the base, often minutely rusty-pubescent. *Flowers* pink, in a spike-like, long-stalked, ferruginous-tomentose panicle of small corymbose bracteate clusters; peduncles of corymbs 1 in. long or shorter, sometimes none; bract linear-subulate, .05 to 1 in. long.; pedicels .05 to 1 in., slender, with minute bracteoles. *Calyx-lobes* triangular, acute, .025 in. long, densely glandular. *Corolla-lobes* ovate, with linear glands, glabrous. *Stamens* infolded in the corolla; filaments very short; anthers oblong-linear, apiculate, with several hard round or linear black warts on the back. *Ovary* rounded, pubescent, ending in a subulate angular style with minute notched stigma. *Fruit* a globose red berry, about .15 in. in diam., ribbed and with prominent elongate glands, surmounted by the persistent style. Mez Monog. Myrs. 171 (var. *genuina*). *L. pothoina*, Lindl. in Bot. Reg. 31. t. 48; Clarke in Hook. f. Fl. Br. Ind. III. 518; Stapf in Trans. Linn. Soc. Ser. 2, IV. 200; *Ardisia punila*, Blume Bijdr. 688; A. DC. Prod. VIII. 137; Miq. Pl. Jungh. 199 and Fl. Ind. Bat. II. 1028; Scheff. Myrs. 92. *A* ? *spicata*, Wall. Cat. 2273; A. DC. in Trans. Linn. Soc. XVII. 135.

SINGAPORE or PENANG: *Walker*, 165. PENANG: *Curtis* 1192; *Kunstler* 1159. PERAK: *Scortechini*; *Wray* 753A. MALACCA: *Maingay* 1013 (K.D.); *Stoliczka*. SINGAPORE: *Ridley* 1804.—DISTRIB. JAVA: *Forbes* 238, 474. In dense moist forests on the lower slopes of hills.

VAR. *lanceolata*, Scheff. l.c. 93. *Leaves* elliptic-lanceolate, acuminate, somewhat rounded at base; not, or very slightly, decurrent; blade 5 to 8 in. long, by 1.5 to 3.5 in. broad; petiole 2 to 5 in. long not winged. *Inflorescence* more slender, bracts often longer than the peduncle of the corymb. Clarke in Hook. f. Fl. Br. Ind. III. 518; Mez Monog. Myrs. 172. *L. pothoina*, N. E. Brown (*non* Lindl.) in Ill. Hort. XXXII. 95 tab. 561.

PENANG: *Hullett* 201. PAHANG: *Goodenough* 2799. SINGAPORE: *Lobb* 61; *Kurz*; *T. Anderson* 196.—DISTRIB. Sumatra, *Korthals*; Borneo, *Motley* 1250, *Haviland*.

VAR. *alata*, Scheff. l.c. 93. *Leaves* thin ashy-green above, dark green below, elliptic oblong, rounded at top or obtusely acuminate; gradually or suddenly narrowed into a broad wing decurrent on the petiole; crenate glands and scales few or none; 6 to 16 in. long, 2 to 4 in. broad. *Inflorescence* with the corymbs usually more closely congested and on a shorter peduncle; flowers somewhat smaller, bracts usually longer than the corymb peduncle, flowers white or pink. Mez Monog. Myrs. 172. *L. alata*, N. E. Brown in Ill. Hort. XXXIII. 123, t. 605.

PERAK: *Wray* 753B, 824, 2482, 2737; *Scortechini*; *King's Collector*

980, 2815, 2882, 2891, 2942, 2974, 2999, 3376, 8325, 10949. SINGAPORE : *Lobb* 313.—DISTRIB. Sumatra, *Korthals* ; Borneo.

2. *LABISIA PAUCIFOLIA*, King & Gamble, n. sp. A small semi-herbaceous undershrub, 10 to 15 in. high; the stems striate, round, minutely purplish-brown-pubescent, bearing rarely more than 3 to 4 leaves. *Leaves* long-petioled, the blade ovate or orbicular-ovate, rounded at top into a bluntly acute point, rounded at base and then very shortly decurrent; entire or very minutely crenate; 2.5 to 4 in. long, 1.5 to 3 in. broad; main-nerves slender, numerous, more or less parallel, joining near the edge; petiole 1 to 2 in. long, thickened at the base and decurrent into the stem. *Inflorescence* 1.5 to 2.5 in. long, consisting of axillary, short-peduncled, rusty-pubescent racemes, the flowers reflexed, single or in few-flowered sessile clusters; pedicels .05 to .1 in. long, with short subulate bracts of equal length. *Calyx-lobes* ovate-acuminate, covered without with numerous glands, .075 in. long; tube short, about half the length of lobes. *Corolla-lobes* oblong-acuminate, .125 in. long, glabrous. *Stamens* closely enfolded; filaments very short; anthers hastate, long apiculate, glandular warted behind, .1 in. long. *Ovary* rounded, pubescent; style about .04 in. long, angular, oblique; stigma minute, notched. *Fruit* a dark red berry, .1 in. in diam., striate and with oblong glands.

PERAK: *Scortechini*; *Wray* 4102; *King's Collector* 8078. In open forest at 3,000 to 5,000 feet.

Besides the characteristic leaves, the acuminate petals and hastate long apiculate anthers make this species recognisable, though the leaf-venation resembles that of *L. pumila*.

3. *LABISIA LONGISTYLA*, King & Gamble, n. sp. An undershrub about 2 feet high; stem thick, rusty-brown, minutely pubescent. *Leaves* sessile, oblong, entire, rounded at apex and very slightly emarginate, decurrent below in a broad wing for about  $\frac{1}{3}$  of their length; prominently glandular-pitted above and with rusty glandular scales below; 7 to 12 in. long, 3 to 4 in. broad; midrib very thick, prominent, glandular scaly; main-nerves at right angles to midrib, extremely numerous, straight, parallel, anastomosing towards the edge which is slightly recurved. *Inflorescence* a raceme-like rusty-pubescent panicle of single flowers or shortly peduncled few-flowered secund corymbs, 8 to 9 in. long, the main peduncle about 4 in.; corymb-peduncles curved, angled, .3 to .4 in. long; bracts very short, subulate; pedicels striate, about .15 in. long; bracteoles minute. *Calyx-lobes* ovate, acute, glandular without, tube rather shorter than lobes, together .06 in. long. *Corolla* and *stamens* unknown. *Ovary* rounded, pubescent, crowned by a

filiform .2 in. long style. *Fruit* a globose berry, with a conical top and the remains of the style, glabrous, striate with linear-oblong prominent glands.

PERAK: *Wray* 1590. SELANGOR: *Curtis* 3750, at 3,000 to 4,000 feet.

### 5. ARDISIA, Swartz.

Small trees, shrubs or semi-herbaceous undershrubs, evergreen, generally all parts with pellucid glands which often dry black. *Leaves* sessile or petiolate, membranous to coriaceous, entire crenate or serrate. *Flowers* regular, pedicellate, hermaphrodite; inflorescence various. *Calyx* inferior, 4-6-lobed, the lobes free or overlapping to the right; tube very open, as long as or shorter than the lobes. *Corolla* red white or spotted, often waxy in appearance, 4-6-lobed, the tube often very short; the lobes overlapping to the right, often twisted. *Stamens* equal in number to, and opposite to, the corolla-lobes, sometimes long and narrow, usually sagittate-lanceolate and apiculate, sometimes very small, fixed to the corolla-tube by filaments usually short and broad; generally opening by slits, occasionally by terminal pores, in *A. littoralis* septate; dehiscence always introrse. *Ovary* globose, sometimes narrowed into the style, more often almost depressed; style usually filiform, rather long; stigma punctiform; ovules few or many, immersed in a globose placenta. *Fruit* a globose, rarely obovoid, berry, usually surmounted by the remains of the style, fleshy, red or purple or black, often spotted; endocarp crustaceous; 1-seeded. *Seed* solitary, large, globose, hollowed at the base; albumen pitted or ruminant; embryo cylindric horizontal.—DISTRIB. 200 to 250 species, all of tropical or sub-tropical regions in both worlds, scarce in Africa.

Leaves entire or crenate, never serrate:—

Leaves entire, or if crenate without glands in the crenatures:—

Calyx-lobes not, or only slightly, overlapping to the right, usually small:—

Inflorescence lateral:—

Inflorescence short-peduncled, shorter than the leaves (I. PIMELANDRA):—

Leaves entire; inflorescence on wood of current and past years:—

Leaves over 6 in. long; nerves conspicuous:—

Leaves nearly glabrous beneath;  
main-nerves less than 20 .. 1. *A. pachysandra*.

Leaves densely tomentose beneath;  
main-nerves more than 20 .. 2. *A. Teysmanniana*.

- Leaves under 6 in. long :—
- Leaves shining, nerves obscure ;  
flower-buds very short, rounded .. 3. *A. chrysophyllifolia*.
- Leaves not shining, nerves conspicuous ; flower-buds long, acuminate .. 4. *A. solanoides*.
- Leaves crenate ; inflorescence on wood of current year .. .. 5. *A. fulva*.
- Inflorescence long-peduncled (II. AKOSMOS):—
- Peduncles slender, under 1 in. long, pubescent ; leaves membranous .. 6. *A. ferruginea*.
- Peduncles thick, 3 to 3·5 in. long, glabrous ; leaves coriaceous .. .. 7. *A. lankawiensis*.
- Inflorescence terminal :—
- Style exsert in the bud (III. STYLARDISIA) :—
- Leaves membranous ; inflorescence short, few-flowered .. .. 8. *A. andamanica*.
- Leaves chartaceous or coriaceous, inflorescence elongate, many-flowered :—
- Leaves without a conspicuous intramarginal nerve :—
- Calyx-lobes ·05 in. long or under, usually glabrous :—
- Leaves coriaceous :—
- Leaves not thickly scaly beneath :—
- Nerves of leaves obscure, leaves dark when dry .. .. 9. *A. tuberculata*.
- Nerves of leaves prominent, leaves pale when dry .. 10. *A. ophirensis*.
- Leaves thickly scaly beneath :—
- Leaves broad ; main-nerves very many, prominent, over 24 pairs 11. *A. labisiaefolia*.
- Leaves narrow ; main-nerves fewer, obscure, 20 pairs .. 12. *A. montana*.
- Leaves chartaceous :—
- Panicles slender, elongate ; leaves usually small, main-nerves at about 60° to midrib .. 13. *A. sinuata*.
- Panicles rather thick, compact ; leaves generally large, main-nerves at about 75° to midrib .. 14. *A. colorata*.
- Calyx-lobes ·2 in. long, ferruginous pubescent .. .. 15. *A. crassa*.
- Leaves with a conspicuous intramarginal nerve .. .. 16. *A. platyclada*.
- Style not exsert in the bud (IV. ACARDISIA) :—
- Branches of the inflorescence racemose ; buds long, slender .. .. 17. *A. porosa*.
- Branches of the inflorescence umbellate ; buds short, conical .. .. 18. *A. divergens*.
- Calyx-lobes clearly overlapping to the right, usually large and broad :—
- Inflorescence terminal (V. TINOPSIS) :—

- Leaves under 6 in. long; panicle compact, pedicels slender, flowers rather small; berry globose, .2 in. in diam. .. .. 19. *A. sumatrana*.
- Leaves usually over 6 in. long; panicle spreading, pedicels stout, flowers large; berry depressed, over .25 in. in diam. .. 20. *A. lanceolata*.
- Inflorescence lateral (VI. TRINUS):—
- Anthers septate; leaves coriaceous, obovate, inflorescence short .. .. 21. *A. littoralis*.
- Anthers not septate:—
- Leaves usually over 6 in. long:—
- Leaves 8 to 15 in. long, elliptic, buds .25 in. long .. .. 22. *A. Kunstleri*.
- Leaves 5 to 10 in. long:—
- Main-nerves at about an angle of 60° with midrib:—
- Buds .4 in. long or more; leaves coriaceous:—
- Buds conical; calyx-lobes rounded; raceme glabrous .. 23. *A. solanacea*.
- Buds rounded; calyx-lobes emarginate, raceme rusty-pubescent .. 24. *A. lurida*.
- Buds .3 in. long only, rounded; leaves chartaceous .. .. 25. *A. oxyphylla*.
- Main-nerves at only about 30° with the midrib; calyx-lobes emarginate .. 26. *A. Scortechinii*.
- Leaves usually under 6 or even 5 in. long:—
- Leaves few-nerved; inflorescence long, racemose .. .. 27. *A. pendula*.
- Leaves many-nerved; inflorescence short, 1-5-flowered .. .. 28. *A. Hullettii*.
- Anthers not known; leaves 7 to 10 in. long, under 2.5 in. broad; main-nerves at an angle of 80° with midrib in an elegant network with secondary nerves and reticulations .. 29. *A. oblongifolia*.
- Anthers not known; leaves elliptic or elliptic-ovate, acuminate, 4.5 to 6.5 in. long; calyx-lobes 4; inflorescence apparently terminal.. 30. *A. tetrasepala*.
- Anthers not known; leaves 3 to 5 in. long, under 1.5 in. broad, acuminate, flowers 2 .. 31. *A. biflora*.
- Anthers not known; leaves 4 to 6 in. long, .7 to .9 in. broad, linear-lanceolate; flowers in peduncled axillary umbellate racemes, about 5 to 8 .. .. 32. *A. tahanica*.
- Leaves crenate, with glands in the crenatures (VII. CRISPARDISIA):—
- Calyx-lobes more or less gland-dotted:—
- Calyx-lobes oblong, obtuse or obtusely acute:—
- Calyx-lobes lingulate, over .25 in. long, sparsely dotted; inflorescence short; leaves lanceolate, more or less villous.. .. 33. *A. villosa*.
- Calyx-lobes under .1 in. long, prominently

dotted; inflorescence long; leaves oblong, glabrous, pale .. .. 34. *A. virens*.

Calyx-lobes ovate, more or less acute:—

Inflorescence axillary, racemose or umbellate:—

Racemes or umbels in the axils of upper leaves only:—

Leaves over 5 in. long, crenatures broad, very shallow, rounded:—

Leaves membranous, pedicels slender 35. *A. Wrayi*.

Leaves coriaceous, pedicels thick .. 36. *A. minor*.

Leaves under 4 in. long, crenatures narrow, almost dentate .. .. 37. *A. perakensis*.

Racemes in the axils of all or nearly all the leaves, crenatures narrow .. 38. *A. Meziana*.

Inflorescence terminal or pseudo-terminal:—

Inflorescence of a single sessile, umbellate raceme; leaves 4 to 8 in. long .. 39. *A. Ridleyi*.

Inflorescence usually of paniced racemes; leaves 2 to 4 in. long .. .. 40. *A. crenata*.

Calyx-lobes not gland-dotted; inflorescence terminal or pseudo-terminal:—

Branches of inflorescence short, not more than 1 in. long; leaves 2 to 4 in. long .. 41. *A. rosea*.

Branches of inflorescence 2 to 3 in. long; leaves 4 to 6 in. long .. .. 42. *A. longepedunculata*.

Leaves acutely and prominently serrate occasionally abortive (VIII. БЛАДНІА):—

Inflorescence long, reaching 6 to 8 in.; leaves large, nearly or quite sessile .. .. 43. *A. Mainyayi*.

Inflorescence short, under 2·5 in.; leaves petioled:—

Inflorescence 1·5 to 2·5 in. long; anthers mucronate; leaves under 3 in. long .. 44. *A. theaeifolia*.

Inflorescence under 1·5 in. long; anthers emarginate; leaves over 4 in. long:—

Leaves and branchlets fulvous-villous; flowers pink; ovary and base of style pubescent .. .. 45. *A. odontophylla* var. *Lobbii*.

Leaves and branchlets glabrous; flowers white; ovary and base of style glabrous .. 46. *A. bambusetorum*.

1. ARDISIA PACHYSANDRA, Mez Monog. Myrs. 97 fig. 14 A-E (1901).

A large shrub or small tree reaching to 40 to 50 feet high, and 6 to 10 in. diam.; branches with pale brown bark, marked with decurrent lines below the leaves or leaf-scars; branchlets thickly rusty-villous at the ends. *Leaves* membranous; oblong or slightly obovate, acute at apex, cuneate at base; glabrous above, except on the midrib which is sometimes minutely pubescent, glabrous or slightly pubescent beneath; entire, glands numerous near the margins; 6 to 10 in. long, 1·5 to 3 in. broad; midrib thick, slightly impressed above; main-nerves

14 to 20 pairs, irregular, .4 to .5 in. apart, starting at an angle of about 60°, then slightly arching to and along the margin; petiole .4 to .6 in. long, pubescent, wrinkled, slightly channelled above. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels or corymbs; peduncles .1 in. long, flowers 6 to 8; pedicels slender, pubescent, striate, .4 in. long; bracts minute, subulate, densely pubescent, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .2 in. long, slightly overlapping to the right, ciliate, gland-dotted especially near the tip. *Corolla-lobes* boat-shaped, broadly ovate, shortly acuminate, .3 in. long, glabrous, white, faintly nerved, dots very few, revolute in flower; tube short. *Stamens* a little shorter than corolla-lobes; anthers ovate, cuspidate-acuminate, much gland-dotted and warted at the back on the connective; filaments thick. *Ovary* rounded, glabrous, style subulate, as long as the anthers. *Berry* .2 to .4 in. in diam., globose, glabrous, pale. *Myrsine pachysandra*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 297; Wall. Cat. 2284; A. DC. in Trans. Linn. Soc. XVII. 111. *Pinclandra Wallichii*, A. DC. in Ann. Sc. Nat. 2. XVI. 88; Prod. VIII. 106; Deless. Ic. Sel. V. 14. t. 31; Scheff. Myrs. 94; Miq. Fl. Ind. Bat. II. 1029; Clarke in Hook. f. Fl. Br. Ind. III. 531.

PENANG: *Wallich* 2284; *Porter*; *Curtis* 1156, 3164, 3181, 3737. MALACCA: *Griffith* (K.D.) 3597; *Maingay* (K.D.) 1006. PERAK: *Wray* 1358; *King's Collector* 5995, 7194.—DISTRIB. Borneo (?).

2. *ARDISIA TEYSMANNIANA*, Scheff. in Tijdschr. Ned. Ind. XXXI. 368 and in Flora 253 (1870). A large shrub or small tree; branchlets brown, with wavy longitudinal lines passing downwards from the sides of the bases of the petioles, lenticels numerous, innovations densely ferruginous-pubescent. *Leaves* entire, chartaceous; oblong or slightly obovate-oblong or oblong-lanceolate, acuminate at the apex, alternate and sometimes abruptly rounded at base; glabrous above, densely ferruginous-tomentose beneath; glands very numerous, small, evenly distributed over the whole under surface; 6 to 11 in. long, 1.5 to 3 in. broad; midrib thick, prominent beneath; main-nerves 25 to 30 pairs, .3 to .4 in. apart, starting at an angle of 60°, at first straight, then curving to meet in the margin in a looped nerve, raised beneath as are the few secondary nerves and the many oblique reticulations; petiole very thick, .5 to .6 in. long, usually bordered by the decurrent margins of the blade which are again revolute. *Inflorescence* of axillary pedunculate umbels or corymbs; peduncles in flower .1 to .2 in. long, in fruit sometimes up to .5 in., 4-5-flowered; pedicels slender, .4 in. long, densely rusty-pubescent, striate; bracteoles linear-subulate, deciduous. *Calyx-lobes* ovate, rounded, pubescent, .1 in. long, ciliate. *Corolla-lobes* ovate-acuminate, .2 in. long, softly

pubescent, glands inconspicuous, tube very short. *Stamens* nearly as long as corolla-lobes; anthers ovate, cuspidate-acuminate, concave and warted on the connective at the back, .175 in. long; filaments slender, .05 in. long, glabrous. *Ovary* rounded, glabrous; style slender, subulate, as long as stamens. *Berry* globose, slightly depressed, .3 in. in diam., black-gland-dotted, faintly ribbed. Mez in Monog. Myrs. 97. *Pimelandra Teysmanniana*, Hook. f. in Benth. & Hook. f. Gen. Pl. II. 64. *Pimelandra Wallichii* var. *Teymanniana*, Clarke in Hook. f. Fl. Br. Ind. III. 531.

MALACCA: *Maingay* (K.D.) 1007. SINGAPORE: *Cantley*; *Ridley* 2800, 5573, 6788.—DISTRIB. Bangka.

This species is easily distinguished from the former by having many more and much closer nerves to the leaves, and by the dense rusty tomentum.

3. *ARDISIA CHRYSOPHYLLIFOLIA*, King & Gamble, n. sp. A tree, branchlets reddish-brown, innovations densely ferruginous-pubescent. *Leaves* entire, coriaceous; oblong-lanceolate, obtusely acute at apex, narrowed at base; glabrous on both surfaces; glands scattered, visible on the under surface; 4 to 6 in. long, .75 to 1.25 in. broad; midrib thick, prominent; main-nerves many, more or less parallel, inconspicuous, meeting, with the secondary nerves, in a wavy intramarginal nerve, reticulations fine; petiole .4 to .5 in. long, glabrous, channelled above and edged by the decurrent margin of the blade. *Inflorescence* of small, axillary, sessile or shortly peduncled, umbels of up to about 12 flowers; pedicels slender, .2 in. long, ferruginous-pubescent; bracts minute, triangular; buds very short, rounded. *Calyx-lobes* 5, ovate, minutely ciliate, pubescent and scaly outside, dotted with many conspicuous golden glands, .05 in. long, tube a little shorter. *Corolla-lobes* ovate, concave, sparsely glandular, glabrous, .08 in. long; tube none or very short. *Stamens* a little shorter than the corolla-lobes; anthers ovate acuminate, black-gland-dotted behind; filaments short. *Ovary* rounded, glabrous; style subulate, .05 in. long. *Berry* globose, somewhat depressed, covered with round and elongate glands, .15 in. in diam.

PERAK: at Lower Camp, Gunong Pateh, 3,400 feet, *Wray* 483, 1118, 1182.

4. *ARDISIA SOLANOIDES*, King & Gamble, n. sp. A small shrub, 3 to 4 feet high; branches slender, smooth, dark brown; branchlets glandular-hirsute, marked by obscure raised lines from the sides of the bases of the petioles. *Leaves* entire, membranous; elliptic, bluntly long caudate-acuminate at apex, attenuate at base; glabrous above, more or less glandular-hirsute beneath; glandular dots many, scattered, prominent; 2.5 to 3.5 in. long, .75 to 1.25 in. broad; midrib slender,

raised beneath; main-nerves 8 to 9 pairs, raised, at an angle of 60° with the midrib, the lowest pair more oblique, nearly straight, meeting at about two-thirds of the way to the margin in a looped intramarginal raised nerve, reticulations obscure; petiole .15 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of sessile, axillary, umbellate, nearly glabrous racemes of about 4 to 6 flowers, racemes hardly .1 in. long; bracteoles oblong-lanceolate, gland-dotted, .1 in. long; pedicels slender, .3 to .4 in. long, slightly clavate; buds conical, acuminate, .3 in. long; flowers white with a blueish tinge. *Calyx-lobes* 4 to 5, very short, rounded, scarious and ciliate on the margins, gland-dotted. *Corolla-lobes* ovate below, caudate-acuminate above, twisted and reflexed in flower, .3 in. long, sparsely pale-glandular-punctate. *Stamens* nearly as long as corolla-lobes, lanceolate, membranous at tip, with two lines of glandular dots on the back of the connective. *Ovary* rounded; style very slender, as long as stamens. *Berry* bright red, glossy, .25 in. in diam. when dry.

PERAK: in dense jungle on rich soil, at 500 to 800 feet, *King's Collector* 4254.

This species very closely resembles *Antistrophe caudata*, but is at once distinguished by the fact of the corolla-lobes overlapping to the right instead of to the left. The flowers somewhat resemble those of *Ardisia porosa*.

5. *ARDISIA FULVA*, King & Gamble, n. sp. Apparently a shrub; branchlets rather thick, usually marked by raised lines descending from the bases of the leaves; innovations densely tawny-villous; leaf-buds lanceolate, densely pubescent. *Leaves* coriaceous; elliptic-oblong or elliptic-lanceolate, shortly acuminate at apex, somewhat rounded at base; glabrous or slightly scaly above, thickly tawny-villous beneath; glandular dots few, scattered, obscure, in the areoles of the minor nerves; crenate, especially in the upper two-thirds; 4 to 7 in. long, 1 to 2 in. broad; midrib slender; main-nerves 20 to 24 pairs, irregular, arching upwards and joining in an intramarginal nerve; secondary nerves slender, faint, reticulations curved; petiole .4 to .6 in. long, winged by the decurrent edges of the blade. *Inflorescence* of short 1 to 1.5 in. long, densely tawny-pubescent, drooping, corymbs in the axils of tawny, leaf-like, often nearly 1 in. long, bracts from the young branches below the end leaves; peduncles about .7 in. long, slender, pedicels slender, up to .5 in. long; bracteoles subulate, short, tawny; buds ovate, .2 to .25 in. long. *Calyx-lobes* ovate, thin, villous without, ciliate, .1 to .15 in. long, marked with prominent black dots, recurved in flower; tube short. *Corolla-lobes* obovate, obtuse, .2 to .25 in. long, oblique, unequal, marked by prominent round or oblong black dots, tube short. *Stamens*

a little shorter than the corolla-lobes, acuminate, with 2 rows of prominent black dots behind the anthers; filaments short. *Ovary* ovoid, surmounted by a short, .1 in. long, subulate style, glabrous. *Berry* .2 in. in diam., black when dry, ribbed.

KEDAH: on Langkawi Island, *Curtis* 2133. PENANG: *Ridley* 10216. PERAK: *Ridley* 8269.

6. *ARDISIA FERRUGINEA*, Mez Monog. Myrs. 108 (1901). A shrub (?); branchlets slender, densely ferruginous-tomentose. *Leaves* membranous; linear- or oblong-lanceolate, bluntly acute at apex, rounded at base; glabrous or slightly rusty-scaly above, rusty-pubescent beneath; entire; glands not apparent; 3 to 4.5 in. long, .75 to 1 in. broad; midrib slender, nerves very faint; petiole .1 to .2 in. long, rusty-pubescent. *Stipules* small, linear-falcate. *Flowers* in densely ferruginous-pubescent, bipinnate panicles in the axils of upper leaves; peduncles .5 to .75 in. long; bracts linear subulate about .15 in.; pedicels slender, .1 to .2 in. long; bracteoles minute; buds conical. *Calyx-lobes* ovate, obtuse, ciliate, connate to rather over one-third, with wavy glandular dots. *Corolla-lobes* shortly connate at the base, broadly and obliquely ovate, short acuminate, gland-dotted. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate, gradually acute, scarcely punctate; filaments very short. *Ovary* ovoid, glabrous, style slender.

JOHORE: at Kampong Sunpai, *Lake & Kelsall* (*Ridley* 4032).

This species does not seem to differ very much from *A. Miqueliana*, Scheff. in Tijdsch. Ned. Ind. XXXI. 367, in respect to leaves, but that species has terminal and not axillary flowers.

7. *ARDISIA LANKAWIENSIS*, King & Gamble, n. sp. A tree; branchlets smooth, glabrous, obscurely striate, with raised lines from the edges of the bases of the leaf-petioles. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acuminate at apex, acute at base, glabrous; entire; glandular dots frequent near the margins; 3.5 to 5 in. long, 1.25 to 1.5 in. broad; midrib slender; main-nerves obscure, about 12 to 14 pairs, anastomosing near the margin, secondary nerves and reticulations similar; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade. *Flowers* pink, in long-peduncled, closely congested racemes in the axils of the uppermost leaves; peduncles 3 to 3.5 in. long, flattened, glabrous; pedicels .5 to .7 in. long, striate, slender; bracteoles minute, caducous. *Calyx-lobes* ovate, acute, ciliate, with many glands on the back, .075 in. long. *Corolla-lobes* ovate, acuminate, much gland-dotted, .25 to .3 in. long. *Stamens* a little shorter than the corolla-lobes, ovate-lanceolate, mucronate, dehiscing on the margins but more widely near the top. *Ovary* rounded, obscurely 5-lobed; style .2 in. long, twisted and

wrinkled. *Fruit* a depressed, obscurely 5-angled berry, .2 in. in diam., pericarp very smooth inside.

KEDAH: on Lankawi Island, *Ridley* 8313.

8. *ARDISIA ANDAMANICA*, Kurz For. Fl. II. 108 (1877) and in Journ. As. Soc. Beng. XLVI. ii. 225. A small or medium-sized evergreen shrub reaching 15 feet high and 2 in. in diam.; branches slender with reddish-brown bark, striate when dry, branchlets glabrous. *Leaves* entire, membranous; oblong lanceolate, narrowly long acuminate at apex, cuneate at base; glabrous on both surfaces but with many scattered glandular dots and occasional peltate scales; 3 to 6 in. long, .75 to 1.75 in. broad; midrib slender; main-nerves about 20 pairs, very thin and inconspicuous, at about 60° with the midrib, at first straight then arching upwards to and along the margin; petiole .3 to .5 in. long, channelled above. *Inflorescence* a loose terminal panicle 2 to 3 in. long, with few slender umbel-like racemes on .3 to .5 in. long, squarrose peduncles; pedicels slender, .3 in.; bracteoles small, ovate, deciduous. *Calyx-lobes* acute, triangular, .05 in. long, minutely ciliate at the edges, dotted with black glands; tube rather shorter than lobes. *Corolla-lobes* ovate, acute, .15 in. long, glabrous, with inconspicuous nerves and few scattered round or oblong glands. *Stamens* a little shorter than corolla-lobes; anthers ovate, apiculate, .1 in. long, glabrous on the back or with few black glands; filaments .05 in. *Ovary* rounded, glabrous; style filiform, long exsert, .15 in. long. *Berry* round or slightly pyriform, smooth, .3 in. in diam. Clarke f. Fl. Br. Ind. III. 521; Mez Monog. Myrs. 110. *Ardisia neriiifolia*, A. DC. Prod. VIII. 127 in part (not of Wall.), Trans. Linn. Soc. XVII. t. 8 (fig. only).

MALACCA: *Griffith* (K.D.) 3570; *Hullett* 830; *Stoliczka*. PERAK: *Ridley* 9718; *Wray* 867, 943, 971, 1033; *King's Collector* 5692, 8064. JOHORE: *Ridley* 3717.—DISTRIB. Andamans, Mergui.

9. *ARDISIA TUBERCULATA*, Wall. Cat. 2274 (1829). A shrub, reaching 10 feet in height; branchlets smooth, stout, reddish, uppermost flattened, glabrous. *Leaves* entire, coriaceous; elliptic, bluntly acuminate at apex, attenuate or rounded at the base; glabrous and shining above, covered beneath with rather deciduous peltate scales, dark when dry; 3 to 6 in. long, 1 to 2 in. broad; midrib prominent; main-nerves obscure, about 15 pairs, starting at an angle of about 75° from the midrib, then arched upwards to and along the margin; secondary nerves more slender, reticulations obscure; petiole .3 to .5 in. long, thick, rough, winged by the decurrent margins of the blade. *Inflorescence* a lax, leafy, terminal, tripinnate, 3 to 6 in. long, panicle; rachis flexuous, flattened, often scaly; primary peduncles squarrose, .6 to 1 in. long, supported by ovate acuminate leafy bracts; secondary peduncles also squarrose,

·3 to ·5 in. long with subulate bracts; ultimate racemes umbellate, 6-8-flowered; pedicels slender, short, ·1 to ·15 in. long; bracteoles subulate; buds ovoid, obtuse, glabrous. *Calyx-lobes* ovate, acute or rounded, ·05 in. long; margin ciliate, dotted with black glands. *Corolla-lobes* broadly ovate, blunt, glabrous, ·1 in. long, with very few dots; tube very short. *Stamens* a little shorter than the corolla-lobes; anthers acute, but gland-dotted behind; filaments minute, broad. *Ovary* globose; style subulate, longer than the petals. *Berry* obovoid, smooth, ·15 to ·2 in. in diam. A. DC. in Trans. Linn. Soc. XVII. 119, Prod. VIII. 130; Miq. Fl. Ind. Bat. II. 1026; Clarke in Hook. f. Fl. Br. Ind. III. 521, *except var.*; Mez Monog. Myrs. 112, fig. 16. *A chrysophylloides*, Miq. Fl. Ind. Bat. Suppl. 574.

PENANG: *Wallich* 2274. MALACCA: *Derry* 394. PAHANG: *Ridley* 1071. JOHORE: *Ridley* 6438. SINGAPORE: *Griffith* (K.D.) 3564; *Maingay* (K.D.) 1014; *Ridley* 2817, 8916, 1916(A).—DISTRIB. *Bangka Teysmann*.

10. *ARDISIA OPHIRENSIS*, Mez Monog. Myrs. 113 (1901). A shrub (?); branchlets pale brown, flattened, smooth; innovations minutely ferruginous-scaly. *Leaves* coriaceous; elliptic, shortly acuminate at apex, rounded or somewhat acute at base; pale and somewhat shining on both surfaces, the under covered with minute brown peltate scales; glands scattered, numerous; 3 to 6 in. long, 1·75 to 2·25 in. broad; midrib thick, prominent; main-nerves prominent, raised on both surfaces, 10 to 12 pairs, starting at an angle of about 75° with the midrib, at first straight then curving upwards to meet some way from the margin in a prominent network; secondary nerves prominent, reticulations transverse; petiole ·4 to ·5 in. long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a terminal, leafy, angular, tripinnate panicle, about 3 to 4 in. long; rachis flexuous, flattened, scaly; peduncles squarrose, about 1 in. long, supported by ovate-oblong, reflexed, leafy bracts; pedicels ·3 in. long, slender, in fruit very spreading. *Calyx-lobes* ovate, acute, ·05 in. long, back dotted with prominent large glands. *Corolla-lobes* elliptic-ovate, rather oblique, shortly connate, nervose; glands few, near the apex, black. *Stamens* rather shorter than the corolla-lobes; anthers ovate, large, not glandular, apiculate; filaments short, slender. *Ovary* ovoid, glabrous; style long, subulate, exsert. *Berry* black when dry, ·15 in. in diam., with prominent glands. *A. tuberculata* var. *ophirensis*, Clarke in Hook. f. Fl. Br. Ind. III. 522.

MALACCA: *Hullett* 754; *Ridley* 621; *Miller* 9. On the top of Mount Ophir.

11. *ARDISIA LABISLÆFOLIA*, King & Gamble, n. sp. A small tree; branchlets thick, slightly flattened, smooth, glabrous below, lepidote-

scaly above. *Leaves* coriaceous; elliptic or elliptic-oblong, shortly and rather abruptly acuminate at apex, rounded at base; glabrous above when old, when young densely covered, as is the under-surface always, with rather large reddish-brown peltate scales, margins recurved; 6 to 8 in. long, 2 to 4 in. broad; midrib thick, prominent, impressed above; main-nerves 24 to 30 pairs, irregularly spaced, at first parallel, leaving the midrib nearly at right angles, then near the margin curving upwards to and along the margin and anastomosing with the prominent secondary nerves which resemble the main ones; reticulations prominent in an elegant network, all more or less raised above when dry; petiole .5 to .8 in. long, thick, bordered above by the decurrent margins of the blade. *Inflorescence* a pyramidal, rusty-scaly, bracteate, tripinnate panicle, up to 6 in. long, the branches bearing sub-umbellate, pedunculate clusters of small flowers; rachis somewhat flattened, rusty-scaly; bracts leafy spatulate; bracteoles minute, ovate; pedicels .1 to .2 in. long, reflexed. *Calyx-lobes* ovate, .06 in. long, ciliate, scaly and glandular-dotted; tube one-third of lobes. *Corolla-lobes* deep pink, ovate-acute, .14 in. long, with a very few black glands. *Stamens* nearly as long as corolla-lobes; anthers ovate, acute, .1 in. long, apiculate; filaments rather thick, .3 to .4 in. long, minutely pubescent. *Ovary* rounded, glabrous; style slender, exsert. *Berry* globose, often depressed at top, .15 to .2 in. in diam., black when dry.

PERAK: *Wray* 320, 1566; *Scortechini*. Hilltops at 6,500 to 7,000 feet.

12. *ARDISIA MONTANA*, King & Gamble, n. sp. A shrub reaching 4 to 6 feet in height; branchlets brown, somewhat angular, uppermost covered with a nearly furfuraceous glandular tomentum. *Leaves* coriaceous; elliptic-oblong or oblong-lanceolate, obtusely acuminate at apex, rounded or attenuate at base; scaly above, densely ferruginous-hairy and scaly beneath, scales stellate; glandular dots scattered, obscure; margins slightly recurved; 4 to 6 in. long, 1 to 2 in. broad; midrib prominent, impressed above; main-nerves 20 pairs, obscure, irregular, starting nearly at right angles to the midrib and curving upwards to and along the margin; secondary nerves many, reticulations obscure; petiole .5 in. long, channelled above by the decurrent margins of the blade, densely scaly and ferruginous-pubescent. *Inflorescence* a rather lax, terminal, pyramidal, bi-tri-pinnate, leafy panicle, up to 6 in. long in fruit, shorter in flower, the branches bearing sub-umbellate pedunculate clusters of minute flowers; rachis somewhat flattened, furfuraceous-scaly; branches squarrose; peduncles .5 to .7 in. long; umbel-peduncles .5 in. long; pedicels .2 in. long, often reflexed; bracts leafy, deciduous; bracteoles ovate, very small. *Calyx-lobes* ovate-acute, under .05 in. long, margins scarious ciliate, dotted with large glands.

*Corolla-lobes* slightly longer than calyx-lobes, ovate, glabrous, gland-dotted. *Stamens* as long as corolla-lobes; anthers ovate, apiculate; filaments extremely short. *Ovary* rounded, glabrous; style subulate, rather thick, scarcely exsert. *Berry* red, globose, .15 in. in diam., gland-dotted when dry.

PERAK: *Wray* 327, 3869; *Scortechini* 296; *King's Collector* 8029. Rocks and hilltops at 3,000 to 7,000 feet.

13. *ARDISIA SINUATA*, King & Gamble, n. sp. A shrub or small tree, reaching a height of 10 to 15 feet and a diam. of stem of 2 to 3 in.; branchlets pale brown, sinuate, compressed, with raised lines joining the sides of the bases of the petioles, minutely scaly-pubescent or nearly glabrous. *Leaves* chartaceous; elliptic-oblong, acute or shortly acuminate at apex, rounded or attenuate at base; glabrous above, minutely scaly beneath when young, afterwards glabrate; glandular dots few, scattered; 3 to 6 in. long, 1 to 2 in. broad; midrib slender; main-nerves 10 to 12 pairs, .3 to .4 in. apart, starting from the midrib at an angle of 60° and at once curving upwards to and along the margin; secondary nerves and reticulations faint; petiole .3 to .4 in. long, channelled above by the decurrent margins of the blade. *Inflorescence* a lax, terminal, bracteate, nearly glabrous, bi-tri-pinnate panicle 5 to 7 in. long, the branches bearing subumbellate clusters of small flowers; rachis flat, sinuate; bracts leafy, uppermost lanceolate recurved, .5 to 1 in. long; bracteoles minute, ovate; pedicels slender, .1 in. long. *Calyx-lobes* triangular-ovate, glabrous, ciliate, gland-dotted, .04 in. long. *Corolla-lobes* pale green or pink, ovate, acute; margins transparent. *Stamens* nearly as long as corolla-lobes; anthers broadly ovate, shortly apiculate; filaments very short. *Ovary* rounded, glabrous; style slender, exsert, .1 to .15 in. long. *Berry* globose, .15 in. in diam., obscurely striate and black when dry.

PERAK: *Wray* 2408, 3023; *King's Collector* 4599.

14. *ARDISIA COLORATA*, Roxb. Hort. Beng. 16 (1814), Fl. Ind. I. 581, and Fl. Ind. Ed. Carey and Wall. II. 271. A large shrub or small tree, reaching 25 feet in height and a girth of 1 foot; branchlets compressed, pale brown, more or less lepidote-scaly, furnished with somewhat zigzag raised lines proceeding downwards from the sides of the bases of the petioles. *Leaves* chartaceous; oblong-lanceolate or elliptic-lanceolate, acute or shortly acuminate at apex, cuneate at base; glabrous on both surfaces, entire; glandular dots many, irregularly scattered, chiefly visible on the upper surface; 5 to 10 in. long, 1.5 to 3 in. broad; midrib prominent beneath, impressed above; main-nerves 20 to 30, also prominently raised beneath and impressed above, usually .3 to .4 in. apart, starting at an angle of 70° to 75° with the midrib, at first straight

then arched upwards to and along the margin; secondary nerves many, slender, 1 to 2 between each pair of main-nerves, reticulations oblique; petiole rather thick, .5 to .8 in. long, channelled above, winged by the decurrent margins of the blade. *Inflorescence* a pyramidal terminal panicle, 4 to 12 in. long, tripinnate, ferruginous scaly, bearing clustered umbellate racemes of flowers; rachis much flattened, as are its branch peduncles; primary branches 2 to 6 in. long, peduncle .5 in., bracts caducous; secondary branches .5 to 1 in. long, peduncles .2 to .4 in., bracteoles small, ovate-acuminate; pedicels slender. .1 to .2 in. long; umbels many-flowered. *Calyx-lobes* ovate, bluntly acute, .05 to .08 in. long, densely gland-dotted, margins scarious and ciliate; tube rather shorter than lobes. *Corolla-lobes* pink, ovate-acute, oblique, unequal, about .15 in. long, not gland-dotted; tube very short. *Stamens* a little shorter than corolla-lobes; anthers sagittate, acuminate; filaments very short. *Ovary* ovoid, glabrous; style thick, .2 in. long. *Berry* globose, .2 to .25 in. in diam., deep red to black, obscurely ribbed when dry, shining. Clarke in Hook. f. Fl. Br. Ind. III. 520; Mez Monog. Myrs. 113. *A. pyramidalis*, Roth Nov. Pl. Sp. 123 (not of Cav.). *A. Rothii*, A. DC. in Trans. Linn. Soc. XVII. 117, Prod. VIII. 126. *A. anceps*, Wall. in Roxb. Fl. Ind. l.c. 280, and Cat. 2261; DC. Prod. l.c.; Kurz in Journ. As. Soc. Beng. XLVI. II. 224, and For. Fl. II. 107; Scheff. Myrs. 77. *A. polycarpa*, Wall. Cat. 2285. *A. grandiflora*, Wall. Cat. 2272.

KEDAH: *Ridley* 5509. PERAK: *Scortechini* 20, 203, 397, 1505, 1568; *King's Collector* 798, 1301, 3099, 3284, 3567, 6473, 6823, 7741, 8252, 10866; *Ridley* 5508. PROVINCE WELLESLEY: *Ridley* 6945. SELANGOR: *Ridley* 7559; *Goodenough* 10551. MALACCA: *Maingay* (K.D.) 1008; *Goodenough* 1762; *Derry* 553, 915, 1075; *Ridley* 1245, 1581, 2817.—DISTRIB. India, Burma, Malay Islands.

VAR. *polyneura*, Clarke in Hook. f. Fl. Br. Ind. III. 520. *Leaves* paler when dry than in the typical form; wide, reaching 4.5 in. in width, sometimes reaching 15 in. in length; more usually elliptic, oblong or obovate, more rounded at base; all nerves more prominent. *Panicle* wide at the base; pedicels much reflexed; rachis very much flattened. *A. polyneura*, Miq. in Pl. Jungh. I. 198, and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 81.

PERAK: *Ridley* 3000; *Scortechini* 1290, 1412; *Wray* 1643, 1950, 2810; *King's Collector* 527, 2152, 2197, 2629, 3643, 3655, 3657, 4119, 4751, 6922, 8640. MALACCA: *Griffith* (K.D.) 3568.—DISTRIB. Java.

VAR. *complanata*, Clarke l.c. *Panicles* smaller, rusty-pubescent; flowers and berries smaller; panicle, rachis, and branches much flattened. *Leaves* usually narrower and smaller, rarely over 7 in. long

and 2.75 in. broad. *A. complanata*, Wall. Cat. 2277; Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 210; DC. Prod. VIII. 126; Scheff. Myrs. 78; Miq. Fl. Ind. Bat. II. 1024. *A. sanguinolenta*, Bl. Bijdr. 685 (not of Wall.). *A. Zollingeri*, DC. Prod. VIII. 670.

PENANG: *Wallich* 2277; *Curtis* 1052, 22494. PERAK: *Wray* 2896, 3929; *Scortechini* 144, 112; *King's Collector* 7680.—DISTRIB. Chittagong, Java, Sumatra.

VAR. *salicifolia*, King & Gamble. *Leaves* lanceolate, 5 to 7 in. long, 1 to 1.5 in. broad, glabrous, obscurely gland-dotted; main-nerves not prominent. *Panicles* spreading, leafy; rachis zigzag, much flattened; bracteoles persistent.

PERAK: *Wray* 2960; *King's Collector* 3216, 6816, 8563. MALACCA: *Hervey*.

VAR. *elliptica*, King & Gamble. *Leaves* elliptic or elliptic-obovate, acuminate at apex, cuneate at base, glabrous; 4.5 to 8 in. long, 2 to 3 in. broad; main-nerves fewer, 15 to 20 pairs, less prominent. *Panicles* rather short and stout, 4 to 6 in. long, pyramidal, rachis less flattened, scarcely zigzag.

PERAK: *Wray* 3293; *King's Collector* 3326, 3453, 5057, 6473, 6624, 6820, 8856.

15. *ARDISIA CRASSA*, Clarke in Hook. f. Fl. Br. Ind. III. 518 (1882). A small tree; branches pale brown, rounded, stout; branchlets somewhat flattened above and with raised lines from below the base of the petioles. *Leaves* coriaceous; oblong, acute or slightly blunt-acuminate above, cuneate at base; glabrous and shining above, rufescent and with inconspicuous rounded scales beneath; entire; 4 to 9 in. long, 1.5 to 2.5 in. broad; midrib prominent beneath; main-nerves nearly regular at first, nearly at right angles to midrib, afterwards arching upwards and round parallel to the edge, 20 to 27 pairs, secondary obscure. *Inflorescence* a terminal rusty-pubescent panicle, 5 to 6 in. long, with remote branches ending in closely packed umbels; rachis thick, much flattened, flexuose; branches first at right angles, then curved, .5 to .8 in. long; pedicels very short, thick; bracteoles ovate, blunt, about .1 in. long. *Calyx-lobes* thick, ovate-orbicular, .2 in. long, minutely ferruginous-pubescent, overlapping to right; tube about half the length of the lobes. *Corolla-lobes* broadly ovate, unequal, obliquely and shortly acute, .15 in. long. *Stamens* shorter than corolla-lobes; anthers ovate, acute; filaments very short, broad at base. *Ovary* rounded, glabrous; style short, about .1 in. long, subulate. *Berry* globose, depressed, not striate, .25 in. in diam. *Mez Monog.* Myrs. 114.

MALACCA: *Maingay* (K.D.) 1015; *Goodenough* 1808.—DISTRIB. Borneo.

16. *ARDISIA PLATYCLADA*, King & Gamble, n. sp. A small tree or shrub reaching 10 to 15 feet in height; branchlets pale brown, prominently marked by zigzag raised lines joining the sides of the bases of the petioles; uppermost ones prominently flattened and covered with rusty furfuraceous scales, as are also the young leaves. *Leaves* chartaceous; oblong or elliptic-oblong, abruptly acuminate at apex, attenuate and somewhat rounded at base; both surfaces covered when young with rusty stellate scales, glabrescent when old; margins undulate, recurved; 4 to 6 in. long, 1.5 to 2 in. broad; midrib slender but prominent beneath, impressed above; main-nerves 14 to 18 pairs, .3 to .4 in. apart, rather irregularly parallel, leaving the midrib at an angle of about 65° and joining at .1 to .2 in. from the margin in a very prominent intramarginal looped nerve; secondary nerves and reticulations obscure; petiole none or very short, rarely .2 in. long, rugose, rusty-scaly, and bordered by the decurrent margins of the blade. *Inflorescence* a terminal, compact, bracteate, rusty-scaly, pyramidal, bi-tri-pinnate panicle, 4 to 5 in. long, the flowers in dense subumbellate clusters on the branches; rachis flattened, flexuose; bracts foliaceous, spatulate or oblong-lanceolate, .5 to 1.5 in. long; bracteoles small, triangular-subulate; pedicels glabrous, cernuous, about .1 in. long; buds very small, conical. *Calyx-lobes* pink, lanceolate, .04 in. long, ciliate, obscurely red-gland-dotted; tube as long as or rather shorter than the lobes. *Corolla-lobes* waxy-white, ovate-acuminate, .07 in. long, slightly gland-dotted; tube very short. *Stamens* shorter than corolla-lobes; anthers ovate, apiculate; filaments very short. *Ovary* rounded, minutely pubescent at top; style straight, .15 in. long, exsert. *Berry* globose, .15 to .2 in. in diam., glandular-rugose, dark blue, black when dry.

PERAK: *Scortechini* 232; *King's Collector* 824, 4569, 5863, 8136, 10140; usually in dense mixed forest.

*A. pterocaulis*, Miq.; Mez Monog. Myrs. 111, a tree of the forests of the Sumatran mountains, much resembles this at first sight, but the leaves are bigger, the flower panicles much larger and more open, with shorter pedicels, and the nerves of the leaves do not meet in a prominent looped intramarginal nerve. (*Forbes* 1992 in Herb. Calc.)

17. *ARDISIA POROSA*, Clarke in Hook. f. Fl. Br. Ind. III. 522 (1882). A shrub, reaching 8 feet in height; branches flexuose, almost zigzag, winged by lines decurrent from the bases of the leaf-petioles. *Leaves* chartaceous; oblong, acute at apex, cuneate at base or sometimes rounded-acute; glabrous, pale beneath; entire, margin often recurved; glands small and obscure; 5 to 9 in. long, 1.5 to 2.5 in. broad; midrib rather slender, prominent beneath; main-nerves obscure, irregular, about

20 to 25 pairs; secondary faint, all arching upwards into an irregular intramarginal ring and reticulate; petiole .4 in. long, narrowly winged by the decurrent blade. *Inflorescence* a loose terminal few-flowered panicle up to 6 in. long; rachis flexuous; branches racemose, at right angles to rachis; peduncles 1 to 1.5 in. long, curving upwards; pedicels .5 to .7 in. long, slender, curved upwards; bracteoles minute, ovate, deciduous; flowers 3-5-, usually 4-merous; buds slender. *Calyx-lobes* ovate, .04 in. long, obscurely dotted; tube short. *Corolla-lobes* ovate-lanceolate, pink, .3 in. long by .1 in. broad, recurved in flower, not dotted but striate. *Stamens* as long as corolla-lobes; anthers very slender, opening by terminal pores as well as longitudinally; filaments very short, thick. *Ovary* conical, gradually passing into a slender style .25 in. long. *Berry* globose, .25 in. in diam., ribbed, glossy black when ripe. Koord. & Val. Bijdr. V. 260; Mez Monog. Myrs. 118.

PERAK: *Scortechini* 116, 1511; *King's Collector* 3108. MALACCA: *Griffith* (K.D.) 3578; *Maingay* (K.D.) 1012; *Wray* 39; *Goodenough* 1528; *Hervey*.

18. *ARDISIA DIVERGENS*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, and Fl. Ind. ed. Carey & Wall. II. 275. A small tree, reaching 20 feet in height; branchlets slender, smooth, rounded. *Leaves* chartaceous; elliptic or lanceolate, shortly acuminate at apex, rounded at base, drying reddish-brown; glabrous on both surfaces; entire, margins slightly incurved; glandular dots large, prominent, especially near the margin; 3 to 5 in. long, 1 to 2 in. broad; midrib prominent beneath; primary nerves 8 to 12 pairs, irregular, arched and joining in an intramarginal prominent nerve with a smaller, less prominent nerve near the edge; secondary nerves few, slender, reticulate; petiole .15 to .3 in. long, winged by the decurrent blade. *Inflorescence* a loose terminal rusty-pubescent panicle, 2 to 3 in. long, ultimate branches umbelled, 3-5-flowered; main peduncle .5 to 1 in. long, secondary peduncles about .5 in. with lanceolate leafy recurved bracts; pedicels about .4 in. long, thickened above, glandular; bracteoles ovate, deciduous; flowers red, buds short, conical. *Calyx-lobes* rounded, .05 in. in diam., ciliate, conspicuously dotted with few large, transparent, light brown glands; tube short. *Corolla-lobes* ovate, acute, .15 to .2 in. long, unequal in size, and oblique; tube very short, dots very few. *Stamens* a little shorter than the corolla-lobes; anthers large, ovate-acute; filaments very short. *Ovary* ovoid, glabrous, attenuated into a .1 in. long style. *Berry* round, smooth, somewhat depressed, tipped by the persistent style. Wall. Cat. 2269; A. DC. Prod. VIII. 130; Clarke in Hook. f. Fl. Br. Ind. III. 521; Mez Monog. Myrs. 117. *A. punctata*, Jack;

Roxb. Fl. Ind. ed. Carey & Wall. II. 275 (not of Lindl.). *A. punctulosa*, D. Dietr. Syn. Pl. I. 615; Miq. Fl. Ind. Bat. II. 1025.

PENANG: *Jack*; *Wallich* 2269; *Maingay* (K.D.) 1020; *Curtis* 1769.

19. *ARDISIA SUMATRANA*, Miq. Pl. Jungh. I. 195 (1853), Fl. Ind. Bat. II. 1018, and Suppl. 247. A large shrub or small tree, reaching 15 to 20 feet in height and 3 to 4 in. in diam. of stem; branches pale brown, smooth; branchlets minutely ferruginous-scaly. *Leaves* chartaceous; elliptic-oblong or -obovate, rather suddenly acute at apex, acute or cuneate at base; entire, glabrous; glands large, frequent near the margin; 3 to 6 in. long, 1.5 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 12 to 15 pairs, irregularly spaced, starting at an angle of about 50° with the midrib, curving upwards to and along the margin; secondary nerves and innovations indistinct; petiole .3 to .5 in. long, bordered above by the decurrent, often erose, margins of the blade. *Inflorescence* a compact, shortly pyramidal, 3 to 4 in. long, squarrosely bipinnate panicle; common peduncle none or scarcely .5 in. long; bracts minute, triangular; branch peduncles .7 to 1 in. long, minutely ferruginous-scaly as is the rachis; pedicels .2 to .3 in. long, slender; buds ovoid, conical; flowers waxy-white, pedicels and rachis pink. *Calyx-lobes* orbicular, .1 in. broad, ciliate, with scarios margins, much overlapping; glandular dots very few, scattered. *Corolla-lobes* shortly connate, ovate, acute, much twisted, .15 in. long; margins thin, denticulate; glands few, large and brown. *Stamens* about two-thirds the length of the corolla-lobes; anthers ovate-acute, .1 in. long, a few large black glands on the back. *Ovary* ovoid, glabrous; style subulate, .15 in. long. *Berry* bright red at first afterwards black, globose, shining, .2 in. in diam., smooth, faintly striate. *Scheff. Myrs.* 84; *Koord. & Val. Bijdr.* V. 268; *Mez Monog. Myrs.* 121.

PERAK: *King's Collector* 771, 5639, 10836.—*DISTRIB.* Sumatra, *Beccari* 325, 724; *Forbes* 2083 &c.; Java.

20. *ARDISIA LANCEOLATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, and Fl. Ind. ed. Carey & Wall. II. 275. A large glabrous shrub or small tree, reaching 15 to 25 feet in height; branches cylindric, pale, smooth; branchlets sometimes fugaciously ferruginous-scaly. *Leaves* coriaceous; elliptic-oblong or -obovate, shortly acuminate at apex, long-cuneate at base; entire or sometimes slightly crenate near the apex; glabrous on both surfaces; glandular dots large scattered, more numerous near the margins; 6 to 11 in. long, 2 to 3.5 in. broad; midrib prominent beneath, impressed above; main-nerves 12 to 15 pairs, oblique, starting at an angle of about 50° with the midrib, and at first more or less parallel, then arching upwards to join in an irregular intramarginal nerve; secondary nerves similar but shorter, reticulations scarcely prominent,

irregular; petiole .5 to .7 in. long, winged by the decurrent blade, the wings overlapping. *Inflorescence* a spreading, terminal or sometimes sub-axillary, panicle, 4 to 6 in. long; rachis flexuose, angular or flattened; branches stout, flattened, swollen at base, bearing corymbose racemes of about 7-8 flowers; pedicels .6 to 1 in. long, stout, narrowly clavate, striate, minutely ferruginous-pubescent; bracteoles small, obtuse, deciduous. *Calyx-lobes* orbicular, .2 in. in diam., enlarged and spreading in fruit, glabrous or slightly pubescent; margins scarious and fimbriate-ciliate, base thickened; glandular dots many, prominent; tube short. *Corolla* ovate acuminate, pink, much twisted in bud, .35 in. long, of which one-third tube; lobes unequal in size, oblique, dots not prominent. *Stamens* large, shorter than corolla-lobes; anthers ovate acute, dehiscing longitudinally, back with few large usually oblong prominent black glands. *Ovary* globose; style .1 to .2 in. long, subulate, twisted. *Berry* globose, depressed, smooth, .25 to .3 in. in diam., black when dry. Wall. Cat. 2292; A. DC. Prod. VIII. 126; Miq. Fl. Ind. Bat. II. 1025; Clarke in Hook. f. Fl. Br. Ind. III. 519; Mez Monog. Myrs. 122. *A. speciosa*, Bl. Bijdr. 684; A. DC. l.c. 133; Miq. in Pl. Jungh. I. 197 and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 88; Mez Monog. Myrs. 123. *A. purpurca*, Reinw.; Bl. Bijdr. 684; A. DC. l.c. 129; Miq. in Pl. Jungh. I. 197 and Fl. Ind. Bat. 1026; Scheff. Myrs. 88; Koord. & Val. Bijdr. V. 265. *A. Hasseltii*, Blume; Scheff. Myrs. 86; Mez Monog. Myrs. 123. *A. mucronata*, Bl. Bijdr. 685; A. DC. l.c. 126; Scheff. Myrs. 83; Koord. & Val. Bijdr. V. 269; Mez Monog. Myrs. 123. *A. Leschenaultii*, DC. l.c. 133; Miq. Pl. Jungh. I. 197 and Fl. Ind. Bat. II. 1022; Scheff. Myrs. 89. *A. plagioneura*, Scheff. Myrs. 85; Koord. & Val. Bijdr. V. 268.

PENANG: *Roxburgh*; *Curtis* 2755. PERAK: *Scortechini* 1824; *Wray* 192, 1401, 2480, 2863, 3659; *King's Collector* 2954, 3200, 4528, 4785, 6586, 6785, 8730, 10049. MALACCA: *Griffith* (K.D.) 3569, 3579; *Derry* 512, 1117. JOHORE: *Lake & Kelsall* 4033. SINGAPORE: *Major McNair*; *Cantley* 133; *Ridley* 6136, 6436.—DISTRIB. Java, Sumatra, Borneo, Celebes.

21. *ARDISIA LITTORALIS*, Andr. Repos. X. t. 630 (1811). A glabrous shrub of succulent character, reaching 8 to 10 feet in height; branches thick, rounded; buds lanceolate. *Leaves* succulent-coriaceous; obovate or oblong-obovate, rounded or bluntly acute or almost lanceolate at apex, cuneate at base; entire; glandular dots many, scattered, inconspicuous; 2 to 5 in. long, 1 to 2.5 in. broad; midrib prominent; main-nerves invisible in the fresh plant, obscure when dry, irregular, 13 to 18 pairs, at an angle of about 60° with the midrib, curved upwards to and along the margin; secondary nerves similar, slender, reticulations

obscure; petiole .3 in. long, thick, winged by the decurrent margins of the blade, which are often erose or wrinkled. *Inflorescence* of axillary umbellate racemes of about 8 flowers each, racemes shorter than the leaves, about 2 in. long; common peduncle about 1 in. long, usually recurved; pedicels .3 in. long, enlarged in fruit to .5 in. and then clavate thickened; bracteoles oblong, obtuse, deciduous; flowers rose-coloured, buds conica .4 in. long. *Calyx-lobes* orbicular, .1 in. in diam., ciliate, edges somewhat scarious, elsewhere thickly dotted with black glands, tube rather longer than lobes. *Corolla-lobes* ovate acuminate, oblique, unequal, lineolate and much gland-dotted, .3 in. long; tube short. *Stamens* nearly as long as corolla-lobes; anthers ovate, acute, united in a cone, opening longitudinally and obscurely septate in the cells; filaments short, on broad bases confluent into a ring adherent to the corolla-lobes. *Ovary* sub-globose, ending in a subulate style .3 in. long. *Berry* globose, depressed, .2 in. in diam., smooth, bright red, turning purplish-black when ripe; black glands many, small. Kurz For. Fl. II. 110 and Journ. As. Soc. Beng. XLVI. II. 226. *A. obovata*, Bl. Bijdr. 688; DC. Prod. VIII. 132. *A. humilis*, Clarke in Hook. f. Fl. Br. Ind. III. 529 (not of Vahl. and in part only); Mez Monog. Myrs. 127, fig. 20, A-E. *A. umbellata*, Roxb. Hort. Beng. 16; Fl. Ind. I. 582; Fl. Ind. ed. Carey & Wall. II. 273; Lodd. Bot. Cat. t. 531. *A. solanacea*, Wall. Cat. 2283A (part), 2283D (not of Roxb.). *A. polycephala*, Wight Ill. Ind. Bot. t. 145 (not of Wall.). *Climacandra obovata*, Miq. Pl. Jungh. I. 199, Fl. Ind. Bat. II. 1030; Scheff. Myrs. 05; Koord & Val. Bijdr. V. 271. *C. littoralis*, Kurz in Journ. As. Soc. Beng. XL. II. 68.

PENANG: Curtis 217; Phillips. PERAK: Wray 1866, 2373; *Scortechini* 1053; King's Collector 4960. MALACCA: Griffith; Maingay (K.D.) 1010; Hervey. KELANTAN: Ridley. PAHANG: Ridley 1638. SINGAPORE: Hullett 331, 649; Cantley 153.—DISTRIB. Malay Islands and eastwards to South China and the Philippines; westwards to Ceylon (C.P. 1803) and Travancore (Wight 1767).

*Climacandra multiflora*, Miq., and *C. salicifolia*, Miq., are probably only varieties of this species, which seems to be a coast shrub only.

22. *ARDISIA KUNSTLERI*, King & Gamble, n. sp. A shrub or small tree, usually 6 to 10 feet high, rising sometimes to 20 feet, and with a stem about 2 to 3 in. in diam.; branchlets thick, dark brown, uppermost and innovations rusty-pubescent; leaf-buds lanceolate. *Leaves* coriaceous-chartaceous; elliptic, or elliptic-oblong, shortly acuminate at apex, cuneate at base; minutely pubescent or scaly on both surfaces, afterwards glabrate; entire or obscurely undulate-crenate on the margins

which are somewhat reflexed; glandular dots many, prominent in the areolations of the leaves and along the margins; 8 to 15 in. long, 2·5 to 5 in. broad; midrib slender; main-nerves 20 to 24 pairs, irregularly spaced, starting at an angle of about 65° with the midrib, at first straight then curving upwards to and along the margin where they anastomose; secondary nerves usually one between each pair of main-nerves, reticulations oblique, all raised on the lower surface when dry; petiole 1 to 2·5 in. long, sometimes shorter, thick, channelled above by the decurrent margins of the blade, which are connivent. *Inflorescence* lateral or axillary, a ·5 to ·7 in. long corymbiform minutely pubescent raceme of about 18 to 22 flowers, on a thick flattened peduncle 2 to 4 in. long; bracts small, lanceolate, very early caducous; pedicels slender, clavate, ·7 to 1 in. long, curved upwards in flower downwards in fruit; buds ovoid, ·25 in. long. *Calyx-lobes* orbicular, ·1 in. long, margins scarious ciliate, covered with many black glandular dots; tube shorter than lobes, minutely pubescent without. *Corolla-lobes* dark blue without, pink within, ovate, acute, ·2 in. long, minutely ciliate, prominently dotted, tube ·05 in. long. *Stamens* shorter than corolla-lobes; filaments very short; anthers ovate acuminate, the connective studded on the back with prominent black glands in 2 rows. *Ovary* ovoid, glabrous; style slender, ·15 in. long. *Berry* globose, blueish-black, ·3 in. in diam., faintly striate when dry.

PERAK: *King's Collector* 2207, 2970, 3060, 3264, 4071, 4110, 6486; *Ridley* 9530.

This species is distinguished by its large elliptic leaves, comparatively small flowers, and large fruits, but comes in some respects near to *A. oxyphylla* and in others to *A. solanacea*, and to *A. polycephala*, Wall.

23. *ARDISIA SOLANACEA*, Roxb. *Cor. Pl.* 27. t. 27 (1795), *Hort. Beng.* 16, *Fl. Ind.* I. 580, and *Fl. Ind.* ed. Carey & Wall. II. 269. A large shrub, reaching 6 to 8 feet in height; bark ash-coloured, branches stout, glabrous, grey, somewhat angular, buds lanceolate. *Leaves* coriaceous; oblong or elliptic-oblong, acuminate at apex, cuneate at base, glabrous, entire; glandular dots many scattered in the areolations of the nerves and especially near the margin; 6 to 10 in. long, 2 to 3·5 in. broad; midrib slender, somewhat impressed above; main-nerves 12 to 20 pairs, unequally spaced, leaving the midrib at an angle of about 60°, at first straight but soon curving upwards to and along the margin and then anastomosing; secondary nerves many, rather prominent as are the reticulations; petiole stout, ·5 to ·8 in. long, channelled above by the decurrent and often connivent margins of the blade. *Inflorescence* of pedunculate corymbiform racemes, bearing 10 to 16 flowers, from the

axils of the upper leaves or of the scars of fallen leaves, 2 to 4 in. long; peduncle 1 to 2.5 in. long, stout, flattened above as is the very short rachis of the raceme; bracteoles concave, thin, prominently gland-dotted; pedicels .7 to 1 in. long, more or less clavate, slender at first, thicker in fruit; buds conical, .4 in. long. *Calyx-lobes* orbicular, ciliate, scarious on the margins, .15 to .2 in. long, prominently black-gland-dotted; tube nearly equal to lobes. *Corolla-lobes* pink, ovate, rounded, .3 to .35 in. long, prominently gland-dotted, minutely ciliate on the margins, otherwise glabrous; tube extremely short. *Stamens* about two-thirds the length of the corolla-lobes; filaments short, stout, conical; anthers ovate-sagittate, .2 in. long, acute, apiculate, the back of the connective studded with prominent large black glands in a double row. *Ovary* ovoid, glabrous; style slender, .25 in. long. *Berry* globose, dark blue or black, .3 in. in diam. Willd. Sp. Pl. I. 1063; Bot. Mag. t. 1677; Wall. Cat. 2283 A-K; Mez Monog. Myrs. 132, fig. 20 F-K; Cooke Bomb. Fl. II. 86. *A. humilis*, A. DC. in Trans. Linn. Soc. XVII. 118 (not of Vahl); Wight Ic. t. 1212; Dalz. & Gibs. Bomb. Pl. 137; Clarke in Hook. f. Fl. Br. Ind. III. 529 (in part); Brandis For. Fl. 287; Kurz in Journ. As. Soc. XLVI. II. 226, and For. Fl. II. 100; Prain Beng. Pl. 645. *A. elliptica*, Bedd. Fl. Sylv. p. CXXXVIII. (not of Thunb.).

PERAK: Wray 1900, 3000; King's Collector 6011.—DISTRIB. India, Burma.

VAR. *elata*, King & Gamble. A small tree reaching 25 to 35 feet in height, and 6 to 8 in. in diam. *Leaves* thinner, oblong-lanceolate; main-nerves less prominent than in the type. *Inflorescence* with rather longer stouter peduncles and more numerous flowers. *Berry* slightly larger.

PERAK: Scortechini 679; King's Collector 4717, 5770.

This variety is scarcely worthy of being classed as such, but, at any rate in the herbarium, the specimens are easily separable.

24. *ARDISIA LURIDA*, Blume Bijdr. 687 (1826). A large shrub, reaching 20 feet in height and 3 to 4 in. in diam. of stem; branchlets thick, glabrous, as are the lanceolate acuminate leaf-buds. *Leaves* entire, coriaceous; lanceolate- or sub-obovate-oblong, shortly acuminate at apex, gradually cuneate at base; glabrous and dark green above, pale and ferruginous-brown beneath; glands many, regularly scattered in the areoles of the net venation; 5 to 10 in. long, 1.5 to 2.5 in. broad; midrib prominent; main-nerves 16 to 20 pairs, slender, irregular, starting at about 60° with the midrib, parallel at first and then arched up to and along the margin where they meet; secondary nerves similar, reticulations obscure; petiole .4 to .7 in. long, winged by the decurrent edges of the blade, the

wings connivent above when dry. *Inflorescence* a short (2 to 3 in. long), axillary, few-flowered, sub-umbellate, minutely ferruginous-pubescent, peduncled raceme; peduncles 1 to 1.5 in. long, flattened; pedicels .4 to .6 in. in flower, longer in fruit and then clavate; flowers large, waxy, pinkish-white; buds rounded, .4 to .5 in. long. *Calyx-lobes* ovate-orbicular, emarginate, scarious and ciliate at the edges, puberulous outside, .2 in. in diam., glandular dots conspicuous, of various sizes, black and brown mixed; tube short. *Corolla-lobes* ovate, obtuse, oblique, concave and keeled, .4 in. long, .2 in. broad, glandular dots and lineoles prominent, tube very short. *Stamens* two-thirds as long as petals; anthers hastate, mucronate, opening by longitudinal slits, prominently dotted on the back with large black glands. *Ovary* rounded, ending in a short subulate style. *Berry* globose, apiculate, .4 in. in diam., smooth, gland-dotted. A. DC. Prod. VIII. 130; Miq. Fl. Ind. Bat. II. 1019; Scheff. Myrs. 71; Koord. & Val. Bijdr. V. 245; Mez Monog. Myrs. 130.

PERAK: Ridley 7172, 10319.—DISTRIB. Java.

25. *ARDISIA OXYPHYLLA*, Wall. Cat. 2291 (1829). A shrub; branchlets rounded, smooth; buds narrowly lanceolate, glabrous. *Leaves* chartaceous; elliptic, acute or shortly acuminate at apex, acutely narrowed at base, entire; glabrous above, glabrous beneath except for a few minute scales; glandular dots many, especially near the margin; 3 to 7 in. long, 1 to 2.5 in. broad; midrib slender, prominent; main-nerves about 16 pairs, irregular, usually at about an angle of 60° with the midrib, more or less parallel at first, then arching nearly to the margin; secondary nerves slender, like the main-nerves, reticulations irregular; petiole .4 to .7 in. long, winged by the decurrent margins of the blade. *Inflorescence* an axillary, long-peduncled, short, few-flowered (5 to 8) subumbellate raceme, about 2 to 4 in. long; peduncles 1 to 2 in. long, angular when dry; pedicels .4 in. long, .7 in. in fruit, slender; buds rounded, .3 in. long. *Calyx-lobes* ovate-rotundate, obtuse, .1 in. in diam., ciliate on the scarious edges, prominently dotted with numerous black and brown glands; tube short. *Corolla-lobes* broadly ovate, sub-acute or obtuse, oblique, .25 to .3 in. long, prominently dotted with many black or brown round glands and fewer elongate lineolate ones. *Stamens* nearly as long as corolla-lobes, almost quite sessile; anthers sagittate, long-acute, the connective prominently marked on the back with large black conspicuous glands. *Ovary* rounded, ending in a short .15 in. long style, glabrous. *Berry* globose, .3 in. in diam., fleshy, smooth. A. DC. in Trans. Linn. Soc. XVII. 120, Prod. VIII. 130; Clarke in Hook. f. Fl. Br. Ind. III. 528 *variety excepted*; Stapf in Trans. Linn. Soc. Ser. 2. IV. 204; Mez Monog. Myrs. 131.

PENANG: *Wallich* 2291; *Curtis* 668; *Ridley* 7093. PERAK: *King's Collector* 5624, 5913, 5929, 6185, 8218, 10504. PROVINCE WELLESLEY: *Ridley* 6953.—DISTRIB. Andamans or Tenasserim, *Helper* (K.D.) 3571, 3585; Borneo.

26. *ARDISIA SCORTECHINII*, King & Gamble, n. sp. A tree reaching 40 to 50 feet in height and 8 to 12 in. in diam.; branchlets round, dark brown, lenticellate, leaf-buds acuminate. *Leaves* entire, coriaceous; obovate, acute at apex, cuneate at base; glabrous, margins incurved; glandular dots many, obscure; 5 to 7 in. long, 1.5 to 2 in. broad; midrib prominent slender; main-nerves 14 to 16 pairs, very oblique, at about 30° to the midrib, curved upwards and joining parallel to the margin; secondary nerves similar but more slender, reticulations curved, surrounding the dots; petiole .4 in., rather broadly edged by the decurrent margins of the blade, which are nearly connivent above; stipules leafy, more or less persistent. *Inflorescence* 2 in. long, of short axillary peduncled, umbellate racemes 8–12-flowered, in the axils of short leafy bracts; peduncles thick, about 1 in. long, flattened; pedicels .5 in., thickened and longer in fruit; bracteoles ovate, acute, boat-shaped, deflexed, persistent; flowers reddish-pink. *Calyx-lobes* orbicular, obtuse, .2 to .25 in. long, emarginate, ciliate, scarious on the edges, with many parallel veins and many prominent round or oblong mixed black and brown glandular dots; tube short. *Corolla-lobes* ovate, acute, oblique, .35 in. long, unequal, with very few dots, some round some lineolate, tube very short. *Stamens* shorter than corolla-lobes; anthers long acuminate, villous on the connective on both sides, back marked with large black glands; filaments short, very thick. *Ovary* ovoid, surmounted by the conical, subulate, .2 in. long, glabrous style. *Berry* globose, smooth, .3 in. in diam., bluish black.

PERAK: *Scortechini*; *King's Collector* 4662, 4672—on rich soil, in dense jungle, up to 800 feet.

27. *ARDISIA PENDULA*, Mez Monog. Myrs. 125 (1901). Apparently a shrub; branchlets thick, glabrous below, ferruginous-pubescent at the extremities, leaf-buds lanceolate, ferruginous-pubescent. *Leaves* chartaceous; elliptic lanceolate, long acute at apex, cuneate at base; entire but sometimes very faintly crenate near the apex; glabrous above, glabrous or slightly ferruginous-pubescent beneath; glandular dots scattered, more numerous and prominent near the margins; 4 to 7 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves 10 to 12 pairs, irregular, starting from the midrib at about an angle of 60°, then arching upwards and joining near the margin; secondary nerves slender, minor nerves reticulate; petiole .3 to .5 in. long, winged by the decurrent edges of the blade. *Inflorescence* of 3 to 5 in. long axillary peduncled ferruginous-

pubescent racemes; peduncles about 2 in., pedicels .4 to .5 in. long, curved. *Calyx-lobes* ovate, rounded, with many glandular dots, .1 in. long; tube short. *Corolla-lobes* ovate-elliptic, rounded, much gland-dotted. *Stamens* shorter than the petals; anthers acute, dotted on the back; filaments very short. *Ovary* ovoid, glabrous. *Berry* globose, black when dry, .25 in. in diam., much gland-dotted. *A. attenuata*, Miq. Fl. Ind. Bat. II. 1020 and Suppl. I. 575 (not of Wall.); Scheff. Myrs. 68. *A. reclinata*, Blume; Scheff. l.c.

MALACCA: *Goodenough* 1295.—DISTRIB. Java, Sumatra. A poor specimen only available.

28. *ARDISIA HULLETTII*, Mez Monog. Myrs. 130 (1901). Apparently a shrub; branchlets light brown, round, smooth; leaf-buds lanceolate, glabrous, black. *Leaves* membranous; oblong-lanceolate, acuminate at apex, acuminate narrowed at base; entire, glabrous on both surfaces; glands light-brown, large, in the areoles of beautifully netted venation; 4 to 7 in. long, 1.5 to 2 in. broad; midrib slender; impressed above; main-nerves many, slender, irregular, 20 to 24 pairs, parallel at first and then arching upwards and joining in a narrow intramarginal ring; secondary nerves many, like the main-nerves, reticulations numerous; petiole .4 in. long, slender, only very narrowly winged. *Inflorescence* an axillary, short, few- (1-5) flowered, glabrous, umbellate raceme, peduncle .5 to .7 in. long; pedicels .5 in. long, recurved, more or less clavate; buds conical, .3 to .4 in. long. *Calyx-lobes* scarcely overlapping, ovate-orbicular, ciliate, .1 to .15 in. long, minutely gland-dotted; tube short. *Corolla-lobes* ovate-acuminate, upper edges incurved, oblique, unequal, many-nerved, sparsely black-gland-dotted; tube very short. *Stamens* a little shorter than the corolla-lobes; anthers oblong, mucronate, with 2 lines of prominent black glands on the back; filaments short, spreading at base. *Ovary* ovoid, thick, glabrous; style short, subulate. *Berry* brown, smooth, globose, .2 in. in diam., seed white-ringed at base.

MALACCA: on Mount Ophir, *Hullett* 769, 778.

29. *ARDISIA OBLONGIFOLIA*, King & Gamble, n. sp. A shrub; branchlets brown, glabrous, with faint decurrent raised lines from either side of the insertion of the leaf-petioles; leaf-buds lanceolate acuminate. *Leaves* chartaceous; oblong, acute at apex, cuneate at base; glabrous, entire; glandular dots scattered but not prominent except near the margins which are reflexed; 7 to 10 in. long, 2 to 2.5 in. broad; midrib prominent, impressed above; main-nerves 22 to 26 pairs, starting at an angle of nearly 80° from the midrib, at first straight and near the margin curving upwards to and along it; secondary nerves many, usually at least 1 to 2 between each pair of main-nerves, reticulations in an elegant network;

petiole rather slender, .8 to 1 in. long, bordered above by the decurrent margins of the blade. *Inflorescence* an axillary corymbose raceme of about 8 flowers and about .5 in. long on a 1.5 to 2 in. long flattened peduncle; pedicels .75 in. long, clavate. *Calyx-lobes* orbicular, ciliate, gland-dotted, about .1 in. long; tube as long; rest of flowers unknown. *Berry* globose, .2 in. long, glandular-dotted.

PERAK: at 1,000 feet, *Wray* 3797.

30. *ARDISIA TETRASEPALA*, King & Gamble, n. sp. A shrub; branchlets slender, pale brown, with indistinct raised lines from the sides of the leaf-petioles, sinuate, slightly scaly above. *Leaves* chartaceous; elliptic or elliptic-ovate, gradually acuminate at apex, rounded at base; glabrous above, pale brown when dry, very slightly pubescent on and near the midrib beneath; glandular dots many scattered, prominently raised on the upper surface, margins slightly recurved; 4.5 to 6.5 in. long, 1.5 to 2.5 in. broad; midrib prominent below; main-nerves about 16 to 20, irregularly spaced, starting at an angle of 60° from the midrib, curved upwards, dividing and anastomosing with the secondary nerves in a marginal network, all raised beneath; petiole .2 to .3 in. long, channelled above. *Inflorescence* a pseudo-terminal subumbellate 8-12-flowered scarcely .2 in. long raceme in the axil of the uppermost leaf; peduncle about .5 in. long, pedicels slender, about .5 in. long. *Calyx-lobes* 4, ovate-orbicular, ciliate, gland-dotted, about .1 in. long, reflexed in fruit: rest of flower unknown. *Berry* globose, .25 in. in diam., black when dry and prominently dotted with oblong glands.

JOHORE: at Jaffaria and Gunong Palai, 1,500 feet, *G. King*.

We place this species in *TINUS* instead of in *TINOPSIS* because not only does the inflorescence seem to be only apparently terminal but its sub-umbellately racemose character seems to approximate more nearly to that of the former section.

31. *ARDISIA BIFLORA*, King & Gamble, n. sp. A small shrub, 4 to 8 feet high; branches smooth, pale brown; branchlets divaricate, slender. *Leaves* chartaceous; oblong-lanceolate, acuminate at both apex and base; glabrous; entire or very faintly crenulate; glandular dots many, black, large, in the areoles of the reticulations; 3 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 12 to 14 pairs, at an angle of about 55° with the midrib, curving upwards to and along the margin where they meet in a wavy intramarginal nerve; secondary nerves many, reticulations irregular; petiole slender, .2 to .5 in. long, sometimes longer. *Inflorescence* a lateral, 2-flowered, pedunculate umbel, 1.5 in. long; peduncle and pedicels each .75 in. long, slender. *Calyx-lobes* ovate, scarious and ciliate on the margins, prominently gland-dotted, .05 in. long; tube as long; rest of flower unknown. *Berry*

black, globose, .25 in. in diam., ribbed and prominently gland-dotted.

PERAK : in dense jungle on limestone hills at 300 to 800 feet, *King's Collector* 4296, 4711 ; *Wray* 3343. It is very near *A. paupera*, Mez, of Sumatra, but the long slender peduncle and pedicels distinguish it.

A specimen collected by Scortechini (without number) has similar leaves, but the inflorescence is pseudo-terminal and branched, with more than 2 flowers and very short pedicels.

Ridley's No. 2670 from Pahang seems to be *Ardisia rhynchophylla*, Clarke, but the specimen is imperfect, and we hesitate to describe it as a Malay plant.

32. *ARDISIA TAHANICA*, King & Gamble, n. sp. A shrub (?); branchlets brown, shining, somewhat flattened; innovations scaly and hirsute, leaf-buds ferruginous-pubescent, lanceolate. *Leaves* chartaceous; linear-lanceolate, acuminate at both ends; glabrous above, scaly beneath and slightly pubescent along the midrib; margins entire, recurved; glandular dots numerous, scattered, conspicuous on the under surface; 4 to 6 in. long, .7 to .9 in. broad; midrib slender; main-nerves obscure, about 12 pairs, starting at a very oblique angle and curving upwards to and along the margin; secondary nerves similar, reticulations obscure; petiole slender, .4 to .6 in. long. *Inflorescence* an umbellate peduncled raceme, 1.5 to 2 in. long, from the axils of some of the upper leaves; peduncle slender, .7 to 1.2 in. long; flowers about 5-8, pedicels slender, .5 in. long. *Calyx-lobes* semi-orbicular, scarious and ciliate on the margins, rusty-pubescent on the back and with many glandular dots, .05 in. long; tube as long as lobes: rest of flower not seen. *Berry* globose, depressed, .2 in. in diam., prominently striate.

PAHANG : *Ridley* 2669, in Tahan woods.

*Goodenough* No. 10552, from Selangor, is also possibly the same species, but the leaves reach 1.5 in. in breadth and the peduncle and pedicels are stouter.

33. *ARDISIA VILLOSA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 582, and Fl. Ind. ed. Carey & Wall. II. 274. A small shrub, reaching 6 to 8 feet in height; branchlets rounded, from nearly glabrous to densely ferruginous-pilose, the hairs moniliform. *Leaves* chartaceous; oblong-lanceolate or lanceolate, acute or acuminate at apex, cuneate at base; more or less distinctly but shallowly crenate, the crenations broad, margins recurved; glabrous to minutely rusty-hirsute above, densely red-villous beneath, especially on the nerves; glandular dots many, black, prominent; 4 to 8 in. long, .75 to 2.5 in. broad; midrib prominent; main-nerves 8 to 12 pairs, very irregular, slender, obscure, arching upwards and ending in the crenature-glands; secondary nerves similar, meeting the main-nerves, reticulations faint; petiole .4 to .8 in.

long, rusty-villous. *Inflorescence* a sessile or short-peduncled, more or less rusty-villous, umbellate raceme at the end of the main branchlets or at the ends of long-peduncled axillary 2-leaved branchlets; bracts ovate-lanceolate, .1 to .2 in. long, deciduous; pedicels .3 to .4 in. long, secund; buds conical. *Calyx-lobes* pink, linear-oblong or lingulate, obtuse or slightly acute, .25 to .3 in. long, .075 in. broad, glabrous to thickly rusty-villous, apex often recurved, glandular lines and dots scattered; tube exceedingly short. *Corolla-lobes* pale pink, ovate-acute or -acuminate, .25 to .3 in. long, prominently dotted with round or oblong glands, much twisted in bud; tube short. *Stamens* shorter than the petals, .2 in. long; anthers ovate, acuminate, dehiscing by wide pores in the upper half; filaments very short. *Ovary* globose, crowned by a slender .2 in. long style, the base of the style and top of ovary minutely pubescent. *Berry* globose, .25 in. in diam., bright red, sparingly pubescent. A. DC. Prod. VIII. 136; Wall. Cat. 2280A; Miq. Pl. Jungh. 191, Fl. Ind. Bat. II. 1017; Scheff. Myrs. 90; Kurz in Journ. As. Soc. Beng. XLVI. ii. 227 and For. Fl. II. 113; Clarke in Hook. f. Fl. Br. Ind. III. 525 var. *excepted*; Koord. & Val. Bijdr. V. 253. *A. vestita*, Wall. in Roxb. Fl. Ind. ed. Carey & Wall. II. 274; A. DC. l.c.; Miq. l.c.; Mez Monog. Myrs. 141. *A. mollis*, Bl. Bijdr. 689. *A. tavoyana*, A. DC. in Trans. Linn. Soc. XVII. 125.

PENANG: *Maingay* (K.D.) 1011; *Ridley* 9357; *Curtis* 1597. PERAK: *Scortechini* 638; *Wray* 151, 862, 2967, 3149; *King's Collector* 1819, 3138, 6104, 6448, 7915, 10052. PAHANG: *Ridley* 2176. SELANGOR: *Ridley* 1558; *Curtis*. MALACCA: *Griffith* (K.D.) 3588; *Hervey*; *Ridley*; *Cuning* 2390. SINGAPORE: *Ridley*, 2833, 2816.—DISTRIB. Burma, Sumatra, Java, Borneo, and eastwards to Tonkin and Hainan.

VAR. *glabrata*, Kurz l.c. *Leaves*, at least when full grown, glabrous. *Calyx* glabrous or nearly so. Stapf in Trans. Linn. Soc. Ser. 2, IV. 204. *A. glabrata*, Bl. Bijdr. 692; A. DC. Prod. VIII. 136; Miq. Fl. Ind. Bat. II. 1022.

PERAK: *Ridley* 2899; *Wray* 2801, 3414; *King's Collector* 949, 4612, 6188, 6255, 7696; *Scortechini* 315.—DISTRIB. Java, Sumatra, Borneo.

*Ridley's* 5510 from Kedah seems to be a form of this with smaller leaves and shorter calyx-lobes, but can hardly be separated as a second variety.

34. ARDISIA VIRENS, Kurz For. Fl. II. 575 (1877), and Journ. As. Soc. Beng. XLVI. ii. 226. A small glabrous shrub; branchlets slender, pale, somewhat compressed and twisted. *Leaves* membranous, oblong or oblong-lanceolate, acuminate at apex, cuneate at base; faintly

crisped-crenulate with large glands in the crenulations; pale and glabrous on both surfaces; glandular dots scattered, in the areoles of the reticulations; 4 to 6 in. long, 1.5 to 2 in. broad; midrib prominent, somewhat impressed above; main-nerves about 12 to 14 pairs, irregular and irregularly spaced, usually starting at an angle of about 60° with the midrib, at first straight, branching and joining in an intramarginal nerve close to the margin and passing through the crenature glands; secondary nerves many, slender, reticulations many, curved; petiole .4 to .6 in. long, winged by the decurrent margins of the blade. *Inflorescence* an almost sessile terminal corymb, composed of long-peduncled sub-umbellate racemes; peduncles 1 to 1.5 in.; pedicels .5 to .8 in. long; buds conical .25 in. long. *Calyx-lobes* oblong, obtuse, thin, .075 in. long, conspicuously dark-brown-gland-dotted; tube short. *Corolla-lobes* ovate, bluntly acuminate, oblique, unequal, conspicuously marked by few dark brown lines and dots, .3 in. long; tube very short. *Stamens* shorter than corolla-lobes, .2 in. long, obtusely hastate; anthers opening by broad longitudinal slits, conspicuously black-gland-dotted on back; filaments short. *Ovary* rounded, style slender, .2 in. long. *Berry* globose, pale, somewhat depressed, .3 to .4 in. in diam., conspicuously marked with round or oblong purple dots, somewhat fleshy. Clarke in Hook. f. Fl. Br. Ind. III. 524; Stapf in Trans. Linn. Soc. Ser. 2, IV. 203; Mez Monog. Myrs. 147.

PERAK: *Wray* 1444 at 2,000 feet.—DISTRIB. Assam, Cachar, Manipur, Yunnan, Borneo.

35. *ARDISIA WRAYI*, King & Gamble, n. sp. A single-stemmed treelet or shrub reaching 5 feet in height, but usually smaller; upper part of stem .25 in. thick, brown, with spongy bark and scurfy scales; leaf-buds glabrous, lanceolate-acuminate. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, long cuneate at base; margins recurved; somewhat scaly on both surfaces, scurfy along the midrib beneath; glandular dots prominent scattered; broadly crenate, the crenatures shallow with large glands; deep green above, red or purple beneath; 6 to 10 in. long, 1.5 to 3 in. broad; midrib slender; main-nerves 12 to 20 pairs, irregular in angle and distance, curving upwards to and along the margin where they or their branches end in the glands of the crenatures; secondary nerves few, reticulations many scarcely prominent; petiole .7 to 1.3 in. long, somewhat flattened, bordered by the decurrent margins of the blade. *Inflorescence* of glabrous sub-umbellate racemes from the axils of the uppermost leaves, usually crowded so as to present almost the appearance of a terminal cluster; peduncles usually .5 in. long, occasionally shorter but often longer, even up to 2 in., flattened; racemes very short, much marked by the scars of very

caducous bracteoles; flowers 8 to 12; pedicels slender below, flattened above, twisted and curved, .3 to .4 in. long; buds ovoid. *Calyx-lobes* ovate, acute, .1 in. long, prominently black-gland-dotted. *Corolla-lobes* waxy, reddish or purple, ovate, .15 to .2 in. long, sparsely gland-dotted. *Stamens* nearly as long as corolla-lobes; filaments very short, thick; anthers ovate, acute, connective much gland-dotted on back. *Ovary* rounded; style short, slender, glabrous. *Berry* globose, red, rugose, .3 in. in diam., prominently gland-dotted when dry.

PERAK: *Wray* 438, 2795, 3280, 4051; *Scortechini* 418; *King's Collector* 1888, 3631, 6938, 7514, in dense jungle on rich soil, both in low-level localities and up to 4,000 feet in the mountains; one specimen, rather more slender, thinner and more glabrous, from the top of rocks (K.C. 7514).

K.C. No. 6938 from mountains at 3,000 to 4,000 feet, has the main-nerves nearly at right angles to the midrib, while other specimens have it at 60° or even 45°; these are, however, intermediate, and all that can be said is that the character is a variable one. The species seems to resemble the *A. macrocarpa*, Wall., of Northern India, in its habit of growth.

36. *ARDISIA MINOR*, King & Gamble, n. sp. Apparently a short (12 to 18 in. high) treelet or undershrub; lower part of stem with side rootlets; stem .2 to .25 in. thick, rusty-pubescent, dark brown. *Leaves* coriaceous; elliptic, long caudate-acuminate at apex, attenuate or cuneate at base often unequally; margins recurved, very shallowly crenate, the crenatures with large prominent glands; glabrous on both surfaces but somewhat scaly; 5 to 7 in. long, 2 to 2.5 in. broad; midrib slender; main-nerves about 15 pairs, starting at an angle of about 50° with the midrib, and thence straight to the margin where they or their branches end in the crenature glands; secondary nerves similar to the main-nerves, reticulations oblique, all raised beneath when dry; petiole thick, rugose, rusty-pubescent, .7 to 1 in. long, winged by the decurrent margins of the blade. *Inflorescence* of very short, rusty-pubescent, umbellate racemes of about 5 to 6 flowers from the axils of the uppermost leaves; peduncle scarcely .2 in. long, thick; racemes about .2 in. long; bracteoles many, ovate or oblong, recurved; pedicels thick, .3 to .4 in. long, flattened, recurved. *Calyx-lobes* ovate acute, .1 to .15 in. broad, glabrous, prominently gland-dotted, nearly free. *Corolla-lobes* ovate acute, .2 in. long, glabrous, dotted prominently with large black glands. *Stamens* shorter than corolla-lobes; filaments very short, thick; anthers oblong acuminate, the connective gland-dotted at the back, .1 in. long. *Ovary* rounded, glabrous; style .1 in. long, subulate. *Berry* not known.

PERAK: *Scortechini*.

Very near *A. Wrayi*, but differs especially in the coriaceous leaves and the shorter and much thicker pedicels.

37. *ARDISIA PERAKENSIS*, King & Gamble, n. sp. A small bush; branchlets pale brown, smooth, wrinkled when dry; innovations densely rusty-glandular-pubescent. *Leaves* membranous; elliptic-lanceolate, long acute both at apex and base; nearly glabrous on both surfaces but with small peltate scales, young leaves rusty-glandular-pubescent; margin slightly recurved, shortly and shallowly crenate or nearly dentate except on the lower third and at the apex, glands in the crenatures present, obscure; glandular dots absent or very sparse; 2·5 to 4 in. long, ·75 to 1·25 in. broad; midrib slender; main-nerves about 16 pairs, rather irregular in angle and distance, meeting near the margin in an irregularly looped intramarginal nerve, reticulations many, transverse, all raised on lower surface; petiole slender, ·2 to ·4 in. long, bordered by the decurrent margins of the blade. *Inflorescence* of small, 2-3-flowered, rusty-glandular, pubescent, pedunculate umbels from the axils of upper leaves or of reduced bract-like leaves; peduncles ·3 in. long; pedicels ·1 to ·2 in. long; bracteoles ovate, minute; buds ovoid, pale pink. *Calyx-lobes* triangular-ovate, acute, minutely pubescent and gland-dotted, ·05 in. long. *Corolla-lobes* ovate, acute, ·1 to ·15 in. long, glabrous, sparsely black-gland-dotted. *Stamens* a little shorter than corolla-lobes; filaments almost none; anthers ovate, acute, ·1 in. long. *Ovary* rounded, glabrous; style subulate, ·075 in. long. *Berry* not known.

PERAK: at 300 feet in Upper Perak, *Wray* 3462.

38. *ARDISIA MEZIANA*, King & Gamble, n. sp. A herbaceous under-shrub, 1 to 2 feet in height, stem 2 in. in diam.; bark soft, pale brown, upper parts and innovations rusty-glandular-pubescent. *Leaves* chartaceous; elliptic-obovate, shortly and abruptly acuminate at apex, cuneate at base; glabrous above, sparsely glandular-pubescent beneath; margins rather narrowly crenate-dentate except in the lower third to half and at the acumination, recurved, glands in the crenatures obscure; glandular dots many, scattered, inconspicuous; 3·5 to 5·5 in. long, 1·5 to 2 in. broad; midrib slender; main-nerves 10 to 14 pairs, at an angle of about 60° with the midrib, at first straight afterwards curved upwards to anastomose near the margin; secondary nerves few, reticulations oblique, all more or less raised on both surfaces when dry; petiole ·3 to ·5 in. long, somewhat thickened below, densely rusty-glandular-pubescent. *Inflorescence* of very short, sessile, rusty-glandular-pubescent racemes of about 6 flowers each, in the axils of the leaves all

down the stem, the racemes  $\cdot 1$  to  $\cdot 15$  in. long; bracteoles ovate, scarious, conspicuously black-gland-dotted and ciliate; pedicels short,  $\cdot 1$  to  $\cdot 15$  in. long, stout; buds ovoid; flowers waxy-white. *Calyx-lobes* 5, ovate, acute, ciliate, hyaline, with conspicuous black dots,  $\cdot 05$  in. long; tube as long as lobes. *Corolla-lobes*, ovate, blunt,  $\cdot 1$  in. long, conspicuously black-gland-dotted; tube very short. *Stamens* nearly as long as corolla-lobes; filaments short, thick; anthers ovate-lanceolate, long apiculate, the connective studded on the back with large black glands. *Ovary* rounded, style filiform as long as corolla. *Berry* not seen.

PERAK: on limestone rocks in open jungle at 500 to 800 feet, *King's Collector* 5838.

We have dedicated this well-marked species to C. Mez, whose Monograph of MYRSINÆ has done so much for the elucidation of the Natural Order, and whose study of *Ardisia* in particular has been of so much help to us.

39. *ARDISIA RIDLEYI*, King & Gamble, n. sp. A slender shrub or treelet, reaching 10 to 15 feet in height and about 1 in. in diam.; branchlets dark brown, slender, minutely ferruginous-pubescent; leaf-buds lanceolate, densely ferruginous-pubescent. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, acuminate or somewhat rounded at base; prominently crenate, the crenatures usually regular, margin slightly recurved; glabrous on both surfaces; glandular dots few, scattered; 4 to 8 in. long,  $1\cdot 25$  to  $1\cdot 75$  in. broad; midrib slender; main-nerves about 12 pairs, at irregular angles and spaces, ending in the crenatures of the margin; secondary nerves and reticulations obscure; petiole  $\cdot 2$  to  $\cdot 7$  in. long, bordered by the decurrent margins of the blade. *Inflorescence* a 3-6-flowered, sessile, umbellate raceme in the axil of the uppermost leaf of the branchlets; raceme about  $\cdot 2$  in. long; pedicels slender,  $\cdot 7$  to  $1\cdot 4$  in. long, minutely rusty-pubescent; buds ovoid, acute. *Calyx-lobes* 5, broadly triangular, acute,  $\cdot 075$  in. long, sparsely black-gland-dotted, rusty-pubescent. *Corolla-lobes* broadly ovate, acute,  $\cdot 15$  in. long, glabrous, densely and closely black-gland-dotted. *Stamens* a little shorter than the corolla-lobes; filaments very short, thick; anthers oblong, hastate, mucronate,  $\cdot 1$  in. long. *Ovary* rounded, glabrous, style slender,  $\cdot 05$  in. long. *Berry* dark red, ovoid, apiculate, sparsely striate and gland-dotted,  $\cdot 25$  to  $\cdot 3$  in. in diam.

PERAK: in dense forest at 2,500 to 4,500 feet, *Wray* 209; *King's Collector* 5019. SELANGOR: *Ridley* 8534. SINGAPORE: *Ridley* 6434.

Very like *A. crenata* var. *angusta* but has broader and thinner leaves, differently nerved.

40. *ARDISIA CRENATA*, Roxb. Hort. Beng. 85 (1814), Fl. Ind. I. 583, 358

and Fl. Ind. ed. Carey & Wall. II. 276. An evergreen small glabrous shrub; branchlets thick, somewhat fleshy, striate with faint lines decurrent from the bases of the leaves; leaf-buds small, conical. *Leaves* chartaceo-coriaceous; lanceolate to oblong-lanceolate, acute or sub-obtuse at apex, acuminate narrowed at base; margins crispately crenate with glands in the crenatures, recurved; glabrous on both surfaces; glandular dots scattered in the areoles of minor nerves, sometimes prominent, often obscure; 2 to 4 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves 10 to 14 pairs, irregular, slender, arching upwards and joining in an intramarginal nerve close to the margin which passes through the crenature glands; secondary nerves similar but fainter, reticulations curved; petiole .2 in. long, narrowly winged by the crisped edges of the decurrent blade. *Inflorescence* of short, sessile or shortly peduncled, paniced racemes, springing from the branchlets just below the terminal pair of leaves; pedicels .2 to .4 in. long, slender, longer and thicker in fruit, generally recurved; buds conical, .15 to .2 in. long; flowers 4- or 5-merous, waxy pink or white. *Calyx-lobes* ovate, .05 to .1 in. long, scarious at the edges, dotted with black glands in the middle; tube very short. *Corolla-lobes* rose-pink, ovate-oblong, bluntly acuminate, .2 in. long, oblique, unequal, sparsely dotted with round or elongated glands, sometimes papillose at the base within. *Stamens* shorter than corolla-lobes; anthers ovate-oblong, acute, with few glands on the back; filaments very short. *Ovary* ovoid, surmounted by a twisted subulate slender style .15 in. long. *Berry* globose, .25 in. in diam., scarlet, succulent, obscurely striate, crowned by the persistent style. Wall. Cat. 2262; Bot. Mag. t. 1950; Clarke in Hook. f. Fl. Br. Ind. III. 524; Koord. & Val. Bijdr. VI. 190. *A. glandulosa*, Bl. Bijdr. 690 (not of Roxb.). *A. crenulata*, Lodd. Bot. Cat. t. 2 (not of Vent.). *A. crispa*, A. DC. in Trans. Linn. Soc. XVII. 124 and Prod. VIII. 134; Scheff. Myrs. 72; Miq. Fl. Ind. Bat. II. 1020; Kurz in Journ. As. Soc. Beng. XLVI. ii. 226 and For. Fl. II. 113; Mez Monog. Myrs. 144, fig. 22. *A. densa* and *A. polysticta*, Miq. Fl. Ind. Bat. Suppl. 575, 576. *Bladhia crispa*, Thunb. Fl. Jap. 97; Kaempf. Ic. Pl. Jap. t. 7.

KEDAH: *Ridley* 5517. PENANG: *Wallich* 2262; *Maingay* (K.D.) 1009; *Phillips*; *Curtis* 337; *Deschamps*; *G. King*; *J. Scott*. MALACCA: *Griffith* (K.D.) 3583/1; *Cuming* 2254; *Hullett* 637; *Derry* 944. PERAK: *Scortechini*; *Wray*, 1257; *King's Collector* 1337, 4180, 4903, 7847, 8706, 10566. SELANGOR: *Ridley* 10553. PAHANG: *Ridley* 24; *Haviland*. JOHORE: *Fox* 11285.—DISTRIB. Assam, Burma, Sumatra, Java, Borneo, and eastwards to South China and Japan. *Ridley* (Trans. Linn. Soc. III. (1893) 317) says the berries are "sweet and eatable."

VAR. *angusta*, Clarke, l.c. *Leaves* narrowly lanceolate; flowers in a simple umbellate raceme, pedicels divaricate, buds obtuse.

MALACCA: *Griffith* (K.D.) 3584.

41. *ARDISIA ROSEA*, King & Gamble, n. sp. A small shrub reaching 4 to 6 feet in height; branchlets divaricate, purplish-brown when dry, glabrous; buds lanceolate. *Leaves* membranous; elliptic, cuspidately acuminate at apex, cuneate at base; broadly crenate with shallow crenatures and prominent glands, the margin recurved; glabrous on both surfaces; glandular dots extremely numerous, prominent on the under surface which is paler than the upper when dry; 2 to 4 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves obscure, 8 to 12 pairs, irregular, branching and usually ending in the crenature-glands; secondary nerves and reticulations indistinct; petiole red, slender, .25 to .5 in. long, bordered by the decurrent crisped margins of the blade. *Inflorescence* a corymbiform terminal or pseudo-terminal panicle of umbellate racemes, the branches divaricate, minutely rusty-pubescent; common peduncle, above the last leaf, short, about .05 in.; branch peduncles slender, .5 to 1 in. long; pedicels slender, .2 to .4 in. long, up to .5 in. long in fruit, flattened in flower; flowers in each umbel about 12, usually recurved; buds ovoid, acute. *Calyx-lobes* 5, triangular-ovate, .05 in. long, glabrous, not glandular; tube as long as lobes, lobes reflexed in fruit. *Corolla-lobes* waxy-white tinged with pink, or pink only, ovate-acuminate, .2 in. long, much twisted to the left, not glandular. *Stamens* nearly as long as corolla-lobes; filaments slender, .05 in. long; anthers ovate, blunt, .1 in. long, with very few glands. *Ovary* rounded, glabrous; style filiform, .15 in. long. *Berry* black, globose, .25 in. in diam., smooth, tipped with the long slender persistent style.

PERAK: *Wray* 32, 402; *Scortechini* 295, 664; *Ridley* 5511, 9720; *King's Collector* 3247, 6247, 8057; in dense forests in the mountains from 3,000 feet elevation to the top of Gunong Batu at 6,700 feet.

42. *ARDISIA LONGEPEDUNCULATA*, King & Gamble, n. sp. A shrub; branchlets slender, rusty-pubescent, divaricate. *Leaves* membranous; oblong-lanceolate, long acuminate at apex, attenuate at base; crenulate with shallow glandular crenatures, margin recurved; glabrous on both surfaces, pale beneath when dry; glandular dots many, scattered, prominent on the under surface when dry; 4 to 6 in. long, 1.25 in. broad; midrib slender; main-nerves 12 to 16 pairs, curved upwards to and along the margin usually to end in the crenature-glands; secondary nerves and reticulations obscure; petiole slender, .5 in. long, bordered by the decurrent crisped margins of the blade. *Inflorescence* a terminal

pyramidal panicle of long-peduncled racemes, 5 to 6 in. long and 6 to 9 in. broad, branches and rachis all rusty-pubescent; common peduncle about 1 in. long; branch peduncles 2 to 3 in. long, at right angles to the rachis and curved upwards; racemes about .5 in. long, about 8-flowered; pedicels slender, somewhat clavate, twisted, .5 to 1 in. long; bracteoles subulate, caducous; buds ovoid, acuminate. *Calyx-lobes* triangular, blunt, .05 in. long, rusty-pubescent; tube as long. *Corolla-lobes* pink, ovate, long acuminate, .25 in. long, rusty-pubescent within, not gland-dotted; tube very short. *Stamens* much shorter than corolla-lobes; anthers oblong, acute; filaments very short. *Ovary* rounded, style subulate, .25 in. long. *Berry* purplish-black, globose, .2 in. in diam.

PERAK: at low levels, *Wray* 296.

43. *ARDISIA MAINGAYI*, King & Gamble. A "bush or small tree" (*Wray*), "slender tree" (*Scortechini*); branchlets smooth, bark brown, pith rather small; innovations glandular-pubescent. *Leaves* membranous; sub-opposite or falsely whorled; elliptic-obovate or obovate-lanceolate, attenuately or abruptly acuminate at apex, attenuately cuneate at base; glabrous on both surfaces except for a few scattered glandular hairs, pale beneath; margin finely toothed except on the lower third, the teeth caudate and glandular; 6 to 11 in. long, 2 to 3.5 in. broad; midrib slender above, thickened below; main-nerves 15 to 20 pairs, irregular in angle and distance, but usually at about 50° with the midrib, straight for about half-way and then curved to and along the margin; secondary nerves and reticulations very faint; petiole none or very short, the base of the leaf almost half stem-clasping. *Inflorescence* of slender, 6 to 8 in. long, sparsely glandular-pubescent, panicles of long peduncled sub-umbellate racemes, from the axils of upper leaves, of abortive leaves, or of the scars of fallen leaves below them; common peduncle slender, 2 to 3 in. long; branch peduncles very slender, divaricate, .5 to 1.5 in. long, supported by linear subulate .2 to .3 in. long bracts; racemes .3 to .5 in. long, 8-12-flowered; bracteoles small, subulate; pedicels slender, flattened above; buds ovoid acute. *Calyx-lobes* ovate, obtuse, .05 to .1 in. long, recurved in fruit, minutely pubescent, ciliate on the margins. *Corolla-lobes* white, ovate, acute or acuminate, .15 in. long, glabrous, gland-dotted. *Stamens* much shorter than corolla-lobes; filaments short, dilated at base; anthers oblong, bluntly mucronate, .1 in. long. *Ovary* rounded, glabrous; style slender, .05 in. long. *Berry* red, .3 in. in diam., longitudinally ribbed when dry. *A. odontophylla*, Wall., var. *Maingayi*, Clarke in Hook. f. Fl. Br. Ind. III. 526.

PERAK: *Wray* 304, 953, 1597; *Scortechini* 335, 339; *Curtis*.

MALACCA: *Maingay* (K.D.) 1016, in the mountains about 4,500 feet and below.

Although Wray and Scortechini describe this more or less as a "tree," *Maingay*'s specimen is that of a semi-herbaceous undershrub about 24 in. high, sending out roots from above the ground-level.

44. *ARDISIA THEÆFOLIA*, King & Gamble, n. sp. A small shrub reaching 3 feet in height; branchlets brown, smooth, the uppermost parts and innovations rusty-glandular-pubescent. *Leaves* chartaceous; elliptic, long acuminate at apex, acuminate at base; alternate or sub-opposite or falsely whorled; minutely glandular-pubescent on both surfaces, scaly beneath; margins recurved, finely toothed except on the lower third and on the acumination, the teeth erect, glandular; glandular dots very numerous and prominent on both surfaces; 2 to 3 in. long, .7 to 1.2 in. broad; midrib slender; main-nerves 10 to 14 pairs, close, curved upwards to near the margin, reticulations obscure; petiole .4 in. long, bordered by the decurrent margins of the blade. *Inflor-escence* a 1.5 to 2.5 in. long panicle with short racemose branches in the axil of a leaf or of a subulate .2 in. long linear abortive leaf between the leaves on the upper part of the branches; branches .5 in. long, slender, divaricate; bracteoles minute, linear; flowers 2 to 5 in each raceme, buds ovoid. *Calyx-lobes* 5, rounded, .05 in. long, ciliate. *Corolla-lobes* 5, white, ovate, acute or obtuse, .15 in. long, gland-dotted. *Stamens* as long as corolla-lobes; filaments very short; anthers broadly oblong, mucronate. *Ovary* rounded, gradually produced in an erect or curved style, .1 in. long. *Berry* pyriform or nearly globose, .2 in. in diam., smooth, slightly ribbed when dry.

PERAK: on Ulu Batang Padang at 4,900 feet, *Wray* 1513; *Scortechini*.

45. *ARDISIA ODONTOPHYLLA*, Wall. Cat. 2279 (1829) (*not of* Lindl.); A. DC. Trans. Linn. Soc. XVII. 125, t. VI., Prod. VIII. 135; Clarke in Hook. f. Fl. Br. Ind. III. 525; Mez Monog. Myrs. 150. *A. pavonina*, Herb. Hamilt. *vide* DC. in Prod. l.c.—DISTRIB. India (Assam and Cachar).

VAR. *Lobbii*, Clarke in Hook. f. Fl. Br. Ind. III. 526. An almost herbaceous undershrub reaching to about 2 feet in height, the stems rooting from nodes near the base; bark fleshy, pale brown; pith large; upper part of stem densely fulvous-villous; leaf-buds small, short. *Leaves* membranous, sub-opposite; elliptic or elliptic-oblong or obovate-lanceolate, acute at apex, cuneate at base and sometimes slightly rounded; the margins sharply serrate except for a short distance near the base; glabrous above except on the hirsute midrib, rusty-tomentose beneath, the midrib and main-nerves usually ferruginous-

villous on the lower surface; glands scattered, not prominent; 4 to 8 in. long, 1.5 to 3.5 in. broad; midrib thick, prominent; main-nerves 8 to 12 pairs, prominent, irregular in distance and angle, curving upwards to and along the margin; secondary nerves few, reticulations transverse; petiole variable, stout, .4 to 1 in. long, ferruginous-villous, rarely glabrescent. *Inflorescence* of short (under 1 in. long) lax, few-flowered, pubescent, simple or compound, umbellate racemes, from the axils of leaves below the summit or of a linear subulate abortive leaf about .5 in. long; peduncles slender, .5 to 2 in. long; pedicels slender, .3 to .7 in. long, recurved; bracteoles short, subulate; buds ovoid. *Calyx-lobes* ovate, obtuse, ciliate, .1 in. long, slightly pubescent, marked with faint brown striæ; tube short. *Corolla-lobes* pink, ovate, obtuse or bluntly acuminate, .15 to .2 in. long, unequal, marked with many light brown linear and round glands; tube short. *Stamens* half the length of the petals; anthers broad, oblong, .1 in. thick, emarginate; filaments very stout. *Ovary* ovoid, gradually narrowed into a slender subulate style .1 in. long, the top of the ovary and base of the style short pubescent. *Berry* globose, scarlet, fleshy, .25 in. in diam., smooth.

PERAK: *Wray* 2285, 2975; *King's Collector* 2583, 2978, 3053, 7367. SELANGOR: *Ridley* 7560. PAHANG: *Ridley* 2270, 5825. SINGAPORE: *Lobb* 316, an undershrub of dense forests in wet localities.

Ridley's Pahang specimens have smaller leaves and longer calyx-lobes, with fewer-flowered inflorescences, the whole plant more thickly fulvous-villous, but do not seem capable of separation.

46. *ARDISIA BAMBUSETORUM*, King & Gamble, n. sp. A small semi-herbaceous shrub 1 to 2 feet high; stem pale brown about .25 in. in diam., bark spongy, pith large. *Leaves* membranous; oblong or oblong-lanceolate or obovate-oblong, acute at apex, narrowly attenuate at base and slightly rounded; glabrous on both surfaces, slightly scaly only beneath; glands few, scattered, chiefly near the margin; margins very briefly and irregularly toothed, usually recurved; 4 to 6 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curved upwards, and often branching, to and along the margin, where they anastomose in a rough intramarginal nerve; secondary nerves few, reticulations oblique; petiole .4 to .6 in. long, channelled above. *Inflorescence* of lateral pedunculate racemes 1 to 1.5 in. long supported by a linear abortive leaf .5 in. long; peduncle .7 to .8 in. long, raceme the same; bracteoles small subulate about .1 in. long; pedicels slender, clavate, .4 to .5 in. long recurved; buds ovoid; flowers white.

*Calyx-lobes* 5, linear-oblong, acute, reflexed, .05 to .07 in. long, not gland-dotted. *Corolla-lobes* ovate-oblong, .15 in. long, dotted with elongated brown glands. *Stamens* shorter than the corolla-lobes; filaments short; anthers oblong, obtuse, emarginate, .1 in. long. *Ovary* rounded, glabrous; style slender, curved, .1 in. long. *Fruit* not seen.

PERAK: in dense bamboo forest, King's Collector 10095.

This is scarcely more than a var. of *A. odontophylla*, but is recognised by the somewhat different leaves, white flowers, glabrous ovary and style, and the absence of fulvous tomentum.

## 6. ANTISTROPHE, A. DC.

Slender shrubs, with puberulous branchlets. *Leaves* alternate, entire or dentate, lanceolate, acuminate, glandular, petiole margined. *Flowers* hermaphrodite, in sub-sessile axillary umbels or solitary, pedicels slender, bracts small. *Calyx* small, 5-lobed, persistent; lobes acute, imbricate. *Corolla* deeply 5-cleft; lobes lanceolate acuminate, overlapping to the left in bud. *Stamens* 5, inserted on the throat of the corolla; filaments short; anthers free, hastate-lanceolate, the connective produced upwards in a membranous tip, cells dehiscing longitudinally and introrsely. *Ovary* ovoid, attenuated in a filiform style, stigma punctiform; ovules many on a globose central placenta. *Fruit* a globose berry, pericarp coriaceous, endocarp chartaceous. *Seed* 1, albumen ruminated; embryo cylindric, transverse.—DISTRIB. Species 4, Indian and Malayan.

Inflorescence 1-2-flowered, glabrous; leaves caudate acuminate .. 1. *A. caudata*.  
 Inflorescence 4-6-flowered, hirsute; leaves short acuminate .. .. 2. *A. Curtisii*.

1. ANTISTROPHE CAUDATA, King & Gamble, n. sp. A shrub or small tree; branches smooth, divaricate, nearly glabrous; branchlets puberulous, with faint raised lines from the bases of the leaf-petioles; innovations rusty-pubescent. *Leaves* membranous; elliptic-lanceolate, caudate-acuminate at apex, attenuate or somewhat rounded at base; entire or undulate on the margins; glabrous on the upper, minutely puberulous or glabrous and with pale peltate scales on the lower, surface; glandular dots very many, scattered, prominent; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, conspicuous below; main-nerves 8 to 12 pairs, prominent beneath, at an angle of about 60° with the midrib, arching upwards, forking and obscurely anastomosing near the margin, the lowest pair of nerves more oblique than the rest; secondary nerves short, slender, reticulations indistinct; petiole .1 to .2 in. long, edged by the decurrent margins of the blade which are almost connivent above. *Inflorescence* of short, axillary, usually only 1-2-flowered sub-

sessile umbels, with very minute bracts; pedicels slender, clavate, .4 in. long; buds conical, long acuminate, .3 in. long, glabrous. *Calyx-lobes* ovate, acute, .05 in. long, ciliate on the edges, gland-dotted in two central lines. *Corolla-lobes* ovate, long-caudate-acuminate, .3 in. long, glabrous, dotted with few elongate glands. *Stamens* inserted at the base of the corolla-lobes and nearly as long as them (.25 in.); anthers sagittate-lanceolate with prominent rows of glands on the back, connective produced upwards in a membranous tip. *Ovary* ovoid, glabrous; style subulate, .25 in. long, very slender. *Berry* globose, .25 in. in diam., smooth, obscurely vertically striate.

PERAK: at Gunong Batu Pateh, 3,400 feet, *Wray* 456, 978, 3242; *Curtis* 3324.

This species at first sight resembles *A. oxyantha*, A. DC., of North-East India, but has smaller and differently-veined leaves, with different glands and smaller flowers.

2. ANTISTROPHE CURTISII, King & Gamble, n. sp. A shrub (?); branchlets round, rusty-glandular-hirsute, zigzag, with faint raised lines from the bases of the petioles of the leaves; innovations densely rusty-glandular-hirsute. *Leaves* membranous; elliptic or elliptic-oblong, acuminate at apex, rounded at base, entire; nearly glabrous above except on the midrib, sparsely rusty-hirsute beneath; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath; main-nerves about 10 pairs, at about an angle of 50° with the midrib, curved upwards, forked and broadly anastomosing near the margin, lowest pair not more oblique than the others; secondary nerves and reticulations obscure; petiole .2 in. long, crispedly channelled above. *Inflorescence* of densely rusty-hirsute, sub-sessile, axillary, 4-6-flowered, umbellate racemes, .1 to .15 in. long; bracteoles subulate, .05 in. long; pedicels slender, .3 to .5 in. long; buds caudate-acuminate, .3 in. long. *Calyx-lobes* linear subulate, .1 in. long, densely rusty-hirsute. *Corolla-lobes* ovate at base, long caudate-acuminate, .3 in. long, scarcely dotted, 3-5-nerved, sparsely hirsute without. *Stamens* rather shorter than the corolla-lobes, connivent in a cone; anthers sessile, lanceolate sagittate, the back with 2 rows of prominent round or elongate glands, the connective produced in a blunt membranous tip. *Ovary* ovoid, style slender, as long as anthers. *Berry* not seen.

PERAK: in Kuran Valley, below the gap, 4,000 feet, *Curtis* 3390.

## 7. ÆGICERAS, Gaertn.

Sea-coast shrubs, or small trees; branches cylindric, glabrous. *Leaves* scattered, petioled, entire, glabrous, alternate. *Flowers* large

(for the Order) white, pedicellate, without bracteoles, in terminal or axillary umbels or panicles, pedicels slender. *Calyx* 5-lobed; lobes obtuse, coriaceous, twisted to the left, overlapping to the right; tube none. *Corolla* with short tube; lobes 5, acute, overlapping to the right in bud, afterwards recurved. *Stamens* 5, inserted on the corolla-tube; filaments elongate, connate into a tube below; anthers with transversely septate cells, cordate-lanceolate, introrse, dehiscent longitudinally. *Ovary* fusiform, narrowed into an elongated style; stigma acute; ovules many, immersed in a central globose placenta. *Fruit* cylindric, curved, acute, coriaceous, 1-seeded; pericarp coriaceous, afterwards splitting, testa membranous. *Seed* elongate, exalbuminous; radicle inferior, enlarged at the base, joined with the cotyledons into a cylindric tube; germination often taking place while still on the plant, as in some *Rhizophoræ*.—DISTRIB. Two species, of the sea-coasts of India, Burma, the Malay Peninsula and Islands, to South China and tropical Australia.

*ÆGICERAS MAJUS*, Gaertn. Fruct. I. 216, t. 46, fig. 1 (1788). A shrub or small tree reaching 15 to 20 feet in height, evergreen, all parts glabrous; branches greyish-black, smooth; branchlets reddish. *Leaves* coriaceous; obovate, rounded obtuse or emarginate at apex sometimes even obcordate, cuneate at base, margins recurved; glandular dots many, inconspicuous; 1·5 to 3·5 in. long, 1 to 1·5 in. broad; midrib slender, raised above or sometimes depressed; main-nerves about 10 pairs, slender, raised above, straight at first then curving upwards; secondary nerves slender, few, reticulations not prominent; petiole ·2 to ·3 in. long, thick, bordered by the decurrent margins of the blade. *Inflorescence* a terminal, axillary or leaf-opposed many- (15 to 20) flowered umbel, sessile or very short peduncled; bracts oblong-lanceolate, deciduous; pedicels slender, ·3 to ·5 in. long; buds conical. *Calyx-lobes* concave, gibbous at the base, broadest at top, ·25 in. long, ·15 in. broad, with parallel veins and scattered black dots in the lower part. *Corolla-lobes* ovate, acuminate, glabrous, parallel-veined, ·25 in. long, recurved; tube as long as lobes, villous hairy within. *Stamens* longer than corolla-lobes, exsert; filaments connate half-way up, linear, connate part densely villous, free part glabrous ·2 in. long; anthers ·1 to ·15 in. long, dorsifixed, cells prominently septate. *Ovary* ovoid, surmounted by a subulate angular style, ·3 in. long, black-gland-dotted below. *Fruit* a long acuminate pale brown capsule, up to 3 in. long, ·25 in. in diam., glabrous. *Seed* 1, elongate, filling the capsule, embryo inverse, funicle very long. Willd. Sp. Pl. I. 1185; Roem. & Schult. Syst. Veg. IV. 511; Roxb. Fl. Ind. III. 130; A. DC. in Ann. Sc. Nat. 2, XVI. t. 9A, and Prod. VIII.

142; Wight Icon. t. 146; Miq. Fl. Ind. Bat. II. 1031; Scheff. Myrs. 97; Benth. Fl. Austral. IV. 277; Dalz. & Gibs. Bomb. Fl. 137; Bedd. Fl. Sylv. CXXXIX. Anal. pl. XIX. III.; Clarke in Hook. f. Fl. Br. Ind. III. 533; Trimen Fl. Ceyl. III. 74; Cooke Fl. Bomb. II. 88; Koord. & Val. Bijdr. V. 276; Pax in Engl. & Prantl Pflanzenfam. IV. i. 97, fig. 57; Schimp. Strandfl. 44, figs. 1, 2; Prain Beng. Pl. 645. *Æ. fragrans*, Koenig Ann. of Bot. I. 129, t. 3; Wall. Cat. 2326; Wight in Hook. Bot. Misc. III. 84, t. 21. *Æ. minus*, A. DC. l.c. 142. *Æ. Malaspinæa*, DC. l.c. 143. *Æ. obovatum*, Blume Bijdr. 693. *Æ. corniculatum*, Blanco Fl. Filip. 79; Kurz in Journ. As. Soc. Beng. XLVI. II. 227 and For. Fl. III. 114; Mez Monog. Myrs. 55, fig. 8. *Rhizophora corniculata*, Linn. Sp. Pl. Ed. 3 (1764), 635. "Pou-Kandel," Rheede Hort. Mal. VI. 36. *Mangium fruticosum corniculatum*, Rumph. Herb. Amb. III. 117.

PENANG: Wallich 2326; Curtis 52, 513. PERAK: King's Collector 4961. MALACCA: Maingay (K.D.) 1017; Griffith (K.D.) 3538. SINGAPORE: Ridley 2801A, 3632A.—DISTRIB. Sea-coast of India from Sind to Ceylon, the Sundarbans, Burma, and the Andaman Islands; eastwards to the Malay Islands, South China, the Philippines and Australia. One of the coast plants included under the general name of "Mangroves."

#### Order LXXI. SAPOTACEÆ.

Trees or shrubs, with milky juice, generally evergreen, young parts often rusty-tomentose. *Leaves* alternate, rarely sub-opposite, coriaceous or rarely membranous, entire, penniveined; stipules none or very caducous. *Flowers* usually hermaphrodite, small or medium-sized, solitary or fascicled in the axils of the leaves, sometimes (*Sarcosperma*) paniculate; bracts and bracteoles very small or wanting. *Calyx* inferior, persistent or deciduous; lobes 4 to 8, much imbricate, occasionally biseriata with the outer ones valvate. *Corolla* gamopetalous; tube short, campanulate or urceolate; lobes as many as, or 2 to 4 times as many as, those of the calyx. *Stamens* inserted on the corolla-tube in 1 to 2 series and opposite to them, sometimes alternating with staminodes; filaments short, erect; anthers ovate-lanceolate or linear-sagittate, 2-celled, the connective sometimes produced. *Disk* hypogynous, often inconspicuous or wanting. *Ovary* superior, sessile, often villous, 2-5- or more celled; style shortly conical or elongate-subulate, glabrous; stigma terminal, punctiform; ovules solitary in the cells, attached to the inner angle. *Fruit* an indehiscent, 1-8-seeded berry, pericarp usually fleshy. *Seeds*, if solitary, conform to

the fruit; if more than one compressed, ellipsoid; hilum conspicuous; testa usually crustaceous, shining; embryo straight, exalbuminous with fleshy cotyledons, or albuminous with flat cotyledons; radicle inferior, usually small.—DISTRIB. About 320 species, in the tropical regions of the whole world, genera about 24.

Calyx-lobes 1-seriate, imbricate; stamens 5 to 6:—

Staminodes none .. .. . 1. CHRYSOPHYLLUM.

Staminodes present:—

Flowers sessile or in panicles .. .. . 2. SARCOSPERMA.

Flowers in axillary fascicles .. .. . 3. SIDEROXYLON.

Calyx-lobes 2-seriate, outer series valvate:—

Calyx segments 4:—

Seeds albuminous:—

Stamens 8 .. .. . 4. ISONANDRA.

Stamens 12 or more .. .. . 5. PAYENA.

Seeds exalbuminous, stamens 12 or more .. .. . 6. BASSIA.

Calyx segments 6 to 8:—

Staminodes none, seeds exalbuminous .. .. . 7. PALAQUIUM.

Staminodes present, seeds albuminous .. .. . 8. MIMUSOPS.

### 1. CHRYSOPHYLLUM, Linn.

Trees with milky juice. *Leaves* coriaceous, glabrous or pubescent on the under-surface, main-nerves usually very many, thin; stipules none. *Flowers* small, in axillary fascicles, usually hermaphrodite. *Calyx* 5-7-lobed; lobes subequal, imbricate. *Corolla* tubular-campanulate or sub-rotate, 5-7-lobed; lobes imbricate, entire. *Stamens* equal in number with, and opposite to, the corolla-lobes, attached to the tube or the base of the lobes; filaments subulate or filiform; anthers ovate or triangular, extrorse or laterally dehiscent; staminodes none. *Ovary* villous, 5-, rarely 6-7-celled, style glabrous; ovules one in each cell, attached to the central placenta. *Fruit* a fleshy or coriaceous berry, globose, 5-celled or less by abortion. *Seeds* large; testa very hard, dull or shining; hilum conspicuous; embryo as large as the seed, erect, cotyledons flat in fleshy albumen, radicle inferior.—DISTRIB. About 60 species, chiefly tropical American, a few only in Asia, Africa and Australia.

CHRYSOPHYLLUM ROXBURGHII, G. Don Gen. Syst. IV. 33 (1837). A slender, erect tree reaching 40 to 60 ft. in height, evergreen; branches horizontal; bark smooth, grey; young branchlets and innovations ferruginous-pubescent. *Leaves* coriaceous, glabrous, alternate; oblong-lanceolate, suddenly caudate-acuminate at the apex which is sometimes obtuse, cuneate at base and unequal, undulate on the margins; 3 to 6 in. long, 1.25-2 in. broad; midrib slender, prominent

beneath; main-nerves very numerous, parallel, nearly at right angles to midrib, meeting in an intramarginal nerve; secondary nerves similar, reticulations slanting; petiole thick, .25 in. long, pubescent. *Flowers* small, in rounded axillary fascicles; pedicels slender, .1 to .2 in. long, ferruginous-pubescent. *Calyx-lobes* 5, ovate, glabrous or pubescent outside, thick, ciliate on the margins, .07 to .1 in. long; tube short. *Corolla* tubular-campanulate, .1 in. long; lobes 5, short, ciliate on the margins. *Stamens* 5, shorter than the corolla, opposite the corolla-lobes and inserted on the base of the tube; filaments slender; anthers ovate, apiculate and ending in a minute tuft of hairs, extrorse, slits somewhat lateral. *Ovary* rounded, obscurely 5-lobed, surrounded by a thick tuft of long ferruginous hairs; style thick, cylindro-conical, glabrous; cells 5. *Fruit* a globose or obscurely 5-lobed berry 1 to 1.5 in. in diam., strongly 5-lobed when dry, ferruginous-tomentose when young afterwards smooth, yellowish-green, with thick glutinous pulp. *Seeds* .6 in. long, .5 in. broad, flattened, the outer edge curved, the inner nearly straight; hilum oblong, conspicuous, pale; testa very hard, thick, shining, chestnut-brown; embryo erect, cotyledons flat, .4 in. broad, ovate, obtuse, 3-nerved; radicle large, cylindrical. A. DC. Prod. VIII. 162; Clarke in Hook. f. Fl. Br. Ind. III. 535; Bedd. Fl. Sylv. t. 236; Kurz For. Fl. II. 118 and in Journ. As. Soc. Beng. XLVI. ii. (1877) 228; Trimen Fl. Ceyl. III. 76; Dalz. & Gibs. Bomb. Fl. 138; Cooke Bomb. Fl. II. 88; Burck Ann. Gard. Buit. V. i. (1886), 4; Koord. & Val. Bijdr. I. 130. *C. acuminatum*, Roxb. Fl. Ind. I. 599; Wall. Cat. 4160 (not of Lamk.). *C. lanceolatum*, A. DC. l.c.; Miq. Fl. Ind. Bat. II. 1035. *C. javanicum*, Steud. Nom. Ed. II. i. 359. *Nycteristition lanceolatum*, Bl. Bijdr. 676.

MALACCA: *Griffith* (K.D.) 3600; *Maingay* (K.D.) 980; *Goodenough* 1739. SINGAPORE: *Ridley* 2756, 5837.—DISTRIB. British India; Burma; Java; Sumatra.

*Curtis* No. 1072, collected at Batu Ferengy, Penang, and now in the Kew Herbarium, seems to be a new species of *Chrysophyllum*. The leaves are chartaceous, lanceolate, acuminate at both ends, glabrous, shining, 2 to 4 in. long, .75 to 1 in. broad, the veins indistinct. *Flowers* unknown. *Fruit* a fleshy berry, .5 in. in diam., 5-lobed when dry, glabrous. *Seeds* .4 in. long, .25 in. broad, rounded on the outside, narrowed and somewhat concave within; testa hard, dark chestnut-brown, shining; hilum narrow. It might be called *C. Curtisii*, n. sp., King & Gamble.

## 2. SARCOSPERMA, Hook. f.

Glabrous trees. *Leaves* coriaceous or chartaceous, opposite and alternate, oblong; stipules caducous. *Flowers* small, sessile or fascicled

on the branches of a simple or compound panicle, sessile or shortly pedicellate; bracteoles minute. *Calyx-lobes* 5, rounded, sub-equal, much imbricate. *Corolla* broadly campanulate; tube short; lobes 5, rounded, entire, much imbricate. *Stamens* 5, inserted on the tube of the corolla and opposite to its lobes; filaments very short; anthers obtuse, laterally or extrorsely dehiscent. *Staminodes* 5, small, subulate or rounded. *Ovary* glabrous, 1-2-celled; style short; stigma somewhat lobed, capitate. *Fruit* an ellipsoid berry, 1-2-seeded; pericarp coriaceous, scarcely thick. *Seeds* 1-2; testa crustaceous; hilum nearly basal; albumen none; embryo fleshy.—DISTRIB. Species 3, in North-East India, Burma, Malaya and S. China.

*SARCOSPERMA PANICULATUM*, Stapf & King in Hook. f. Ic. Plant. t. 2690 (1901). A tree, reaching 50 to 70 feet in height and 18 to 20 in. in diam.; branchlets thick, dark brown, glabrous. *Leaves* chartaceous; sub-opposite, elliptic-oblong, bluntly acuminate at apex, acute or rounded or often rhomboid at base; glabrous on both surfaces, nearly black when dry; 4 to 8.5 in. long, 1.5 to 3 in. broad; midrib slender; main-nerves 7-8 pairs, slender, distant, often nearly 1 in. apart, starting at an angle of about 60° with the midrib and at once curving upwards to and along the margin; secondary nerves many and, like the transverse reticulations, inconspicuous; glandular pits in the axils of most of the main-nerves; petiole .5 to .7 in. long, channelled above and with two minute rounded auricles below the blade. *Flowers* solitary or clustered on the branches of a leafy compound panicle of racemes, the racemes often 2 in. long; bracteoles minute, triangular; pedicels rarely reaching .05 in. in length, stout; buds globose. *Calyx-lobes* 5, imbricate, rounded, usually 3 larger with somewhat scarious margins, 2 smaller thicker and slightly acute, shortly campanulate. *Corolla-lobes* 5, closely imbricate, rounded, glabrous, .05 in. long, the margins revolute; tube as long as lobes. *Stamens* 5, inserted on the top of the tube; filaments very short; anthers ovate, rounded, introrse, or laterally dehiscent. *Staminodes* alternating with the stamens, minute, nearly orbicular, crenulate. *Ovary* conical, furrowed; style very short, thick, stigma capitate, minutely 2-4-lobed. *Fruit* drupaceous, ellipsoid, seeds, 1-2. *Bracca paniculata*, King in Journ. As. Soc. Beng. LXIV. ii. 101.

PERAK: *Scortechini*; King's Collector 7970, 8086, 10284, 10554, 10672, 10835; among large bamboos, on river-banks, or in mixed forest.

### 3. SIDEROXYLON, Linn.

Trees or shrubs, sometimes armed, with milky juice. *Leaves* coriaceous or thinner, entire, alternate; stipules none. *Flowers*

small, in fascicles in the axils of the leaves or of the scars of fallen leaves, sub-sessile or shortly pedicelled. *Calyx* of 5-6 imbricate, usually orbicular and obtuse segments. *Corolla* campanulate, or tubular-campanulate, with 5 or rarely 6 lobes, the lobes imbricate. *Stamens* as many as the corolla-lobes and opposite to them, attached to the tube or at its base; filaments linear, usually short; anthers ovate or lanceolate; staminodes alternating with the stamens, lanceolate. *Ovary* usually villous, with 5 or fewer cells; style cylindric; stigma small; ovules erect, placentas axile. *Fruit* an ovoid or globose fleshy berry, 5- or less-seeded, usually with one seed only. *Seeds* compressed, generally solitary; testa hard, crustaceous, usually shining; hilum oblong or linear; embryo erect, cotyledons flat or thickened, in fleshy albumen; radicle short, inferior.—DISTRIB. About 60 species, mostly of tropical regions in both hemispheres, a few only extratropical in South Africa or Australasia.

- Leaves more than 3 in. broad, yellowish when dry, main-nerves very prominent .. .. . 1. *S. malaccense*.  
 Leaves under 3 in. broad, green or brown when dry :—  
   Leaves nearly glabrous, membranous, obovate-acuminate .. 2. *S. Maingayi*.  
   Leaves pubescent beneath, at least on the nerves :—  
     Corolla-tube longer than the lobes; leaves elliptic, grey-silky beneath .. .. . 3. *S. Derryanum*.  
     Corolla-tube shorter than the lobes :—  
       Leaves obovate, main-nerves not very prominent or regular .. .. . 4. *S. ferrugineum*.  
       Leaves oblong-lanceolate, main-nerves very prominent and regular .. .. . 5. *S. firmum*.

SPECIES IMPERFECTLY KNOWN: 6. *S. Wallichianum*.

1. *SIDEROXYLON MALACCENSE*, Clarke in Hook. f. Fl. Br. Ind. III. 537 (1882). A large tree, reaching 40 to 60 feet in height; branches pale brown; ultimate branchlets ferruginous-pubescent, as are the leaf-buds and young leaves. *Leaves* coriaceous; often, not always, crowded towards the ends of the branchlets; obovate-oblong, rounded or shortly acute at apex, somewhat cuneate at base; deep-green above, pale bluish-green beneath, yellow when dry, densely rusty-pubescent beneath when young, glabrous on both surfaces when old except for rusty hairs on the midrib and main-nerves beneath; 6 to 8 in. long, 3 to 4.5 in. broad; midrib very thick and prominent; main-nerves 8-14 pairs, very prominent, starting at about an angle of 60° with the midrib, parallel at first, ultimately arched upwards; reticulations not prominent, obliquely joining the main-nerves; petiole 1 to 1.5 in. long, thick, enlarged at base, bordered above by the slightly decurrent margins of the blade. *Flowers* fasciculate, shortly pedicelled, in the axils of the leaves, above

the scars of fallen leaves or on the year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, rusty-tomentose. *Calyx-lobes* 5, imbricate, .15 to .2 in. long, densely rusty-pubescent without, rounded. *Corolla* tubular-campanulate, .15 in. long, absent in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* attached to the base of the corolla-tube; anthers ovate, apiculate, opening by side-slits; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top, obscurely 5-lobed, 5-celled; style cylindric. *Berry* fleshy, somewhat oblong, rounded, tipped with the persistent style, thickly covered with velvety orange-red tomentum and about .5 in. in diam. *Seeds* not accurately known.

PENANG: *Curtis* 1452. PERAK: *Wray* 136; *King's Collector* 6550. MALACCA: *Maingay* (K.D.) 994; *Holmberg* 704. SINGAPORE: *Ridley* 6130, 6499; *Cantley* 89.

Mr. Cantley says that this tree gives the true "Daru-daru" or "Dedâru" wood of the Malay Peninsula.

2. *SIDEROXYLON MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 536 (1882). A tree with rusty-pubescent branchlets and young shoots. *Leaves* membranous; crowded towards the ends of the branchlets; obovate, shortly acuminate at apex, cuneate at base; rusty-pubescent when young, glabrous when old or rusty-pubescent on the midrib and main-nerves; 4 to 8 in. long, 1.5 to 3 in. broad; midrib prominent; main-nerves 8 to 11 pairs, starting at an angle of nearly 60° to the midrib, at first parallel then arching upwards to near the margin; transverse reticulations more or less parallel; petiole 1 to 1.5 in. long, bordered by the decurrent margins of the blade. *Flowers* fasciculate, sessile or with very short pedicels, chiefly on the previous year's wood below the leaves and shoots of the year. *Calyx-lobes* 5, imbricate, rounded, rusty-pubescent without, .075 to .1 in. in diam. *Corolla* tubular-campanulate, as long as or rather shorter than the calyx, wanting in ♀ flowers; lobes very short, obtuse, imbricate. *Stamens* short; filaments slender; anthers ovate; staminodes linear-lanceolate. *Ovary* thickly rusty-pubescent, flattened at top; style cylindric. *Berry* fleshy, 1.5 in. in diam., ovoid or globular, full of guttapercha. *Seeds* 4, compressed, .7 in. long by .3 to .35 in. broad; rounded outside, nearly straight within, the long narrow oblong hilum covering nearly the whole margin; testa hard, shining, dark chestnut-brown; albumen firm, white; cotyledons plane, appressed, elliptic; radicle inferior.

NEGRI SEMBILAN: *Ridley* 10084. MALACCA: *Maingay* (K.D.) 993; *Hervey*. SINGAPORE: *Ridley* 8928, 9223.

The fruit description is chiefly taken from Maingay's notes in the Kew Herbarium.

3. *SIDEROXYLON DERRYANUM*, King & Gamble, n. sp. A tree; branchlets grey, uppermost appressed-pubescent; innovations with nearly black hairs. *Leaves* chartaceous; elliptic, very abruptly short-acuminate at apex, broadly cuneate at base; margins more or less recurved; glabrous above, densely silvery-pubescent beneath; 3 to 5·5 in. long, 1·5 to 3 in. broad; midrib prominent, impressed above; main-nerves 12 to 18 pairs, parallel, starting at an angle of about 75° with the midrib, meeting near the margin in a faint intramarginal looped nerve; secondary nerves similar, rather prominent, reticulations few, obscure; petiole ·3 to ·5 in. long, channelled above, pubescent with nearly black hairs. *Flowers* fascicled, about 5 together in the axils of the leaves or of the scars of fallen leaves; pedicels ·25 in long, tawny-pubescent; buds oblong, conical. *Calyx-lobes* 5, rounded, obtuse, the 2 outer thick very pubescent, the 3 inner somewhat scarious, pubescent only on the middle of the back. *Corolla* campanulate, ·2 in. long; tube ·15 in. long, glabrous within, with a few sparse hairs without; lobes 5, ovate, imbricate, margins recurved. *Stamens* 5, short, inserted at the top of the tube; filaments conical; anthers ovate-cordate, dehiscing by side-slits; staminodes subulate, glabrous. *Ovary* villous, obscurely 5-lobed, 5-celled; style very short; stigma obscurely 5-lobed. *Berry* oblong, dark blue, glabrous, the top flat and crowned with the remains of the style, ·6–·7 in. long, 1-seeded. *Seed* oblong, ·6 in. long by ·3 in. in diam. truncate obliquely at the base; testa thick, light-brown, striate; hilum rather small, sub-basal; albumen thin; cotyledons thick; radicle small.

PERAK: *Derry-Curtis* 3641.

The colour of the silvery under-surface of the leaves is difficult to describe—it is sometimes dark and smoky-looking.

4. *SIDEROXYLON FERRUGINEUM*, Hook. & Arn. Bot. Beech. Voy. 266, t. 55 (1841). A small tree; branches rough, ultimate branchlets ferruginous-pubescent like the leaf-buds and young leaves, branchlets with a raised line downwards from each leaf or scar of a fallen leaf. *Leaves* coriaceous; obovate or oblong-lanceolate, rounded or bluntly acute at apex, attenuate at base; shining above, densely appressed ferruginous-silky beneath when young, ultimately nearly glabrous; 2·5 to 6 in. long, 1 to 3 in. broad; midrib prominent; main-nerves 10 to 12 pairs, fairly prominent, especially above, starting at about an angle of 60° with the midrib, at first nearly parallel then arching upwards to meet near the margin; secondary nerves similar, reticulations oblique; petiole ·5 to ·7 in. long, the edges bordered by the decurrent margins of the blade, enlarged at base. *Flowers* fasciculate, shortly pedicelled, in the axils of

the leaves or above the scars of fallen leaves on year-old wood below the leaves and shoots of the year; pedicels .1 to .2 in. long, covered like the obtuse buds with rusty tomentum. *Calyx-lobes* round, .025 to .075 in. in diam., with scarios margins, closely imbricate, rusty-pubescent outside. *Corolla* campanulate, .1 in. long; tube short; lobes 5, imbricate, rounded, crenulate, sparingly pubescent near the base within, in ♀ flowers wanting or deciduous. *Stamens* very short, attached to the corolla-tube above the base; filaments linear; anthers rounded, opening by marginal slits; staminodes subulate or somewhat hastate, acuminate. *Ovary* depressed, obscurely 5-lobed, pubescent; stigma short, cylindric, with 5 minute punctiform styles. *Berry* ovoid, shining .35 by .3 in., 1-2-seeded. *Seeds* ovoid, .25 by .15 in.; testa shining, dark brown, thick; hilum large, oblong; albumen thick; cotyledons flat. A. DC. Prod. VIII. 178; Clarke in Hook. fil. Fl. Br. Ind. III. 537. *S. attenuatum*, A. DC. l.c.; Wight Ic. t. 1590; Kurz For. Fl. II. 117, and in Journ. As. Soc. Beng. XLVI. ii. (1877) 229. *Mimusops? attenuata*, Wall. Cat. 4150.

KEDAH: Langkawi, *Curtis*. PENANG: *Curtis* 273, 703, 704. PERAK: *Scortechini* 1463; *King's Collector* 1224. MALACCA: *Maingay* (K.D.) 982; *Griffith* (K.D.) 3604; *Goodenough* 1735. SINGAPORE: *Wallich* 4150; *Lobb* 319; *Ridley* 5643, 5908. A sea-shore tree, found also by Ridley on Tiuman Island and at Kwala Pahang (Trans. Linn. Soc. Ser. 2. III. 317).—DISTRIB. Burma, Andaman Islands, Nicobar Islands, Malay Archipelago to the Philippines and S. China.

5. *SIDEROXYLON FIRMUM*, Pierre; Burek in Ann. Jard. Buit. V. 17, tab. III. (1885). A small tree; branchlets thick, striate, brown; innovations ferruginous-pubescent. *Leaves* coriaceous; oblong-lanceolate, shortly acuminate at apex, narrowly acute at base; glabrous above, rusty-pubescent on the nerves beneath and on young leaves; margins recurved; 4 to 5 in. long, 1 to 1.5 in. broad; midrib strong, prominent, impressed above; main-nerves 12 to 16 pairs, very prominent, about .2 to .3 in. apart, starting at an angle of about 40° with the midrib, parallel, curved near and along the margin; reticulations transverse, very regular and prominent; petiole 1 to 1.5 in. long, channelled above and bordered by the decurrent margins of the blade, rusty-pubescent. *Flowers* fascicled, 4 to 6 together in the axils of the leaves; pedicels variable, .3 to .6 in. long, rusty-pubescent, slender in flower, thickened in fruit. *Calyx-lobes* 5, rounded, imbricate, .15 in. long, densely rusty-pubescent, 3 outer thick, 2 inner more or less scarios on the margins. *Corolla* campanulate, .15 in. long, 5-lobed, glabrous within, slightly hairy without; tube rather short; lobes oblong, rounded. *Stamens* inserted on the top of the tube; filaments glabrous; anthers ovate-apiculate;

staminodes subulate, about .05 in. long. *Ovary* villous; style clavate, glabrous. *Fruit* an oblong or somewhat obovoid berry, depressed at apex, glabrous, fleshy, supported by the somewhat enlarged persistent calyx-lobes, seed usually 1. *Seed* oblong, obtuse above, somewhat pointed below, little compressed, .6 in. long, .25 in. broad and thick; testa chestnut-brown, shining, crustaceous; hilum linear, flat, occupying nearly the whole inner face of the seed; albumen thick; cotyledons leafy, flat, oblong, 3-nerved; radicle inferior, pointed. *Chrysophyllum firmum*, Miq. Fl. Ind. Bat. Suppl. 579.

PENANG: at West Hill, *Curtis*, 1575.—DISTRIB. Bangka, *Teysmann*; Philippines.

The Bangka specimens have the leaves up to 2.5 in. broad, but in other respects we find no difference from *Teysmann's* type in the Penang plant.

#### SPECIES IMPERFECTLY KNOWN.

6. SIDEROXYLON WALLICHIANUM, G. Don Gen. Syst. IV. 28 (1837). A tree (?); branchlets pale brown, ferruginous-villous as are the innovations. *Leaves* chartaceous; elliptic-obovate, obliquely acuminate at apex, cuneate at base, crowded towards the ends of the branchlets; 6 to 8 in. long, 3 to 4 in. broad; midrib thick; main-nerves 6 to 7 pairs, curved upwards, distant, reticulations prominent; petiole thick, densely tawny-pubescent. *Calyx-lobes* apparently 5, short, rounded, rusty-pubescent. Miq. Fl. Ind. Bat. II. 1037. *S.* (?) *rugosum*, Wall. Cat. 4158.

The only sheet of this is in the type Herbarium of Wallich's plants with the Linnean Society of London. The remains of flowers are very slight, but they seem to show that the plant belongs to this genus. The note "a small plant growing on crocks—flowers white—from the hills" attached to the sheet, seems to refer to some other plant, for the specimen itself has every appearance of having come from a tree.

#### 4. ISONANDRA, Wight.

Trees with milky juice. *Leaves* coriaceous, entire, alternate, penniveined, the main-nerves and midrib prominent, the rest usually rather obscure. *Flowers* small, in axillary shortly pedicellate clusters in the axils of present or fallen leaves. *Calyx* of 4 segments, the two outer opposite, more or less valvate; the two inner also opposite, imbricate. *Corolla* tubular, campanulate; lobes 4, much imbricate, somewhat twisted. *Stamens* 8, sub-equal, attached near the base of the corolla, both opposite to and alternate with the lobes; filaments short; anthers lanceolate, sagittate at base, extrorse; staminodes absent. *Ovary* 4-celled, villous; style linear. *Berry* somewhat small, ovoid or oblong with a fleshy pericarp. *Seed* usually 1 only, scarcely flattened; testa thick, shining, crustaceous; hilum

lateral, long; albumen fleshy, cotyledons flat, radicle inferior.—DISTRIB. About 7 species, 6 of which in South India and Ceylon.

1. *ISONANDRA PERAKENSIS*, King & Gamble, n. sp. A small tree reaching 30 to 40 feet in height; ultimate branchlets, leaf-buds and young leaves appressed greyish-brown-pubescent. *Leaves* coriaceous; obovate-oblong, rounded at the apex, cuneate sometimes unequally at the base; the margins reflexed, glabrous and dull above, thickly brown-pubescent beneath; 2 to 3·5 in. long, 1 to 1·5 in. broad; midrib prominent; main-nerves 8 to 10 pairs at about 60° with the midrib, reticulations very inconspicuous; petiole ·2 to ·3 in. long, rather stout. *Flowers* fasciculate, on very short, ·1 in. long, thick, angular pedicels in the axils of upper leaves; buds ·15 in. long, obtuse, brown-appressed-pubescent. *Calyx* of 4 lobes, an outer pair and an inner pair, the outer valvate, the inner shining within, minutely ciliate; lobes ·15 in. long. *Corolla* 4-lobed; lobes rounded, about equal to the tube, together about equal to the calyx. *Stamens* 8, filaments thickened; anthers lanceolate, sagittate at base, extrorse. *Ovary* slightly hairy, conical, surmounted by a short linear style as long as the calyx; cells 4. *Berry* oblong, acute, smooth, ·4 to ·5 in. long. *Seeds* ellipsoid, acute at apex, scarcely flattened, ·35 by ·15 in.; hilum large, oblong; testa dark brown, hard, smooth, shining; albumen fleshy; embryo large, cotyledons oblong.

PERAK: at 1,000 to 1,500 feet elevation, *King's Collector* 7138.

#### DOUBTFUL SPECIES.

2. *ISONANDRA RUFa*, King & Gamble, n. sp. A small tree, reaching 20 to 30 feet in height and 4 to 6 in. in diam.; younger branchlets and innovations densely ferruginous pubescent. *Leaves* membranous; obovate, long acuminate sometimes abruptly at apex, cuneate and finally more or less rounded at base; sparsely pubescent above when young, nearly glabrous when old; roughly pubescent beneath, especially on the nerves; 5 to 7 in. long, 1·5 to 2·5 in. broad; midrib prominent; main-nerves 8 to 10 pairs, irregularly distanced, at first at an angle of about 45° with the midrib, then arching upwards; secondary nerves and reticulations prominent; petiole ·3 in. long, slender, rusty-pubescent, channelled above; stipules very short, subulate, rusty-pubescent, very caducous. *Flowers* solitary or in pairs in the axils of the upper leaves or on the upper branchlets, very small; pedicels slender, ·25 in. long, recurved. *Calyx-lobes* 4, densely ferruginous-pubescent; 2 outer valvate, ovate, ·2 in. long; 2 inner imbricate, ovate, somewhat scarious and ciliate on the margins. *Corolla* tubular-campanulate; ·2 to ·25 in. long; tube slender, minutely

hairy without and near the mouth within; lobes 6 (?), linear oblong, .1 in. long, erect. *Stamens* 6 (?), .1 in. long; filaments very slender, villous; anthers ovate, penicillate-apiculate. *Ovary* rounded, glabrous; style slender, curved, .2 in. long. *Fruit* an oblong berry, about 1 in. long and .5 in. broad. *Seed* 1, testa thin, shining.

PERAK: *Scortechini* 159; *King's Collector* 4550, in dense jungle at 500 to 800 feet.

In only one flower were any traces found of the corolla and stamens, and there seemed to be 6 corolla-lobes instead of 4, and 6 stamens instead of 8. We consider it best, however, to leave the species here for the present and until better material is available.

### 5. PAYENA, A. DC.

Trees with milky juice. *Leaves* membranous or chartaceous, often silky beneath; stipules caducous. *Flowers* fascicled, rather few together, in the axils of the leaves on the upper part of the branchlets, pedicellate. *Calyx-lobes* 4, the 2 outer usually valvate enclosing the 2 inner generally imbricate. *Corolla* campanulate; tube broad, short; lobes 8, imbricate, in one or two series. *Stamens* 16, inserted on the corolla-tube; filaments short; anthers usually extrorse, ovate to linear, connective produced in an acumen; staminodes none. *Ovary* villous, usually 8-celled; style linear-subulate. *Fruit* an oblong or ovoid fleshy berry, few-seeded. *Seeds* oblong, usually somewhat compressed; testa crustaceous, shining; hilum oblong or linear, conspicuous; albumen thin; cotyledons leafy, thin, flat, nearly as long and broad as the cavity of the seed; radicle inferior, generally rather conspicuous.—*DISTRIB.* About 6 to 7 species, found in the Malay Peninsula and Archipelago.

Flowers large, reaching .75 in. in length:—

- |                                                   |    |                                 |
|---------------------------------------------------|----|---------------------------------|
| Leaves 6 to 9 in. long, silky-pubescent beneath.. | .. | 1. <i>P. Maingayi</i> .         |
| Leaves 4 to 5 in. long, glabrous on both surfaces | .. | 2. <i>P. longipedicellata</i> . |

Flowers medium-sized or small, under .75 in. in length:—

- |                                                                                                           |    |                          |
|-----------------------------------------------------------------------------------------------------------|----|--------------------------|
| Flowers in fascicles near the ends of the branchlets, having the appearance of a terminal inflorescence:— |    |                          |
| Flowers moderate-sized, berry obpyriform, acuminate at tip                                                | .. | 3. <i>P. Havilandi</i> . |
| Flowers small, berry oblong conical, truncate at tip                                                      | .. | 4. <i>P. Leerii</i> .    |

Flowers in fascicles in the axils of the leaves, never apparently terminal:—

- |                                                                    |    |                            |
|--------------------------------------------------------------------|----|----------------------------|
| Leaves glabrous, pedicels slender, flowers small                   | .. | 5. <i>P. lucida</i> .      |
| Leaves ferruginous-pubescent, pedicels short, flowers rather large | .. | 6. <i>P. dasypphylla</i> . |

### SPECIES IMPERFECTLY KNOWN.

- |                |    |    |    |    |                         |
|----------------|----|----|----|----|-------------------------|
| Leaves sessile | .. | .. | .. | .. | 7. <i>P. sessilis</i> . |
|----------------|----|----|----|----|-------------------------|

Leaves petiolate :—

- Leaves under 4 in. long, obovate or elliptic-obovate, more or  
 less obtuse .. .. . 8. *P. obtusifolia*.  
 Leaves over 4 in. long, oblong-lanceolate, acuminate .. 9. *P. selangorica*.

1. *PAYENA MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 547 (1882).

A large guttapercha-yielding tree, reaching 80 feet in height and a considerable girth; branchlets dark brown, smooth, younger branchlets and innovations rusty-tomentose; leaf-buds golden pubescent, scales .2 to .3 in. long, lanceolate. *Leaves* chartaceous; oblong, acuminate at the apex sometimes caudately sometimes abruptly, cuneate at the base; glabrous above except on the midrib, covered beneath with a silky golden-brown pubescence, afterwards glabrate; 6 to 9 in. long, 2 to 3 in. broad; midrib prominent, minutely pubescent above or glabrous; main-nerves 20 to 25 pairs, .3 to .5 in. apart, starting at an angle of about 70° with the midrib, at first parallel, ultimately ending in a looped intramarginal nerve; secondary nerves between the main-nerves, obscure like the reticulations; petiole 1 in. long, bordered above by the decurrent margins of the blade; stipules linear, subulate, .3 in. long, golden-pubescent, quickly caducous. *Flowers* fascicled, 2 to 6 together in the axils of the leaves; pedicels slender, .75 in. long, up to 1 in. in fruit and then thickened, clavate, brown-pubescent. *Calyx*-lobes 4, .4 to .5 in. long, densely brown-pubescent outside; outer pair valvate, ovate-acute, thick; inner pair imbricate, concave, keeled, acuminate, rather thin. *Corolla* white, campanulate, .6 to .8 in. long, glabrous; tube about .2 in. long; lobes 8, lanceolate, in 2 rows, the outer 4 enclosing the inner 4. *Stamens* 16, inserted on the top of the tube, .25 in. long; filaments thick; anthers as long as filaments, ovate, extrorse, crowned by a long mucro formed by the produced connective, the mucro ciliate or truncate or bifid at the apex. *Ovary* ovoid, pubescent, tapering into a subulate .8 in. long style, cells 8. *Fruit* an oblong, golden-pubescent or nearly glabrous berry up to 1.5 in. long by .8 in. broad, crowned by the remains of the persistent style, and supported by the persistent calyx-lobes, seeds 1 to 2. *Seeds* oblong, convex on one side, somewhat concave on the other, 1 to 2 in. long by .5 in. broad and .2 in. thick; testa light brown, shining, crustaceous; hilum conspicuous, slender; albumen thin; cotyledons oblong rounded, .8 in. long by .225 in. broad; radicle rather large, inferior. Pierre in Bull. Linn. Soc. Par. I. 526. *Chrysophyllum* ? *molle*, Wall. Cat. 4161.

PENANG: *Curtis* 1565. PERAK: *Scortechini* 172, 346; *Wray* 3423; *King's Collector* 7223, 7918; in open jungle or rich soil from 300 up to 2,000 feet. MALACCA: *Griffith* (K.D.) 3610; *Maingay* (K.D.)

990; Curtis 3483. SINGAPORE: *Ridley* 6239, 6497. Curtis says it is the "Taban Percha" of the Malays.

The drawing of the flower in Engl. & Prantl *Naturl. Pflanzen-Fam.* IV. i. 132, fig. 69 A-C seems a little doubtful. The identification of Wall. Cat. 4161 seems also doubtful, for *Payena Mainyayi* much resembles in leaf *Palaquium Gutta* var. *oblongifolia*.

2. *PAYENA LONGIPEDICELLATA*, Brace MS. in Herb. Cal. A tree, reaching 100 to 130 feet in height; branches slender, silvery-grey, innovations rusty-pubescent. *Leaves* chartaceo-coriaceous; oblong or elliptic-oblong, shortly acuminate at apex, rounded unequally at the base; glabrous on both surfaces, margins slightly recurved; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above; main-nerves about 18 pairs, indistinct, starting at about 85° with the midrib, at first parallel, near the margin joined in an intramarginal looped nerve; secondary nerves nearly as prominent as main-nerves, often branching backwards, reticulations few, indistinct; petiole .7 to .8 in. long, channelled above and bordered by the margins of the decurrent blade; stipules small, ovate-acute, rusty-pubescent, very caducous. *Flowers* fascicled, 1-3 together, in the axils of lower leaves or of the scars of fallen leaves; pedicels 1 to 1.5 in. long, slender, curved, striate when dry, clavate above, puberulous; flower-buds conical, large. *Calyx-lobes* 4; 2 outer valvate, ovate-acute, thick, .5 in. long, sparsely rusty-pubescent; 2 inner lanceolate-acuminate, concave, thickly keeled, .6 in. long, densely tawny-pubescent on the back. *Corolla* tubular-campanulate, .8 in. long; tube .3 in. long, glabrous; lobes 8, 4 outer enclosing 4 inner, ovate-acuminate, glabrous. *Stamens* 16, inserted in 1 row, below the top of the tube but alternate ones covered by the others; filaments very short, slender; anthers .15 in. long, ovate, rusty-hirsute, extrorse, the connective produced in a broad mucro divided in 2 diverging lobes at the tip. *Ovary* oblong, style a little longer than the corolla-lobes. *Fruit* not known.

PERAK: *King's Collector* 2940.—DISTRIB. Borneo, *Haviland* 3035.

3. *PAYENA HAVILANDI*, King & Gamble, n. sp. A large tree (?); branchlets grey, slender, innovations appressed rusty-pubescent. *Leaves* chartaceo-coriaceous; elliptic, abruptly acuminate at apex, attenuate usually unequally at base; glabrous above, glabrous beneath except on the midrib which is appressed-rusty-pubescent, margins recurved; 2.5 to 3 in. long, 1.25 to 1.75 in. broad; midrib slender; main-nerves 10 to 12 pairs, not very prominent, rather irregular, starting at about an angle of 60° with the midrib, meeting close to the margin in an intramarginal looped nerve; secondary nerves and reticulations scanty but prominent, raised beneath; petiole .4 to .5 in. long,

channelled above and bordered by the decurrent margins of the blade; stipules small, ovate-falcate, densely ferruginous-pubescent. *Flowers* fascicled, 3-4 together, in the axils of upper leaves or of terminal leafless branchlets, giving the appearance of a terminal corymbose inflorescence; pedicels .8 to 1 in. long, densely rusty-pubescent, recurved; buds ovate, .25 in. long, obtuse. *Calyx-lobes* 4, outer pair rounded, thick, appressed pubescent to nearly glabrous; inner pair thinner, scarious, ciliate. *Corolla* campanulate, .3 to .4 in. long, longer than the calyx, glabrous; lobes 8, oblong, cordate at base, crenate or ciliate on the margins, veined; tube as long as lobes. *Stamens* 16, usually in 2 rows; filaments slender, glabrous; anthers ovate, the connective broad and produced in a broad glabrous acumen, sharp in bud, flattened later on. *Ovary* linear-oblong; style slender, .5 in. long. *Fruit* an obpyriform fleshy berry, 1.5 in. long and .75 in. broad, surmounted by the persistent conical style, seed 1. *Seed* oblong, 1 in. long, .6 in. broad, flattened; testa crustaceous, shining, chestnut-brown; hilum narrow, elongated; albumen thick; cotyledons broadly oblong, .5 in. long, nerved; radicle rather large, nearly .15 in. long.

KEDAH: Lankawi Island, *Ridley* 8329. PENANG: *Curtis* 777. SINGAPORE: *Ridley* 4959, 9203.—DISTRIB. Borneo, *Haviland* 2098, 2320.

*P. CROIXIANA*, Pierre in Bull. Soc. Linn. Par. I. 524 seems to be this species or very near it. The following is Pierre's description:—

A huge tree. *Leaves* oval or sub-oblong, long acuminate, glabrous; 2-3 in. long, .3 in. broad; main-nerves 24 to 28, petiole .25 in. *Flowers* 3, axillary, sub-terminal; peduncles .2 to .3 in. long, .6 in. in fruit. *Sepals* ovate, ciliate. *Corolla-tube* pubescent without; lobes oblong, truncate at the apex, ciliate; filaments very short; anthers sub-oblong with a long connective, obtuse, pilose on both sides. *Ovary* 8-celled, tomentose, urceolate at the base of the style. *Berry* oblong, .8-1.2 in. long, .5-.6 in. broad, glabrous, 1-seeded; pericarp .06 in. thick; hilum under .04 in. broad, laterally extended over the whole height; cotyledons .8 in. long; .02 in. broad, radicle .14 in. long.

MALACCA: St. Pol Lias; Mad. Errington de la Croix in Paris Mus. "Sundek."

4. *PAYENA LEERII*, Benth. & Hook. f.; Pierre in Bull. Soc. Linn. Par. i. 524 (1885). A tree, reaching 80 to 100 feet in height and a considerable girth; branchlets grey, slender; innovations minutely rusty-pubescent. *Leaves* chartaceous; elliptic, abruptly acuminate at apex, acute or somewhat rounded at base; upper surface glabrous, shining, lower surface sparsely pubescent to glabrous; margins undulate, recurved; 2 to 4 in. long, 1 to 2 in. broad; midrib prominent, impressed

above; main-nerves 14 to 18 pairs, slender, about .2 in. apart, inconspicuous, more or less parallel, starting at an angle of about 80° with the midrib, straight almost to the margin where they are connected by a looped intramarginal nerve; secondary nerves many, forking backwards, reticulations faint; petiole slender, .75 in. long, channelled above by the decurrent margins of the blade; stipules short, subulate, pubescent, very caducous. *Flowers* fascicled, 3-4 together, in the axils of upper leaves, or on terminal leafless branchlets, giving the impression of a terminal inflorescence; pedicels slender, .4 in. long, pubescent. *Calyx-lobes* 4, .15 in. long, the 2 outer ovate-valvate, minutely pubescent; the 2 inner ovate, truncate at apex, almost scarious on the margins, pubescent, imbricate. *Corolla* campanulate; tube .05 in. long, glabrous; lobes 8, imbricate, the 4 rather smaller outer embracing the 4 larger inner, ovate-obtuse, .15 in. long. *Stamens* 16, inserted in one row on the top of the corolla-tube, those opposite the lobes longer than and behind those alternate with them; filaments very short, hairy; anthers ovate, .075 in. long, extrorse, the connective produced in a rather thick penicillate mucro. *Ovary* villous, depressed, obscurely 8-lobed; style subulate, glabrous above, pubescent below, .2 in. long; cells 8. *Fruit* an ovate-oblong conical reddish-green berry, 1.5 to 1.75 in. long, obscurely ribbed and rough, at first tipped with the conical remains of the style, afterwards truncate seed 1. *Seed* 1 in. long, about .4 in. broad, oblong; testa thin crustaceous, dark brown; hilum long, narrow; albumen thin; cotyledons oblong, .85 in. long, .35 in. broad, faintly 3-nerved; radicle small, inferior. Kurz in Journ. As. Soc. Beng. XL. (1871) II. 69; Burck in Ann. Jard. Buit. V. (1885) 56, tab. VIII.; Engl. and Prantl Pflanzenfam. IV. i. 133, fig. 70. *Keratephorus Leerii*, Hassk. Retzia I. (1856) 101; Miq. Fl. Ind. Bat. II. 1039. *Azaola Leerii*, Teysm. & Binnend. in Nat Tijdschr. Neerl. Ind. VI. 116.

PERAK: *Wray* 1539, at 4,900 feet on Batang Padang; *King's Collector* 523. SINGAPORE: *Cantley* 20.—DISTRIB. Sumatra, Bangka, Borneo (?), Amboina. *Vern.* "Getah SundeK." It gives a second-rate variety of guttapercha.

To this species probably belong *Ridley* 11313, *Curtis* 3631, and *David* 10857, all apparently from Sumatra—*Vern.* "Getah Sundi." The specimens have leaves only.

*Curtis'* No. 3640 "Getah SundeK" from the Dindings is either this species or *P. Havilandi*; but the fruit is globose, not elongate or obconical. It seems, however, to have been more or less attacked by insects, and may not show its proper shape.

5. PAYENA LUCIDA, A. DC. Prod. VIII. 197 (1844). An evergreen tree

reaching a height of 60 feet and considerable girth; branchlets slender, dark brown, innovations rusty-tomentose. *Leaves* chartaceous; elliptic, elliptic-oblong or elliptic-lanceolate, obtusely and rather abruptly caudate-acuminate at apex, acute at base and unequal-sided; glabrous on both surfaces, the margins slightly recurved; 4 to 5 in. long, 1·5 to 2 in. broad; midrib prominent, slender; main-nerve 10 to 12 pairs, not prominent, rather irregular, ·3 to ·4 in. apart, starting at an angle of about 60° with the midrib, straight at first, arching near the margin to meet in a looped intramarginal nerve; secondary nerves and reticulations rather scanty; petiole ·4 in. long, channelled above; stipules very minute, linear, silky-pubescent, caducous. *Flowers* fasciated, 1 to 4 together, in the axils of upper leaves; pedicels slender, ·7 to ·8 in. long, somewhat clavate, minutely silky; buds conical, ·1 to ·2 in. long. *Calyx-lobes* 4, 2 outer valvate, thick, enclosing 2 inner, broad, ovate, obtuse, ciliate, often scarious on the margins, ·2 in. long. *Corolla* white, campanulate, ·2 to ·3 in. long; tube short; lobes 8, oblong, obtuse or rounded in 2 rows, 4 outer enclosing 4 inner. *Stamens* 16, ·12 in. long; filaments short, thick; anthers ovate, the connective produced into an obtuse, glabrous, often bifid acumen, cells extrorse. *Ovary* villous, rounded; style subulate, glabrous, ·3 in. long, 6-celled. *Fruit* an oblong, ferruginous-pubescent berry, 1 to 1·5 in. long, ·7 in. broad, 1-seeded. *Seed* oblong, bluntly acute at both ends, flattened, ·8 in. long, ·5 in. broad, ·3 in. thick; testa chartaceous, chestnut-brown, shining; hilum about ·15 in. broad occupying the whole inner edge; albumen thick; cotyledons oblong, thin, flat, faintly nerved as the leaves, ·6 in. long, ·4 in. broad; radicle rather large, inferior. Kurz For. Fl. II. 121, Journ. As. Soc. Beng. XL. ii. 69, and XLVI. ii. 230; Clarke in Hook. f. Fl. Br. Ind. III. 547; Pierre in Bull. Soc. Linn. Par. I. 525. *Mimusops lucida*, Wall. Cat. 4147; G. Don Gen. Syst. IV. 35 (*not of Poir.*).

PENANG: Wallich 4147. PERAK: Scortechini 1989; Wray 2266, 3114, 3191, 3482; King's Collector 3364, 3734, 6636. SINGAPORE: Lobb 307; Ridley.

VAR. *Wightii*, Clarke in Hook. f. Fl. Br. Ind. III. 548. *Leaves* large, up to 6 in. long and 2·5 broad, coriaceous; pedicels stout; sepals large, rusty-tomentose. *Payena polyandra*, Bth. & Hook. f.; Pierre in Bull. Linn. Soc. Par. I. 526. *Isonandra polyandra*, Wight Ic. t. 1589. *Keratephorus Wightii*, Hassk. in Retzia I. 101.

Of this variety Clarke makes two forms, which he distinguishes chiefly by the former having short acuminations to the leaves, the latter long acuminate leaves. We have separated the material into these two groups as well as we can.

Form (1): Leaves up to 6 in. long, 2·5 in. broad, abruptly acuminate, shining

above, ferruginous-red beneath when dry; flower-buds ovoid, .2 in. long or more, rusty-pubescent. Pedicels stout, clavate; fruit oblong, depressed at top; anther-connective not so broad as in *P. lucida*.

MALACCA: *Griffith* (K.D.) 3605 (part); *Maingay* (K.D.) 194; *Hervey*; *Derry* 937; *Holmberg* 794; *Goodenough* 1977. PERAK: *King's Collector* 8705.

Form (2): Leaves up to 6 in. long, oblong-lanceolate, long-acuminate, reddish beneath when dry; nerves more prominent than in *P. lucida*; pedicels slender, .8 to 1.2 in. long; buds ovoid, sometimes flattened, .2 to .3 in. long, rusty-pubescent; young fruit oblong conical, tipped by the persistent style; old fruit oblong, over 1 in. long. *P. costata*, King MS. in Herb. Cale.

MALACCA: *Griffith* (K.D.) 3605 (part); *Maingay* (K.D.) 989; *Goodenough* 1853; *Derry* 654; *Curtis* 3644, 3660. PENANG: *Curtis* 1516. PERAK: *King's Collector* 3734, 4081, 7842, 7957, 10466, 10496, 10978. PAHANG: *Ridley* 2672. SELANGOR: *Goodenough* 10545. SINGAPORE: *Ridley* 3995, 5070, 6508, 11305.

VAR. *nigra*, King & Gamble. Leaves much larger than in the specimens of true *P. lucida*, elliptic, long caudate-acuminate at apex, more or less rounded at base, undulate on the margins, 6 to 8.5 in. long, 2.5 to 4 in. broad; main-nerves and intramarginal nerve very prominent, raised beneath; flower-buds and pedicels often golden-pubescent. Flowers as in *P. lucida*.

PERAK: *Wray* 1170; *Scortechini*.

P. LOWIANA, Pierre in Bull. Soc. Linn. Par. I. 524, seems to be one of the varieties of *P. lucida* or a species allied to it. The following is Pierre's description:—

A huge tree. Leaves with petiole .4 in. long; blade 5 in. long, 1.2-1.6 in. broad, oblong-lanceolate, obtusely acuminate, glabrous; main-veins 24, distant. Fruiting peduncles axillary, 1-1.2 in. long, solitary. Berry oblong, 1.3 in. long by .8 in. broad, sub-glabrous, crowned at the top with the remains of the style. Seed solitary, 1.1 in. long, .35 in. in diam., erect; hilum lateral, .08 in. broad; cotyledons oblong, attenuate at the apex, .8 in. long by .2 in. broad; radicle .15 in. long. *P. lucida* MS. in Herb. Mus. Par.

PERAK: *Sir Hugh Low*; *St. Pol Lias* No. 272.

6. PAYENA DASYPHYLLA, Pierre in Bull. Soc. Linn. Par. I. 527 (1885). A large tree, reaching 80 to 100 feet in height and considerable girth; branches spreading, branchlets greyish-brown, moderately thick; innovations densely ferruginous-pubescent. Leaves membranous; oblong or elliptic-oblong or obovate-oblong, often unequal-sided; acuminate at apex, acute, cuneate or somewhat rounded at base; glabrous above except on the midrib and near the base, densely ferruginous-pubescent beneath, when old nearly glabrous; 4 to 8 in. long, 1.5 to 3 in. broad; midrib thick, pubescent on both surfaces; main-nerves 12 to 16 pairs, unequally spaced, starting at about 60° with the midrib, produced straight to meet a looped intramarginal nerve; secondary

nerves rather prominent, reticulations irregular; petiole .5 in. long, thick, densely rusty-pubescent, channelled above; stipules subulate, rusty-pubescent, short, early caducous. *Flowers* fascicled, 1 to 3 together, in the axils of the leaves; pedicels thickly rusty-pubescent, .4 to .6 in. long, somewhat enlarged in fruit; buds ovoid. *Calyx-lobes* 4, 2 outer thick, valvate, .3 in. long, triangular-rounded, densely rusty-pubescent; 2 inner concave, slightly imbricate, .35 in. long, thickly keeled, scarious on the margins and ciliate, rusty-pubescent around the keel. *Corolla* tubular-campanulate, .3 in. long; tube .1 in. long, glabrous; lobes 8, the 4 outer enclosing the 4 inner but inserted in one row, oblong, obtuse. *Stamens* 16, .175 in. long, inserted on the top of the tube; filaments .05 in. long, villous; anthers nearly linear, extrorse, the connective produced in a .05 in. long, blunt or even bifid acumen. *Ovary* conical, villous as is the base of the .35 in. long subulate style. *Fruit* an ovoid densely tawny-pubescent berry .75 to 1 in. long, umbonate at the tip and crowned with a portion of the style. *Seeds* .4 to .5 in. long, elliptic-acute; testa dark brown, shining; hilum narrow; albumen thin. Burck in Ann. Jard. Buit. V. 51. *Isonandra dasyphylla*, Miq. Pl. Jungh. 201 and Fl. Ind. Bat. II. 1038; de Vriese Journ. Bot. Neerl. I. 256.

PERAK: *Scortechini* 1242; *King's Collector* 2611, on Larút Peak at 3,000 to 3,500 feet.—DISTRIB. Sumatra, Java.

De Vriese says the gutta is only used for adulteration, but that Motley did not agree in this belief.

VAR. *glabrata*, King & Gamble. Lower surface of the leaves nearly glabrous, apex abruptly long-acuminate; pedicels .8 to 1 in. long; fruit nearly spherical.

PERAK: *Scortechini* 536. SINGAPORE: at Selitar, *Ridley* 5644.

7. PAYENA SESSILIS, King & Gamble, n. sp. A tree (?); branchlets grey, rough, uppermost somewhat angular when dry. *Leaves* coriaceous, sessile; obovate, obtuse or emarginate; glabrous on both surfaces, margins recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib prominent, raised on both surfaces; main-nerves not prominent on the upper surface, raised on the lower, about 8 pairs, at about 50° with the midrib, straight but soon anastomosing with the prominent reticulations which are also raised on the lower surface; stipules ovate, acute or obtuse, glabrous, caducous. *Flowers* fascicled, 2 to 3 together, on small tubercles in the axils of upper leaves; pedicels slender, black, .5 in. long, supported by small hard glabrous bracts. *Calyx-lobes* in fruit 4, .2 in. long, ovate-acute, glabrous; rest of flower not seen. *Fruit* a globose glabrous berry, black when dry, prominently surmounted by the

persistent long curved style; cells apparently 4 to 6. *Seeds* oblong, obtuse at top, acute at base, .3 to .4 in. long, rounded on the outer, straight on the inner side; hilum long, narrow; testa thin crustaceous, brown; albumen rather thin; cotyledons oblong, flat, .15 to .2 in. in length; radicle rather large,

SINGAPORE: *Ridley* 5076.

8. *PAYENA OBTUSIFOLIA*, King & Gamble, n. sp. A tree; branchlets stout, greyish-brown, prominently marked by the scars of fallen leaves and the tubercles of fallen flower fascicles, young branchlets and leaves rusty-brown in colour. *Leaves* coriaceous; clustered at the ends of the branchlets, obovate or elliptic-obovate, obtuse, emarginate or shortly acute at apex, cuneately attenuate at base; glabrous on the upper surface, rusty-coloured and sometimes pubescent on the lower; 2.5 to 3 in. long, 1 to 1.5 in. broad; midrib stout, main-nerves 10 to 12 pairs, starting at about 60° with the midrib, slightly curving upwards, inconspicuous above as are the reticulations; petiole .5 to .75 in. long, channelled above by the decurrent margins of the blade. *Flowers* fascicled, 4 to 8 together (to judge by scars only) in the axils of the leaves, or of the scars of fallen leaves; pedicels .5 in. long, clavate, pubescent; buds about .3 in. long, truncate. *Calyx-lobes* 4, 2 outer valvate, ovate-acute, .3 in. long, pubescent; 2 inner imbricate, ovate, golden-pubescent on the back, ciliate on the margins. *Corolla* not seen. *Ovary* ovoid-conical, glabrous, 8-celled; style .35 in. long, linear. *Fruit* not seen.

PERAK: *Scortechini* 340.

9. *PAYENA SELANGORICA*, King & Gamble, n. sp. A tree (?); branchlets dark brown, rough. *Leaves* chartaceo-coriaceous; oblong-lanceolate, acuminate at apex, narrowly attenuate at base, glabrous above, slightly pubescent on the sides of the midrib beneath; 4 to 6 in. long, 1 to 1.7 in. broad; midrib prominent, impressed and keeled above; main-nerves about 16 pairs, indistinct, parallel, at about 80° with the midrib, straight at first, anastomosing near the margin with the secondary nerves and reticulations, which are visible but not prominent; petiole .5 to .7 in. long, channelled above, enlarged at base. *Flowers* fascicled, 2 to 3 together, in the axils of the leaves; pedicels rather thick, .6 to .8 in. long, striate, appressed rusty-pubescent. *Calyx-lobes* 4, outer pair valvate .3 in. long, ovate-acute, thick below, thinner above; inner pair ovate, .25 in. long, scarious on the margins; both appressed rusty-pubescent; rest of flower not seen. *Ovary* pubescent, cylindrical, depressed at top; fruit immature, seed apparently albuminous, with an elongated hilum.

SELANGOR: *Ridley* 7387.

## 6. BASSIA, Linn.

Trees with milky juice. *Leaves* coriaceous or chartaceous, often clustered at the ends of the branchlets; stipules caducous. *Flowers* fascicled, in the axils of the leaves or of the scars of fallen leaves, pedicellate, pedicels frequently reflexed. *Calyx-lobes* 4, the 2 outer usually valvate, enclosing the 2 inner imbricate. *Corolla* campanulate; tube broad; lobes 6 to 12, contorted in bud, erect in flower, imbricate. *Stamens* twice the number of the corolla-lobes or more, inserted in one or more rows on the corolla-tube; filaments usually short; anthers generally lanceolate, laterally or extrorsely dehiscent; connective generally produced in an acumen; staminodes none. *Ovary* villous, 4-12- (usually 6-8-) -celled; style linear, subulate, more or less elongate. *Fruit* a globose or oblong or ovoid berry, few-seeded. *Seeds* ellipsoid, usually compressed; testa crustaceous, shining; hilum oblong or linear, conspicuous; albumen none; cotyledons thick, fleshy; radicle small.—  
DISTRIB. About 40 species, found in India, Ceylon, the Malay Peninsula, and Malay Archipelago.

In several of the species the fruit is unknown, and some of these may prove, when it becomes available, to belong to *Payena*, which is hardly separable except by the important character of having albuminous seeds and leafy cotyledons.

We have not followed Baillon and Engler in changing the name of this genus to *Illipe*, as we agree in the opinions expressed by Drs. Trimen ("Flora of Ceylon") and Cooke ("Flora of Bombay") that the word *Illipe* was not intended by König to be employed as the name of a genus, but was merely mentioned as being the vernacular name employed by the natives of Malabar for one of the species.

- Flower-buds large, nearly .75 in. long, conical; intramarginal nerve of leaves prominent; pedicels thick, 1.5 to 2 in. long .. 1. *B. aristulata*.
- Flower-buds moderately large, about .4 in. long, globose; intramarginal nerve present; pedicels short, about .4 in. long:—
- Intramarginal nerve conspicuous; leaves 10 to 14 in. long .. 2. *B. Kingiana*.
- Intramarginal nerve faint; leaves 4 to 6 in. long .. 3. *B. Kunstleri*.
- Flower-buds moderately large, .4 in. long or rather less, conical:—
- Leaves large, over 6 in. long; main-nerves prominent:—
- Pedicels over 1 in. long; leaves coriaceous, silky-pubescent beneath; main-nerves straight, intramarginal nerve present; connective of anthers penicillate .. .. 4. *B. penicillata*.
- Pedicels under .6 in. long; leaves chartaceous, sparsely pubescent beneath; main-nerves curved, no intramarginal nerve; connective of anthers not penicillate .. .. 5. *B. malaccensis*.
- Leaves moderate-sized, under 6 in. long; main-nerves not prominent .. .. 6. *B. Curtisii*.
- Flower-buds small, under .3 in. long, usually conical, generally in many-flowered fascicles:—
- Pedicels usually under .5 in. long:—
- Pedicels and flower-buds densely tawny-pubescent; connective of anthers produced in a long point .. .. 7. *B. laurifolia*.

- Pedicels and flower-buds thinly rusty-pubescent; connective of anthers produced in a short ciliate point .. .. 8. *B. rupicola*.
- Pedicels .5 in. long or longer:—
- Flowers fascicled in the axils of upper leaves generally, rarely on old wood below them:—
- Leaves glabrous, coriaceous, main-nerves indistinct .. 9. *B. perakensis*.
- Leaves grey-silky-pubescent beneath, almost coriaceous, main-nerves distinct but not prominent .. .. 10. *B. argentea*.
- Leaves only slightly pubescent beneath, chartaceous, main-nerves very prominent .. .. 11. *B. Braceana*.
- Flowers fascicled chiefly in the axils of the scars of fallen leaves, on old wood:—
- Leaves chartaceous, elliptic; main-nerves prominent .. 12. *B. longistyla*.
- Leaves coriaceous, oblong; main-nerves not prominent:—
- Main-nerves of leaves (under 6 in. long) curved upwards, but no intramarginal nerve; anther-connective long-apiculate .. .. 13. *B. cuprea*.
- Main-nerves of leaves (over 6 in. long) meeting in an intramarginal nerve; anther-connective shortly apiculate .. .. 14. *B. Motleyana*.

SPECIES OF WHICH FLOWERS ARE IMPERFECTLY KNOWN.

- Leaves under 5 in. long, obovate, obtuse, greenish-brown when dry .. .. 15. *B. cuneata*.
- Leaves 5 to 7 in. long, oblong-lanceolate, greyish-green when dry .. .. 16. *B. penangiana*.
- Leaves 6 to 8 in. long, obovate-oblong, orange-red when dry .. 17. *B. erythrophylla*.

1. *BASSIA ARISTULATA*, King & Gamble, n. sp. A tree; branchlets stout, brown, lenticellate. *Leaves* coriaceous; oblong, shortly and rather suddenly acute at apex, somewhat rounded unequally and then decurrent at base; glabrous on both surfaces except on the midrib beneath; margins slightly recurved; 6 to 10 in. long, 3 to 4 in. broad; midrib thick, prominent, impressed above; main-nerves 24 to 28 pairs, conspicuous, parallel, .3 to .4 in. apart, starting at about 75° with the midrib, scarcely curved, meeting in a conspicuous intramarginal looped nerve; reticulations oblique, not prominent; petiole 1.5 to 2 in. long, grooved above, much thickened below. *Flowers* fascicled, about 2 to 6 together, in the axils of the leaves or of the scars of fallen leaves, on very short tubercles; pedicels thick, 1.5 to 2 in. long, densely golden-pubescent, flattened under the flower; buds elongate, conical, nearly .75 in. long. *Calyx-lobes* 4, .5 to .7 in. long; the 2 outer valvate, triangular-ovate, pubescent; the 2 inner imbricate, concave, ovate, pubescent. *Corolla-tube* short, .2 to .3 in. long, funnel-shaped, densely pubescent inside; lobes 8 to 9, oblong-lanceolate, .4 in. long, pubescent without. *Stamens* many, up to 36, in 2 or 3 rows, lowest row about 8 to 9, second row 16 to 18, third row 8 to 9, inserted on the top of the corolla-tube; filaments very short, pubescent; anthers

oblong, thin, .2 in. long, opening along their edge; connective black, prominent, ending in a long sharp awn, the anthers usually twisted half round. *Ovary* silky-pubescent, flat at top, style glabrous about equal to corolla, cells 10 to 12. *Fruit* not known.

PERAK: at Goping, *Scortechini* 1984.

Said by *Scortechini* to give a guttapercha.

2. *BASSIA KINGIANA*, Brace MS. in Herb. Calc. A tree, reaching 50 to 60 feet in height, and 10 to 15 in. in diam.; branchlets thick. *Leaves* coriaceous, dark green; obovate-oblong, rounded and then shortly and abruptly acuminate at apex, cuneate at base; glabrous on both surfaces, margins slightly reflexed; 10 to 14 in. long, 3.5 to 4.5 in. broad; midrib very strong, prominent; main-nerves about 20 pairs, conspicuous, .5 to .7 in. apart, starting nearly at right angles to the midrib and curving upwards to meet in a conspicuous intramarginal looped nerve; secondary nerves few but prominent; reticulations distant, not numerous; petiole 2 in. long, grooved above, swollen at base, and then conspicuously rugose when dry; stipules subulate-acuminate from a broad base, very quickly caducous. *Flowers* fascicled, about 3 to 5 together, on small tubercles above the scars of fallen leaves on the previous year's wood; pedicels recurved, thick, .4 in. long, enlarged above, covered as also the calyx with appressed tawny pubescence; buds globose, about .4 in. long. *Calyx-lobes* 4, .4 in. in diam.; outer 2 imbricate, rounded emarginate, thick; inner 2 also imbricate, concave, ciliate on the margins. *Corolla-tube* funnel-shaped, .15 in. long, rusty-hirsute without, pubescent within; lobes 12 to 16, white, much imbricate or in 2 rows, spatulate, ciliate on the margins, hirsute, .25 in. long. *Stamens* many, 32 to 36, in 2 rows on the top of the corolla-tube; filaments .1 in. long, rather stout, densely hirsute; anthers linear-oblong, .125 in. long; connective produced into a broad appendage, penicillate at tip, in bud merely aristate. *Ovary* rounded, villous; style thick, curved, pubescent, .3 in. long, with minute stigmatic lobes; cells about 8. *Fruit* a globose, thickly tawny-pubescent, berry, .75 in. in diam., surmounted by the long subulate persistent style, seeds 1 to 2. *Seed* not seen.

PERAK: *King's Collector* 3314, 3678, 7389; in open jungle at 300 to 500 feet. SINGAPORE: *Ridley* 6238, 6294.

3. *BASSIA KUNSTLERI*, Brace MS. in Herb. Calc. A tree with spreading branches, reaching a height of 30 to 40 feet and 10 to 15 in. in diam.; branchlets slender, grey, innovations rusty-pubescent. *Leaves* chartaceous; obovate-oblong or oblong, abruptly acuminate at apex, acuminate at base, glabrous on both surfaces; 4 to 6 in. long,

1.5 to 2 in. broad; midrib slender, prominent; main-nerves 15 to 20 pairs, starting at an angle of about  $60^\circ$  to the midrib and curving upwards to meet in a faint intramarginal looped nerve; secondary nerves and reticulations prominent; petiole slender, 1 to 1.5 in. long, bordered above in its upper part by the decurrent margins of the blade, base enlarged, sometimes twisted. *Flowers* solitary or fascicled 2 to 3 together in the axils of the leaves, or above the scars of fallen leaves; pedicels thick, .3 to .4 in. long, usually recurved, densely rusty- or golden-pubescent like the calyx-lobes and fruit; buds ovoid-orbicular about .4 in. long. *Calyx-lobes* 4, .4 in. long; outer valvate, ovate-orbicular; inner imbricate, concave, somewhat emarginate, thin and ciliate on the edges. *Corolla* tubular-campanulate; tube about .125 in. long, glabrous on both sides; lobes 16, in 2 rows, very much imbricate, shortly spatulate, rounded at top, fimbriate on the margins, shortly pubescent within, 3-nerved. *Stamens* about 32, in 2 rows, mixed with long unicellular brown hairs; filaments thick, about 0.5 in. long; anthers oblong, opening by marginal slits, often twisted half round; connective conspicuous, produced in a sharp mucro. *Ovary* rounded, villous; style subulate, .5 to .7 in. long; cells about 8. *Fruit* an ovoid densely pubescent brown berry, .8 to 1 in. long, 1-2-seeded, surmounted by the persistent style. *Seed* ovoid, obliquely pointed below, rounded above, .7 in. long, .4 in. in diam., sometimes flattened on one side; testa thin, crustaceous, chestnut-brown, shining; hilum very large, obovate; albumen none; cotyledons thick, .5 in. long, ovate; radicle small, pointed.

PERAK: on Larut peak, at 500 to 2,600 feet, *King's Collector*, 3241, 3547, 3964, 6410; *Wray* 2643, 3201; *Curtis* 3694; *Ridley* 5536.

4. *BASSIA PENICILLATA*, King & Gamble, n. sp. A large tree, reaching 60 feet in height with a girth of 4 feet; ultimate branchlets and innovations densely ferruginous-pubescent. *Leaves* coriaceous; oblong or somewhat obovate-oblong, shortly and abruptly acute at apex, unequally rounded at base; glabrous above, thickly golden-silky-pubescent beneath when young, afterwards glabrate; margins recurved; 6 to 10 in. long, 2.5 to 3.5 in. broad; midrib thick, prominent, impressed and keeled above; main-nerves 24 to 28 pairs, conspicuous, parallel, .3 to .5 in. apart in large leaves, starting at about  $80^\circ$  with the midrib, curved only near the margin to meet in an inconspicuous looped intramarginal nerve; secondary nerves many in large leaves; reticulations oblique, not prominent; petiole 1.2 to 1.5 in. long, thickened below. *Flowers* fascicled, about 1 to 4 together in the axils of the leaves, on very short rusty-pubescent tubercles; pedicels 1 to 1.2 in. long, slender, pubescent; buds conical. *Calyx-lobes* 4, sometimes 5, .4 in. long; outer pair ovate-acuminate, densely rusty-pubescent, thick; inner pair,

sometimes 3, ovate acuminate, thinner, pubescent on the back, ciliate and more or less scarious on the margins. *Corolla* campanulate, .4 in. long; tube nearly .2 in. long, glabrous outside, densely ferruginous hairy within in the upper half; lobes 10 (?), lanceolate, acuminate, as long as tube. *Stamens* 20 in 1 row, but the 10 opposite the corolla-lobes behind the 10 alternate with them; filaments .05 in. long, hairy; anthers linear-sagittate, extrorse, the connective produced in a long penicillate acumen. *Ovary* rounded, densely hairy, as is the lower half of the .75 in. long slender style; cells 10. *Fruit* not known.

PROVINCE WELLESLEY: at Tassek Glugor, *Curtis* 3737, said to be common. Vern. name "*Minjato*."

In its leaves this species greatly resembles *B. aristulata*, but the slender pedicels, smaller flowers, acuminate calyx, and penicillate anthers at once distinguish it.

5. *BASSIA MALACCENSIS*, King & Gamble. A large tree (?); branchlets dark brown, rough, with prominent old leaf-scars, innovations nearly glabrous. *Leaves* chartaceous or almost membranous; obovate or obovate-oblong, obtuse or shortly and abruptly acute at apex, cuneate at base; glabrous above, sparsely and minutely pubescent beneath when young, glabrous when old; 6 to 12 in. long, 4 to 6.5 in. broad; midrib prominent, thick; main-nerves very conspicuous, 14 to 16 pairs, parallel, in average leaves .5 in. apart, in large ones often nearly 1 in., starting at an angle of 60° with the midrib, at once curving gently upwards to and along the margin; secondary nerves few, reticulations mostly transverse, not prominent; petiole 1 to 2 in. long, slightly bordered above to about half-way down by the decurrent margins of the blade, base much swollen, wrinkled. *Flowers* fascicled 4 to 8 together in the axils of the leaves or of the scars of fallen leaves, on rather thick pubescent tubercles; pedicels .4 to .6 in. long, pubescent; buds when young rounded-conical. *Calyx-lobes* 4; 2 outer valvate or slightly imbricate, ovate, bluntly acute or mucronate, rusty-pubescent, .25 in. long; 2 inner imbricate, ovate-acute, margins sometimes scarious, sometimes ciliate, back thickly rusty-pubescent, more or less keeled. *Corolla* campanulate; tube very short, rarely .1 in. long, with a short ring of hairs at the mouth inside; lobes 10-12, lanceolate, obtuse, sub-2-seriate, .25 to .3 in. long, glabrous except for a few stiff hairs outside. *Stamens* 20 to 24 in 2 rows; the inner almost or quite sessile, alternate with the corolla-lobes; the outer with short densely pubescent filaments, longer than the inner ones; anthers narrowly lanceolate with long hairs, opening on the margins; connective produced in a long hair-like acumen. *Ovary* hairy, elongate, conical, style .25 in. long. *Fruit* a fleshy obovate-oblong berry with somewhat flattened top, surmounted

by the persistent base of the style and supported by the persistent calyx-lobes, nearly 1 in. long. *Seed* 1, oblong, acute at the top, .7 in. long, .35 in. broad, and about .3 in. thick; testa shining, crustaceous, chestnut-brown; hilum .15 to .2 in. broad; albumen none; cotyledons thick, inner face somewhat striate; radicle rather large, inferior. *Payena malaccensis*, Clarke in Hook. f. Fl. Br. Ind. III. 547. *Keratephorus Wightii*, Maingay MS. (not of Hassk.).

MALACCA: *Griffith* (K.D.) 3610; *Maingay* (K.D.) 992. PERAK: *Wray* 1229; *Scortechini* 314. SINGAPORE: *Ridley* 2082, 2757, 5643, 6042, 6132, 6133, 6498, 6499, 6500, 6531, 8078, 10159.

Wray says this species gives only a sticky gutta in small quantities.

6. *BASSIA CURTISII*, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height; branches greyish-brown, strongly marked by the scars of fallen leaves and the prominent tubercles of fallen flowers, innovations very slightly rusty-pubescent, thick. *Leaves* very coriaceous; clustered at the ends of the branchlets, obovate or sometimes lanceolate-obovate, obtuse emarginate or very suddenly and shortly blunt-acuminate; glabrous on both surfaces, margins strongly recurved; 4 to 6 in. long, 1.25 to 2.5 in. broad; midrib stout, prominent; main-nerves not prominent, 14 to 15 pairs, at an angle of about 70° with the midrib, .3 to .4 in. apart, straight, joined near the margin by a looped intramarginal nerve; secondary nerves prominent, reticulations few; all raised on the under surface; petiole .7 to 1 in. long, rather thick, bordered by the decurrent margins of the blade, base swollen. *Flowers* fascicled, many (10 to 12) together on prominent tubercles in the axils of the scars of fallen leaves below the leaf-cluster, and covering the branchlets densely for a distance of about 4 in.; pedicels .25 (buds) to .5 (flower) in. long, somewhat angular, decurved, densely pale tawny-pubescent; buds ovoid-conical. *Calyx-lobes* rounded, obtuse, densely tawny-pubescent, .2 in. long, the outer pair thick, the inner somewhat keeled, scarious on the margins. *Corolla* campanulate, rather longer than the calyx; tube short, glabrous except for the ring of hairs at the insertion of the stamens; lobes 8, oblong spatulate, ciliate and hirsute at the tip. *Stamens* 16; filaments short, slender, villous; anthers ovate-acute, the connective ending in a sharp conical acumen, extrorse. *Ovary* rounded, villous; style thick glabrous, stigmas minute; cells 8. *Fruit* an oblong berry, covered without with appressed golden pubescence, .5 to .7 in. long, .5 in. broad, crowned with the persistent style and supported by the persistent calyx; seeds 1-2, placentas thin. *Seeds* oblong, pointed at the ends; testa crustaceous, shining; hilum narrow; albumen none; cotyledons thick, fleshy, radicle small.

PENANG: *Curtis* 1451, 3536. PERAK: *Wray* 512, Vern. "Gutta Gannu"; *Scortechini* 1408.

This species comes near both to *B. Motleyana*, from which it differs in having more coriaceous leaves, larger flowers, and a pubescent fruit; and to *B. cuneata*, in which the leaves (judging from the poor specimens in Kew Herbarium) are thinner and the fruit larger and nearly glabrous, with more rounded seeds and a broad hilum.

7. *BASSIA LAURIFOLIA*, King & Gamble, n. sp. A tree reaching 60 feet in height and a diam. of 12 to 18 in.; branches spreading; branchlets pale brown, rather thick, innovations densely pubescent with yellowish-tawny hairs. *Leaves* chartaceous; obovate-lanceolate, gradually acuminate at apex, also at base; glabrous on both surfaces except on the sides of the midrib beneath; 5 to 10 in. long, 1.5 to 3.5 in. broad; midrib prominent, impressed and keeled above; main-nerves prominent, regular, 14 or 15 pairs, about .3 in. apart, starting at about 45° with the midrib, gradually curving upwards; reticulations obliquely transverse, faintly marked; petiole .75 to 1 in. long, slender, glabrous above, tawny-pubescent at base, bordered by the decurrent margins of the blade and marked above by the produced keel of the midrib; stipules linear-subulate, tawny-pubescent, nearly .5 in. long, very caducous. *Flowers* fascicled, about 6 together, on hairy tubercles in the axils of the leaves or of the scars of fallen leaves near the top of the branchlets; pedicels .4 to .5 in. long, usually recurved, densely tawny-pubescent, thicker in fruit; buds small, conical. *Calyx-lobes* 4, about .2 in. long, rather narrowly ovate; the outer pair obtuse; the inner acute, all densely tawny-pubescent without, glabrous within. *Corolla* campanulate; tube .05 in. long with a ring of hairs at the mouth inside; lobes 8, oblong-spathulate, .1 in. long, glabrous. *Stamens* 14 to 16, .1 in. long; filaments short, thickly hairy; anthers linear-sagittate, the connective produced in a long sharp acumen. *Ovary* rounded, glabrous; style slender, .3 in. long; cells apparently 8. *Fruit* a black glabrous oblong berry about .6 to .7 in. long and .4 in. broad. *Seed* 1, ovoid, .5 to .6 in. long, slightly compressed; testa thin, crustaceous, shining, dark brown; hilum broad; albumen none; cotyledons oblong, fleshy, about .3 in. long and nearly .2 in. broad; radicle inferior, rather large.

PERAK: on low ground, *King's Collector* 3104, 3718, 3720.

VAR. *obtusata*, King & Gamble. *Leaves* obtuse with an abrupt acumen. *Calyx-lobes* obtuse, thickened at tip. *Corolla-lobes* ciliate at the apex, glandular-striate; anthers and produced connective very hirsute.

PENANG: *Curtis* 159, 2254, 3589—a small tree, fairly common.

VAR. *parvifolia*, King & Gamble. *Leaves* smaller than in type;

innovations not tawny-pubescent. *Calyx-lobes* more rounded and glabrous; pedicels longer.

KEDAH: on Kedah Peak, *Ridley* 5506.

*Ridley's* No. 2673 from Tahan Woods, Pahang, is very near *B. laurifolia*, but the pedicels are much longer and the calyx-lobes not tawny-pubescent. The material is insufficient for description.

8. *BASSIA RUPICOLA*, King & Gamble, n. sp. A tree reaching 40 to 60 feet in height and 15 to 20 in. in diam.; branchlets dark grey, marked by the prominent scars of fallen leaves, innovations puberulous; leaf-bud scales ovate-lanceolate, .25 in. long. *Leaves* coriaceous; obovate-oblong, bluntly acute at apex, cuneately attenuate at base; dull and glabrous on both surfaces; 3.5 to 5.5 in. long, 1.5 to 2 in. broad; midrib thick, conspicuous; main-nerves 8 to 10 pairs, starting at an angle of 45° with the midrib, then curving upwards, sometimes rather indistinct, about .4 in. apart; reticulations many, obscure, obliquely transverse; petiole .5 to 1 in. long, grooved above and bordered by the decurrent base of the blade, swollen below. *Flowers* fasciated, about 5 together, in the axils of the leaves, on small tubercles; pedicels .15 in. long, ferruginous-pubescent like the calyx and buds. *Calyx-lobes* 4, 2 outer valvate; 2 inner valvate or imbricate, ovate, .2 to .25 in. long; all more or less recurved and ciliate at tip. *Corolla* tubular-campanulate, lobes and tube nearly equal, mouth of tube inside with a ring of soft ferruginous hairs; lobes oblong, ciliate at tip, sparsely hairy without, nerves spreading. *Stamens* 16, inserted above the ring of hairs in the mouth of the tube; filaments slender, .05 in. long, pubescent; anthers ovate-mucronate, tip ciliate, extrorse. *Ovary* ovoid; style curved, .3 in. long, stigma flat, minute. *Fruit* not seen.

PERAK: in rocky creeks on Gunong Batu at 1,500 to 2,000 feet, *King's Collector* 7411.

9. *BASSIA PERAKENSIS*, King & Gamble, n. sp. A tree reaching 60 to 80 feet in height and a considerable girth; branchlets thick, dark grey, prominently marked by the scars of fallen leaves and the tubercles on which the flower fascicles grew. *Leaves* coriaceous; oblong or obovate-oblong, shortly and abruptly acuminate at apex, acuminate narrowed at base; margins recurved, glabrous on both surfaces; 4 to 6 in. long, 1.5 to 2.5 in. broad; midrib stout, prominent; main-nerves slender, indistinct, 14 to 18 pairs, starting at an angle of 50° with the midrib, parallel, straight at first, arching near the margin to join in an intra-marginal looped nerve which is also met by the secondary nerves between the main ones; reticulations faintly marked on both surfaces; petiole .75 to 1 in. long, rather thick, bordered above by the decurrent

margins of the blade, swollen below. *Flowers* in fascicles of up to 10 to 12, on tubercles in the axils of the leaves or above the scars of fallen leaves on the previous year's wood; pedicels .5 to .6 in. long, slender, flattened below the flowers, densely pubescent at first, afterwards nearly glabrous, recurved in fruit; buds small, conical. *Calyx-lobes* 4, .2 in. long; 2 upper ovate-acute, densely pubescent, valvate; 2 lower imbricate, also densely pubescent, ciliate on the margins, somewhat keeled, ovate-acute. *Corolla* funnel-shaped; lobes 8, throat villous. *Stamens* about 16; filaments short glabrous; anthers sagittate. *Ovary* globose, villous, 8-celled, style .3 to .4 in. long, stigma minutely lobed. *Fruit* an ovoid densely pubescent berry about .7 to .9 in. in diam., crowned by the persistent style; seeds 1-2. *Seed* ovoid-oblong, .65 in. by .35 in., acute at base; testa shining, chestnut-brown, thin, crustaceous; hilum large, oblong; albumen none; cotyledons oblong, .45 in. long, .25 in. broad, radicle very small.

PERAK: *King's Collector* 512, 3846; *Curtis* 3695, on the Larút hill up to 2,500 feet.

10. *BASSIA ARGENTEA*, Clarke in Hook. f. Fl. Br. Ind. III. 545 (1882) (*not of de Vriese*). A large tree; branchlets rather thick, greyish-brown. *Leaves* coriaceous-chartaceous; elliptic or elliptic-oblong, abruptly acuminate at apex, acute and often unequal at base; glabrous above, shining grey-silky beneath when young, nearly glabrous when old; 4 to 7 in. long, 2.5 to 3 in. broad; midrib prominent, thick; main-nerves 13 to 15 pairs, about .4 in. apart, starting at about 60° with the midrib, at first straight then curving upwards; reticulations many, very oblique; petiole 1 in. long, upper part bordered by the decurrent margin of the blade, swollen below and rugose. *Flowers* fascicled in clusters of 6 to 10 in the axils of the leaves, or above the scars of fallen leaves; pedicels slender, about .5 in. long, appressed-pubescent; buds conical. *Calyx-lobes* 4, outer and inner pairs both valvate; lobes ovate, .2 to .25 in. long, acute, pubescent. *Corolla* tubular-campanulate, tube .1 in. long; lobes 8 to 9, .15 in. long, linear-oblong. *Stamens* usually 24, in 3 rows, inserted on the top of the tube on a ring of rusty hairs; filaments very small or none; anthers ovate, densely hirsute, black-apiculate. *Ovary* rounded, depressed above, villous; style .2 to .3 in. long, villous half-way up, subulate; stigma capitate; cells 8 to 10. *Fruit* not seen.

MALACCA: *Maingay* (K.D.) 991, 1524; *Derry* 941.

*Bassia argentea*, de Vriese, seems to be a *Sideroxylon*, cf. Burck & Koord. & Val.

11. *BASSIA BRACEANA*, King & Gamble, n. sp. A tree with spreading branches, reaching 50 to 70 feet in height and 10 to 20 in. in diam.; branchlets pale brown. *Leaves* chartaceous; bright green, glossy,

oblong or elliptic-oblong, acuminate both at apex and at base; glabrous above, minutely pubescent on the nerves or in the axils of the nerves beneath; 4 to 8 in. long, 2 to 3 in. broad; midrib thick, impressed above; main-nerves 14 to 18 pairs, regular, parallel, conspicuous, about .4 in. apart, starting at about 60° with the midrib, arching upwards to join near the margin; reticulations oblique, slender but conspicuous, joining the main-nerves more or less horizontally; petiole .8 to 1.4 in. long, grooved above and bordered by the decurrent margins of the blade, thickened and somewhat curved below. *Flowers* fasciculate, usually 4 to 7 together, in the axils of the leaves, or above the scars of fallen leaves on the last year's wood below; pedicels .4 to .6 in. long, thickened above, otherwise slender, slightly pubescent. *Calyx-lobes* 4, .15 to .25 in. long; 2 outer opposite ovate rounded, enclosing the 2 inner concave rounded; sometimes ciliate on the margins, sometimes slightly emarginate, all more or less golden-pubescent without, enlarged after flowering. *Corolla* cream-coloured; tube cylindrical, short, about .1 in. long only; lobes more or less spreading, 8 to 9, linear-oblong, .2 in. long, slightly twisted. *Stamens* 16 to 18, in 2 rows, inserted on the top of the tube inside above a thick ring of tawny hairs; filaments very short; anthers ovate-lanceolate, strigosely hirsute, the connective ending in a long dark acumen. *Ovary* globose, glabrous; style .15 in. long, stigmas very minute; cells about 8. *Fruit* an oblong green fleshy berry, .8 to 1 in. long, crowned by the remains of the style; seed usually 1 only. *Seed* ovoid, flattened, .8 in. long, .5 in. broad, and .25 in. thick; testa chestnut-brown, shining, crustaceous; hilum elongate, pale, conspicuous; albumen none; cotyledons thick, .5 to .6 in. long, ovoid, somewhat acute; radicle minute.

PENANG: *Curtis* 3063. PERAK: *King's Collector* 1846, 3195, 3275, 3740, 6447, 7584, 10412; *Scortechini* 314, 1483; *Wray* 1775, 2613, 2694.

VAR. *lanceolata*, King & Gamble. *Leaves* narrower, more lanceolate-acuminate; main-nerves closer. *Flowers* more numerous in the fascicles and fascicles more numerous on the last year's wood. *Corolla-lobes* often unequal in length, acute. *Anthers* with the acumen bifid.

PERAK: *Wray* 189, 1248, up to 3,400 feet.

13. *BASSIA LONGISTYLA*, King & Gamble, n. sp. A large tree, reaching 80 to 100 feet in height; branchlets thick, dark greyish-brown, innovations minutely pubescent. *Leaves* chartaceous; elliptic, shortly and rather abruptly acuminate at both apex and base; glabrous on both surfaces; 3.5 to 5 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves 12 to 14 pairs, leaving the midrib almost at right

angles and curving upwards to meet near the margin; secondary nerves somewhat prominent as are the reticulations; petiole .6 to .8 in. long, slender, grooved above. *Flowers* fascicled, often up to 10 together, on tubercles above the scars of fallen leaves on the last year's wood; pedicels slender, glabrous, .5 to .7 in. long. *Calyx-lobes* 4, .15 to .2 in. long, ovate, somewhat acute, somewhat pubescent outside, the 2 outer enclosing the 2 inner. *Corolla* with very short (.05 in. long) cylindrical tube; lobes 8 to 9, rather spreading, oblong-lanceolate, obtuse or emarginate, prominently nerved, glabrous. *Stamens* 16 to 18, .2 in. long, inserted in 2 rows on the top of the tube above a short ring of tawny hairs; filaments .125 in. long, slender; anthers ovate, .075 in. long, apiculate, extrorse. *Ovary* cylindrical, style .5 in. long, surmounted by a minute rounded stigma. *Fruit* unknown.

PERAK: *King's Collector* 2680. SINGAPORE: *Ridley* 6498 (?).

This species comes very near to *B. Braccana*, but the anthers differ so much that we hesitate to join them.

13. *BASSIA CUPREA*, King & Gamble, n. sp. A tree reaching 60 to 70 feet in height; branchlets thick, brown, uppermost somewhat angular. *Leaves* coriaceous; oblong, obtuse or emarginate at apex, attenuate at base and somewhat unequal; glabrous above, sparsely hairy on the nerves beneath, otherwise glabrous; 4.5 to 6 in. long, 2.5 to 3 in. broad; of a coppery-brown colour when dry; midrib very thick and prominent; main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin; reticulations visible but not strong; petiole thick, .75 to 1 in. long, bordered above by the decurrent margin of the blade. *Flowers* fasciculate in the axils of the leaves or of the scars of fallen leaves, 2 to 5 or more in a fascicle, fragrant; pedicels .5 in. long, pubescent; buds conical, .3 in. long. *Calyx-lobes* 4, .25 in. long; 2 outer valvate, broadly ovate, shortly pubescent; 2 inner rounded concave, shallowly emarginate, ciliate and scarious on the margins, pubescent without. *Corolla* .4 in. long; tube funnel-shaped, .1 in. long, mouth densely brown-hirsute; lobes 8-9, erect or spreading, .3 in. long, oblong, rounded at apex, long brown-silky-pubescent on back, strigosely hairy within. *Stamens* 18 to 22, inserted on the mouth of the tube; filaments hairy, .05 in. long; anthers ovate-acuminate, .15 in. long, the connective produced in a long usually curved acumen, strigosely hirsute. *Ovary* oblong, glabrous, 8-10-celled, ending in a style .5 in. long surmounted by a minutely 9-10-lobed flat stigma. *Fruit* not seen.

PERAK: *Scortechini* 1879.

This species comes near to *B. Motleyana*, Clarke, but the flowers are much larger and different.

14. *BASSIA MOTLEYANA*, Clarke in Hook. f. Fl. Br. Ind. III. 546 (1882). An erect lofty tree of swampy places; branchlets dark brown, marked by prominent leaf-scars. *Leaves* coriaceous; elliptic, shortly and abruptly acuminate at apex, cuneate at base, the two sides sometimes unequal; glabrous on both surfaces; 4 to 5 in. long, 1·5 to 2·5 in. broad; midrib prominent, raised above; main-nerves 10 to 12 pairs, irregularly spaced, generally at about an angle of 60° with the midrib, meeting near the margin in a looped intramarginal nerve; secondary nerves prominent, similar to the main-nerves, reticulations few; petiole ·8 to 1·2 in. long, rather thick, bordered by the decurrent margins of the blade. *Flowers* fascicled, many together (10 to 12), in the axils of the leaves or of the scars of fallen leaves below the terminal tuft, often fully clothing the branchlets for a distance of 6 in. or more; pedicels slender, ·4 to ·7 in. long, buds ovoid. *Calyx-lobes* 4, ·15 to ·2 in. long, ovate, obtuse or somewhat acute, sparsely pubescent, the inner pair somewhat scarious on the margins. *Corolla* campanulate, ·15 to ·2 in. long; tube short, about  $\frac{1}{3}$  of the whole; lobes 8, 4 outer enclosing 4 inner, oblong-spathulate, obtuse at tip and ciliate ferruginous-pubescent. *Stamens* 16, inserted on the top of the tube on a ring of long ferruginous hairs; filaments short, slender; anthers ovate-lanceolate, short-apiculate. *Ovary* rounded, villous, 6-8-celled; style ·5 in. long, thick, sparsely pubescent. *Fruit* an obovoid glabrous berry, acute at top and furnished with the remains of the persistent style; calyx-lobes also persistent; ·5 in. long, ·3 in. broad, 1-2-seeded. *Seeds* oblong, acute at both ends; testa crustaceous, shining; albumen none; cotyledons fleshy; radicle small. Burck in Ann. Jard. Buit. V. 44. *Isonandra Motleyana*, de Vriese in Miq. Journ. Bot. Neerl. I. (1861) 257.

MALACCA: *Griffith* (K.D.) 3608; *Derry* 1026. JOHORE: *Ridley* 6496. SINGAPORE: *Ridley* 5645, 5896.—DISTRIB. Borneo (*vide* Burck).

De Vriese says the milky juice gives a gutta of bad quality, being more waxy and fragile than that of other kinds.

VAR. *Scortechinii*, King & Gamble. *Leaves* much larger, 6 to 8 in. long, 2·5 to 3·5 in. broad, main-nerves 15 or 16 pairs. *Fruit* nearly globose—a dark green berry, shining when dry.

PERAK: *Scortechinii*, at Port Weld, No. 1550; *King's Collector* 5454, 6735, on low, wet ground—a tree reaching 60 to 80 feet in height and 15 to 20 in. in diam.

15. *BASSIA CUNEATA*, Bl. Bijdr. 675. A tree (?); branchlets dark brown, scarred, rather thick. *Leaves* coriaceous; clustered at the ends of the branchlets, greenish-brown when dry, obovate, obtuse-emarginate or very shortly and abruptly acute at apex, cuneate at base;

glabrous, margins slightly recurved; 4 to 5 in. long, 2 to 3 in. broad; midrib stout, prominent, impressed above; main-nerves not prominent, about 20 pairs, nearly at right angles to the midrib, anastomosing near the margin with the secondary nerves; reticulations transverse; petiole .6 to 1 in. long, bordered by the decurrent margins of the blade. *Flowers* in axillary fascicles as long as the petiole, not seen. *Fruit* a globose berry .75 to 1 in. in diam., 1-3-seeded. *Seeds* .5 to .7 in. long, .5 in. broad and thick, ovoid, not compressed, pointed at both ends; testa crustaceous, chestnut-brown, shining; hilum very broad (.4 in.); albumen none; cotyledons fleshy, semi-ellipsoidal. Miq. Fl. Ind. Bat. II. 1041; A. DC. Prod. VIII. 199; Clarke in Hook. f. Fl. Br. Ind. III. 546; Koord. & Val. Bijdr. I. 154.

MALACCA: *Maingay* (K.D.) 986. SINGAPORE: *Ridley* 6502.—  
DISTRIB. Java.

16. *BASSIA PENANGIANA*, King & Gamble, n. sp. A tree (?); branchlets dark grey. *Leaves* chartaceous; oblong-lanceolate, acutely attenuate at both ends; glabrous, greyish-green when dry; 5 to 7 in. long, 1.5 to 2.5 in. broad; midrib broad, conspicuous, impressed above and then keeled; main-nerves 10 to 12 pairs, starting at an angle of about 50° with the midrib and curved upwards to and along the margin; reticulations transverse, raised above; petiole 1 to 1.2 in. long, bordered by the decurrent margins of the blade, swollen at base; stipules very small, ovate, pubescent, caducous. *Flowers* in fascicles of about 5 to 6 in the axils of the leaves; pedicels slender, .4 to .5 in. long, appressed rusty-pubescent. *Calyx-lobes* 4, ovate, obtusely acuminate, recurved, .2 in. long, lower half thick, wrinkled, upper half thinner, somewhat scarious, sparsely appressed golden-pubescent. *Corolla* tubular-campanulate, .25 in. long; lobes 8 (?), oblong-spathulate, glabrous within, golden-pubescent without; tube rather shorter than lobes. *Stamens* 16 (?), inserted in a ring of hairs on the top of the tube; filaments slender; anthers linear-oblong, hirsute, the connective produced in a rather long, somewhat blunt, penicillate mucro. *Ovary* conical, glabrous; style slender, .3 in. long; cells 8.

PENANG: *Curtis* 1450.

17. *BASSIA ERYTHROPHYLLA*, King & Gamble, n. sp. A tree, 40 to 50 feet in height and 1 foot in diam.; branchlets thick, grey, marked with the scars of fallen leaves and the tubercles of fallen flowers. *Leaves* coriaceous: obovate-oblong, shortly and bluntly acuminate at apex, unequally attenuate at base; glabrous, orange-red when dry, margins slightly recurved; 6 to 8 in. long, 1.5 to 2.5 in. broad; midrib thick, prominent below, impressed above; main-nerves 10 to 12 pairs, rather irregular, starting at an angle of 60° from the midrib and

curved upwards to and along the margin; reticulations transverse, prominent, raised beneath; petiole 1·5 to 2 in. long, thickened at base, bordered above by the decurrent margins of the blade, younger ones golden-pubescent; stipules linear-subulate, ·3 to ·4 in. long, quickly caducous. *Flowers* fascicled, about 5 to 6 together, on raised tubercles above the scars of fallen leaves on year-old wood; pedicels in fruit thick, ·5 to ·6 in. long, golden-pubescent. *Calyx-lobes* 4, in fruit ovate-acute or rounded, densely golden-pubescent on both surfaces, thick; rest unknown. *Fruit* a globose, golden-pubescent, berry somewhat depressed at top and bearing the remains of the persistent style, ·5 to ·6 in. in diam. *Seed* not seen.

PENANG: at Highlands, *Curtis* 3652 (Kew) or 5652 (Calc.).

### 7. PALAQUIUM, Blanco.

Trees, often of great size and containing a milky juice. *Leaves* usually coriaceous, obovate or oblong, petioled, entire, sometimes covered beneath with a dense silky or tawny pubescence. *Flowers* fasciculate, in the axils of the leaves or of the scars of fallen leaves, pedicellate. *Calyx* of 6 lobes, the outer 3 valvate, the inner 3 imbricate. *Corolla* usually campanulate, tube short; lobes 6, imbricate, often contorted in bud. *Stamens* 12 or more (up to 18), opposite to and alternate with the corolla-lobes, those alternate often shorter and sometimes inserted higher up the tube; anthers ovate-lanceolate, dehiscence extrorse, connective produced; staminodes none. *Ovary* villous, 6-celled; style subulate. *Fruit* a fleshy, ovoid or ellipsoid, berry, 1–2-seeded. *Seeds* large, exalbuminous; the testa crustaceous; cotyledons thick, fleshy; radicle pointed, inferior.—DISTRIB. About 50 to 60 species, found in South India, Ceylon, Eastern Bengal, Burma, the Malay Peninsula and Archipelago, the Philippines, and Samoa (1 sp.). *DICHOPSIS*, Thw. in. Gen. Pl. II. 658.

Pedicels never over ·75 in. long, distributed for some distance down the upper branchlets:—

Leaves large, 5 to 12 in. long, obovate-obtuse; branchlets stout, nearly ·5 in. thick:—

Leaves nearly glabrous and glaucescent beneath, main-nerves distant, irregular .. .. . 1. *P. obovatum*.

Leaves ferruginous-pubescent or tomentose beneath, main-nerves fairly close and regular:—

Leaves appressed-pubescent beneath, midrib glabrous on upper surface .. .. . 2. *P. Maingayi*.

Leaves spreading-tomentose beneath, midrib hairy on upper surface .. .. . 3. *P. Clarkeianum*.

Leaves rarely over 6 in. long, branchlets rarely ·25 in. thick:—

Leaves always more or less obovate:—

- Leaves golden-silky-pubescent beneath :—
- Main-nerves close, over 20 pairs .. .. 4. *P. Gutta*.  
 Main-nerves about  $\frac{1}{2}$  in. apart, under 20 pairs .. 5. *P. Oxleyanum*.
- Leaves not or only very slightly silky-pubescent beneath :—
- Leaves conspicuously red or yellow when dry .. 6. *P. xanthochyllum*.  
 Leaves not conspicuously red or yellow when dry, usually brown or greenish-brown :—
- Leaves over 3 in. long .. .. 7. *P. bancanum*.  
 Leaves 2 to 3 in. long .. .. 8. *P. Ridleyi*.  
 Leaves under 2 in. long .. .. 9. *P. microphyllum*.
- Leaves elliptic, not obovate :—
- Produced connective of anthers bifid at point; leaves glabrous .. .. 10. *P. hexandrum*.  
 Produced connective of anthers simple at point; leaves grey-pubescent beneath .. .. 11. *P. Herveyi*.
- Pedicels 1 in. long or longer, clustered only at the extreme ends of the branchlets; leaves oblong-lanceolate, 3-6 in. long .. 12. *P. stellatum*.

1. *PALAEQUIM OBOVATUM*, King & Gamble. A big tree with a foxy odour (Ridley), evergreen; the branches thick, brown, marked by the very prominent scars of fallen leaves; leaves clustered towards the ends of the branchlets; innovations rusty-pubescent. *Leaves* coriaceous; obovate-cuneate or obovate-oblong, obtuse or very shortly acute at apex, cuneate at base; recurved and somewhat undulate on the margins; glabrous above, glaucescent beneath; 5 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, impressed above, much raised beneath; main-nerves about 12 pairs, at an angle of  $40^\circ$  to  $45^\circ$  with the midrib, inconspicuous above, raised and prominent beneath; reticulations many, oblique, obscure; petiole thick, .7 to 1 in. long, bordered above by the decurrent margins of the blade, glabrescent or slightly rusty-pubescent. *Flowers* in clusters in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels 3 to 5 together, .3 to .5 in. long, rusty-pubescent; buds at first globose, afterwards elongate by the growth of the corolla. *Calyx-lobes* 6; outer 3 triangular-ovate, thick, pubescent outside, .15 in. long; inner 3 imbricate, ovate-obtuse, .1 in. long, margins scarious. *Corolla* campanulate; tube very short; lobes 6, imbricate and twisted, .4 to .5 in. long, glabrous without, slightly pubescent within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the lobes of the corolla, ovate lanceolate, apiculate, thickly rusty-villous; filaments as long as anthers, slender, glabrous. *Ovary* globose; style .5 in. long, subulate, glabrous. *Fruit* a globose berry, .75 to 1 in. in diam., pulp fleshy, seeds 1 to 2. *Seed* ovoid, scarcely flattened on one side, pointed at base; testa thin, shining; albumen none, cotyledons fleshy. *Dichopsis obovata*, Clarke in Hook. f. Fl. Br. Ind. iii. 542. *Isonandra obovata*, Griff. Notul. iv. 293; Kurz

For. Fl. II. 120 and Journ. As. Soc. Beng. XLVI. ii. 230. *Bassia?* *hypoleuca*, Miq. Fl. Ind. Bat. Suppl. 582 (*vide* Kurz).

PENANG: *Holmberg* 783. MALACCA: *Griffith* (K.D.) 3606; *Maingay* (K.D.) 985, 996; *Curtis* 3480, 3481, 3482; *Hervey* 2754; *Derry* 59, 88; *Ridley* 10079; *Goodenough* 1994. SINGAPORE: *T. Anderson* 122; *Ridley*.

—DISTRIB. Tenasserim, Sumatra.

Curtis says it gives a low class bastard gutta of little value. Vern. "Niato bunga" "Niato tunbaga" "Niato balam."

2. PALAQUIUM MAINGAYI, King & Gamble. A tree; stems reaching 60 feet in height and 10 to 15 in. in diam.; branchlets dark brown, rough, about .4 in. in diam., marked by the large scars of fallen leaves; innovations densely short-rusty-pubescent. *Leaves* chartaceous; obovate, obtuse at apex, cuneate or slightly rounded and more or less auricled at base; margins recurved; glabrous above except on midrib, thickly ferruginous-pubescent beneath; 5 to 13 in. long, 3 to 7 in. broad; midrib stout, impressed above, prominent beneath, main-nerves 12 to 20 pairs, .5 to .8 in. apart, starting at an angle of about 55° with the midrib, parallel to near the margin and then curving upwards to join in a marginal nerve; reticulations not prominent, obliquely joining the main-nerves; petiole 1 to 1.5 in. long, thickly rusty-pubescent, channelled above by the decurrent margins of the blade; stipules subulate falcate, .5 in. long, very caducous. *Flowers* fasciculate, up to 10 together, in the axils of the leaves or of the scars of fallen leaves; pedicels .5 to .7 in. long, rusty-pubescent. *Calyx-lobes* 6; outer 3 valvate, ovate, densely pubescent, .15 in. long; inner 3 imbricate, orbicular, depressed at top, scarious and ciliate on the margins, .15 in. long. *Corolla* campanulate; tube short (.1 in.); lobes 6, imbricate, overlapping to the right, ovate-oblong, glabrous, .25 to .35 in. long. *Stamens* 12, .25 in. long, opposite to and alternate with corolla-lobes; anthers ovate, apiculate, slightly rusty-hirsute behind; filaments as long as anthers, slender. *Ovary* rounded; style .2 to .4 in. long, subulate; cells 6. *Fruit* a shining, green, fleshy berry, about .5 in. long, supported by the persistent calyx. *Seeds* 2, oblong; testa dark brown, crustaceous; albumen none. *Dichopsis Maingayi*, Clarke in Hook. f. Fl. Br. Ind. III. 543.

PERAK: *Wray* 524, 553, 2215, up to 2,000 feet; *King's Collector* 6644. MALACCA: *Maingay* (K.D.) 996/2; *Hervey*.

*P. Ottolanderi*, Koord. & Val. of Java is near this species, but is readily distinguished by its larger flowers and long pointed fruit.

3. PALAQUIUM CLARKEANUM, King & Gamble. A large tree, with thick rough bark and spreading branches, reaching 100 to 150 feet in

height and 2 to 4 feet in diam. of stem; branchlets stout, uppermost .5 in. in diam., prominently pitted with the scars of fallen leaves, densely ferruginous-tomentose. *Leaves* chartaceous; obovate, obtuse at apex, cuneate at base; glabrous above except on the midrib which is strongly pubescent, densely ferruginous-tomentose beneath; margins recurved; 8 to 10 in. long, 4 to 5 in. broad; midrib very thick; main-nerves 18 to 22 pairs, rather irregular, starting at about 70° to 80° with the midrib, straight at first then arching at and along the margin, impressed above; reticulations obliquely transverse, prominent; petiole .7 to 1 in. long, thick, densely ferruginous-tomentose, enlarged at base. *Flowers* not seen. *Fruit* an oblong, glossy, bright green berry, 2 in. long, 1-seeded. *Seed* oblong, acute at both ends, rounded on the back, flattened at the hilum, 1.2 in. long, .5 in. broad; testa thin, chartaceous, shining, chestnut-brown; hilum oblong; cotyledons oblong, fleshy. *Dichopsis Clarkeana*, Brace MS. in Herb. Calc.

PERAK: at Waterfall Hill, 600 feet, *Wray* 530; on open hills near Larut at 500 to 1,000 feet, *King's Collector* 3796.

*Wray* says the gutta it gives is not enough in quantity to be worth extraction. The tree is evidently closely allied to *P. Maingayi*, and might almost be made a variety of that species.

4. PALAQUIUM GUTTA, Burck in Ann. Jard. Buit. V. 24, t. IV. (1885). A large evergreen tree; branchlets rough, prominently marked with the scars of fallen leaves and with longitudinal wrinkles; innovations minutely ferruginous-pubescent. *Leaves* coriaceous; obovate or obovate-oblong, abruptly and usually shortly acuminate at apex rarely rounded, cuneate at base; margins slightly recurved; glabrous above, densely appressed-golden-silky-pubescent beneath especially when young, when old glabrescent; 3 to 5 in. long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves 24 to 30 pairs, indistinct, starting at rather more than 60° with the midrib, parallel and arching only close to the margin; secondary nerves and reticulations inconspicuous, the latter very oblique; petiole 1 to 1.5 in. long, slender, grooved above, slightly thickened at base, appressed-golden-pubescent. *Flowers* in fascicles of about 4 to 5, in the axils of the leaves or of the scars of fallen leaves on the previous year's wood; pedicels thick, .1 to .2 in. long, somewhat angular, densely golden-pubescent. *Calyx-lobes* 6; 3 outer valvate, triangular-ovate, .3 in. long; 3 inner imbricate, rather longer and more acute, golden-pubescent without. *Corolla* rotate-campanulate; tube shorter than the calyx; lobes 6, ovate, obtuse, imbricate and twisted at first, afterwards spreading, .25 in. long, glabrous. *Stamens* 12, opposite to

and alternate with the corolla-lobes, inserted at the top of the tube; filaments equal, slender, 1 in. long; anthers shorter than the filaments, ovate, extrorse, the connective produced in a broad point. *Ovary* sub-globose, slightly pubescent, 6-celled; ovules oblong, one in each cell; style 4 to 5 in. long, filiform; stigma obtuse. *Fruit* a 1-2-seeded berry, 6 to 7 in. in diam., ovoid, acute at top; pulp very glutinous, hard. *Seeds* oblong, rounded at the ends; hilum very large, elliptic, occupying about one-half of the surface; testa shining. Pierre in Bull. Soc. Linn. Par. I. 498; Engl. & Prantl Pflanzenfam. IV. i. 135, fig. 71; Baill. Hist. des Pl. XI. fig. 296. *Dichopsis Gutta*, Benth. in Gen. Pl. II. 658; Clarke in Hook. f. Fl. Br. Ind. III. 543. *Isonandra Gutta*, Hook. Lond. Journ. Bot. VI. 463 t. 16; Walp. Ann. i. 496; Miq. Fl. Ind. Bat. II. 1038 t. XXXVI.; Benth. & Trim. Med. Pl. t. 167.

PENANG: *Curtis* 780, 3535, 3582, 3633, 3635. PERAK: *Wray* 522. MALACCA: *Maingay* (K.D.) 983. DINDINGS: *Hallifax* (*Curtis* 3639). SINGAPORE: *Lobb* 290; *Ridley* 9519, 11320.

The true guttapercha tree, perhaps the most valuable of all the trees of the Peninsula. It gives the "Taban" Gutta or "Taban Merah." It has become very scarce in a wild state, but is now being much planted, so perhaps it may soon again become common (see also H. C. Hill, Reports on Forest Conservancy in the Straits Settlements and the Federated Malay States, and Burn-Murdoch in "Indian Forester," XXXI. 309, "Some Facts about Gutta Percha.") *Ridley*, in Trans. Linn. Soc. III. (1893), 317, says the tree was seen by him in several places in the Tahan woods, and that a considerable amount of guttapercha is collected there.

VAR. *oblongifolia*. A large tree; stem reaching 80 feet in height and up to 2 feet in diam. *Leaves* larger than in the typical form, obovate-oblong or lanceolate-oblong; longer, abruptly acuminate, reaching 7 in. in length and 3 in. in breadth, rather more conspicuously golden-pubescent. *Flowers* similar but a little larger, pedicels a little shorter. *Fruit* rather larger, less acute at top. *P. oblongifolium*, Burck in Ann. Jard. Bot. Buit. V. 25 tab. V. *Isonandra Gutta* var. *oblongifolia*, de Vriese, Tuinbouw Flora (1856), III. 226. *Isonandra Gutta*, var.  $\beta$ . *sumatrana*, Miq. Fl. Ind. Bat. II. 1038, and Suppl. 581.

PERAK: *Curtis* 3637, 3725; *Wray* 535; *Murton*; *King's Collector* 6475. JOHORE: *Curtis* 3632—in open forest in the hills at 500 to 1,000 feet.—DISTRIB. Sumatra, Borneo. Gives guttapercha like the type.

We are unable to find sufficient characters for separating this, as a species, from *P. Gutta*, as is done by Burck. The specimens available seem to point to a regular series of intermediates, so that it can scarcely be even maintained as a variety. It is possible that *P. malaccense* and *P. formosum*, Pierre in Bull. Soc. Linn. Par. I. 498, are both forms of *P. Gutta*, but we have seen no specimens. Beccari in "Nelle

Foreste di Borneo," p. 558, suggests the identity of the latter species with *P. oblongifolium*.

5. *PALAEQUIMUM OXLEYANUM*, Pierre in Bull. Soc. Linn. Par. I. 498 (1885), *non* Burck. A large tree; branchlets dark brown, marked by prominent scars of fallen leaves; innovations minutely ferruginous-pubescent. *Leaves* coriaceous; oblong-obovate, abruptly and shortly acuminate at apex, cuneately attenuate at base; glabrous above, densely appressed-golden-pubescent beneath, finally glabrate, margins recurved; 5 to 8 in. long, 2.5 to 3 in. broad; midrib prominent, thick, impressed above; main-nerves 14 to 18 pairs, irregular, sometimes branched, .4 to .5 in. apart, starting at an angle of about 60° with the midrib, curved near the margin to meet in a rather faint looped intramarginal nerve; secondary nerves few; reticulations few, horizontally transverse; petiole 1 to 1.5 in. long, somewhat thickened at base, minutely rusty-pubescent, channelled above and bordered for some distance by the decurrent margins of the blade; stipules minute, falcate, caducous. *Calyx-lobes* 6; 3 outer rather thicker than 3 inner, ovate, sub-acute, densely ferruginous-pubescent, .25 in. long. *Fruit* a nearly globose berry, 1 in. long and about .75 in. in diam. *Seeds* oblong; testa shining, crustaceous. *Dichopsis pustulata*, Hemsl. in *Herb. Kew*.

PENANG: *Curtis* 3582. PERAK: *Curtis* 3631, 3638, 3724—on the hills up to 2,500 feet; *Wray* 511 (*part*), 590; *Douglas*; *Phillips*. SELANGOR: *Curtis* 3763, 3764. SINGAPORE: *Maingay* (K.D.) 983 (the No. 1948 quoted by Pierre); *Jas. Collins* (a pustulate form apparently diseased).

This species gives apparently the "taban sutra" or "taban putih" guttapercha, which is not one of the best quality.

VAR. *glabrata* King & Gamble. *Leaves* smaller, about 1.5 in. broad, glabrate beneath, rarely slightly golden-pubescent; *fruit* oblong; *branchlets* grey, very rough with scars of fallen leaves and flowers.

PERAK: *Wray* 511 (*part*), 518.

*P. Oxleyanum*, Burck Ann. Jard. Buit. v. (1886) 33, is a different plant altogether (see *Teysmann's* specimen in *Herb. Kew*).

6. *PALAEQUIMUM XANTHOCHYMUM*, Pierre ex Burck in Ann. Jard. Buit. V. 30 (1885). A large handsome tree; the stem reaching 80 to 120 feet in height and 2.5 to 3 feet in diam.; branchlets dark brown, innovations rusty-pubescent; leaf-bud scales lanceolate, ciliate, about .1 in. long. *Leaves* coriaceous, glossy-green; obovate, obtuse and often emarginate at apex, cuneate at base; glabrous on both surfaces, margin recurved, reddish when dry; 2.5 to 4 in. long, 1.5 in. broad; midrib prominent,

impressed above; main-nerves obscure, about 12 to 14 pairs at about 60° with the midrib; reticulations scarcely visible; petiole .5 to .6 in. long, channelled above by the decurrent margins of the blade; stipules ovate, ciliate, very small, caducous. *Flowers* fascicled, up to 8 together, in the axils of the leaves or of the scars below them; pedicels slender, recurved, .2 in. long; buds very small, conical. *Calyx-lobes* 6, .1 in. long; 3 outer valvate, 3 inner imbricate, ovate-acute, rusty-pubescent. *Corolla* campanulate, .3 in. long, tube short; lobes 6, imbricate, oblong, blunt. *Stamens* 12, inserted on the top of the tube; filaments stout, curved; anthers ovate-sagittate, mucronate, extrorse. *Ovary* rounded, glabrous; style .1 in. long, subulate. *Fruit* an ovoid berry, glabrous. *Isonandra xanthochyma*, de Vriese Nat. Tijdschr. Ned. Ind. XXI. 311, and Miq. Journ. Bot. Neerl. i. 259. *Dichopsis rubens*, Clarke in Hook. f. Fl. Br. Ind. III. 543.

PERAK: *King's Collector* 7288—on low ground and rich soil. MALACCA: *Maingay* (K.D.) 995. SINGAPORE: *Cantley* 63; *Ridley* 3774.—DISTRIB. Borneo.

Produces a guttapercha of a yellowish colour and second quality (de Vriese).

7. PALAQUIUM BANCANUM, Burck in Ann. Jard. Buit. V. 43 (1885). A very large evergreen tree; stems reaching 80 to 100 feet (Curtis), 100 to 120 feet (Kunstler) in height, with a girth of 10 to 12 feet; branchlets rough, prominently marked with the scars of fallen leaves, upper branchlets and innovations slightly but minutely rusty-pubescent. *Leaves* coriaceous; clustered at the ends of the branchlets, obovate or obovate-oblong, abruptly and very shortly acute at the otherwise rounded apex, cuneate at base; margins slightly recurved; glabrous on both surfaces, the lower with very minute glandular scales; 3 to 4 in. long, 1.5 to 2.5 in. broad; midrib prominent, impressed above; main-nerves very obscure, about 14 to 16 pairs, inclined at nearly 70° to midrib and at first parallel, afterwards arching, reticulations very faint; petiole .7 to 1 in. long, edged above with the decurrent margins of the blade, glabrous. *Flowers* fasciculate, clustered about 2 to 4 together in the axils of the leaves or of the scars of fallen leaves, often on a length of as much as 4 to 5 in. of the branchlet; pedicels and calyx minutely ferruginous-pubescent; pedicels .1 to .15 in. long, thick. *Calyx-lobes* 6, the 3 outer valvate rounded, the 3 inner imbricate acute, .15 to .2 in. long. *Corolla* campanulate, tube as long as calyx; lobes 6, ovate, spreading, as long as tube, glabrous except a slight rusty pubescence within. *Stamens* 12, the 6 longer opposite to, the 6 shorter alternate with, the corolla-lobes; filaments inserted on the top of the tube, slender; anthers ovate, apiculate, extrorse. *Ovary* flattened-

cylindrical, the top rusty-hirsute; style as long as corolla, subulate, glabrous; cells 6. *Fruit* a fleshy oblong or obovate berry, smooth, .75 in. long, .5 in. thick, 1-seeded.

PENANG: *Curtis* 3583, 3659. PERAK: *Wray* 3984; *King's Collector* 6506, 6509. SINGAPORE: *Ridley* 6019, 6134, 6502, 6507; *Fox* 11307 at Bukit Timah; *Cantley* 73.—DISTRIB. Bangka.

Said to give a kind of "guttapercha."

8. *PALAEQUIM RIDLEYI*, King & Gamble, n. sp. A tree (?); branchlets blackish-grey, rough, innovations minutely rusty-pubescent. *Leaves* chartaceous-coriaceous; elliptic or elliptic-obovate, obtuse, emarginate or slightly acute at apex, cuneate at base; glabrous on both surfaces, margins slightly recurved; 2 to 3 in. long, 1 to 2 in. broad; midrib broad; main-nerves 8 to 10 pairs, starting at an angle of about 50° with the midrib, curving upwards to and along the margin, .2 to .3 in. apart; reticulations many, transverse, impressed above; petiole .5 to .7 in. long flattened and bordered by the decurrent broad margins of the blade; stipules small, ovate, hirsute, caducous. *Flowers* small, fascicled in groups of 6 or 7 together in the axils of the uppermost leaves; pedicels rather thick, about .25 in. long, sparsely appressed-pubescent. *Calyx-lobes* 6, .1 in. long; 3 outer rounded, shortly mucronate, glabrous, wrinkled when dry; 3 inner thin, scarious on the margins, ciliate, rusty-pubescent on both sides. *Corolla* tubular-campanulate, .15 in. long, glabrous; lobes 6, oblong, obtuse, erose at tip; tube as long as lobes. *Stamens* 12, inserted on the top of the tube opposite to and alternate with the lobes; filaments slender as long as the lobes; anthers ovate-acute. *Ovary* conical, glabrous below, villous above, surmounted by a conical thick style, .05 in. long, 6-celled. *Fruit* not seen.

SINGAPORE: *Ridley* 3591a.

9. *PALAEQUIM MICROPHYLLUM*, King & Gamble, n. sp. A tree (?); branchlets rounded, rough, dotted with scars of fallen leaves and flowers; innovations dark ferruginous-pubescent. *Leaves* coriaceous; obovate, obtuse or slightly obtusely-acute at apex, cuneate at base; glabrous on both surfaces, margins recurved; 1 to 2 in. long, .7 to 1 in. broad; midrib slender, impressed above; main-nerves indistinct, about 8 to 10 pairs, nearly at right angles to the midrib; reticulations very faint even when dry; petiole .4 to .5 in. long, bordered above by the decurrent margins of the blade. *Flowers* fascicled, 1 to 3 together, above the scars of fallen leaves on the past year's wood; pedicels .2 in. long, rusty-pubescent. *Calyx-lobes* 6; outer 3 valvate, ovate-acute, .15 to .2 in. long, densely tawny-pubescent; inner 3 imbricate, ovate,

blunt, scarious and ciliate on the margins, tawny-pubescent on the back, .1 to .15 in. long. *Corolla* tubular-rotate; the tube very short, scarcely .05 in. long; the 6 lobes oblong or nearly spatulate, .1 to .15 in. long, reflexed in flower, sparsely hairy without. *Stamens* 12, filaments slender, recurved; anthers ovate, .075 in. long, bi-mucronate. *Ovary* tawny-villous, conical; style .15 to .2 in. long, straight; cells 6. *Fruit* not seen.

SINGAPORE: at Bukit Timah, *Ridley* 10840.

10. *PALAEQUIM HEXANDRUM*, King & Gamble. A tree; branchlets light brown, innovations ferruginous-pubescent. *Leaves* chartaceous, glabrous; elliptic-oblong, shortly and bluntly acute at apex, attenuate and more or less unequal at base; 4 to 5 in. long, 2 to 2.5 in. broad; midrib thick, prominent; main-nerves 10 to 13 pairs, starting at about 65° to midrib then arched upwards, reticulations obscure. *Flowers* fasciculate, 3 to 4 together in the axils of the leaves or the scars of fallen leaves; pedicels slender, .4 in. long, minutely pubescent. *Calyx-lobes* 6; 3 outer valvate, 3 inner more or less imbricate, pubescent outside, ciliate, .05 to .07 in. long, apex scarcely acute. *Corolla* campanulate; tube .1 in. with a ring of hairs near the mouth inside; lobes 6, imbricate, .15 in. long, oblong obtuse, spreading. *Stamens* 12, inserted on the top of the tube, 6 opposite to and 6 alternate with the lobes, the alternate ones shorter; filaments slender; anthers exsert, ovate-lanceolate, bi-mucronate, as long as filaments. *Ovary* rounded, thickly rusty-pubescent; style subulate, .25 in. long. *Fruit* a fleshy berry, about .75 in. in diam., smooth, 1-seeded. *Seed* ovoid, .7 in. long, .5 in. broad, scarcely flattened; testa thin, brown, shining; hilum very large, occupying about one-half of the seed; albumen none. *Dichopsis hexandra*, Clarke in Hook. f. Fl. Br. Ind. iii. 543. *Isonandra hexandra*, Griff. Notul. IV. 292. *Payena Griffithii*, Kurz For. Fl. II. 121, and Journ. As. Soc. Beng. XLVI. ii. 230 (*vide* Clarke, but with doubt).

MALACCA: *Griffith* (K.D.) 3609; *Maingay* (K.D.) 984. SINGAPORE: *Ridley* 11373.—DISTRIB. Burma(?)

11. *PALAEQUIM HERVEYI*, King & Gamble, n. sp. A large tree; branchlets rather stout, dark brown; innovations minutely rusty-pubescent; leaf-bud scales lanceolate, .15 in. *Leaves* chartaceo-coriaceous; elliptic or elliptic-obovate, very shortly acute or sometimes emarginate at apex, cuneately attenuate often unequally at base; glabrous above except on midrib and nerves, sparsely rusty-pubescent beneath, afterwards glabrate, cinereous when dry; 2 to 3.5 in. long, 1.25 to 1.75 in. broad; midrib prominent; main-nerves 5 to 7 pairs at about 45° with the midrib and arching upwards, reticulations obscure; petiole .5 in. long

bordered above by the decurrent margins of the blade, rusty-pubescent. *Flowers* small, fascicled 4 to 6 together in the axils of the leaves or on tubercles above the scars of fallen leaves; pedicels .3 in. long, slender, decurved, pubescent; buds very small, globose. *Calyx* 6-lobed, 3 outer valvate, and 3 inner imbricate, .1 in. long, lobes ovate acute, pubescent. *Corolla* campanulate; tube short, rusty-hirsute without; lobes 6, oblong-linear, recurved in flower, hairy within at the base, .15 in. long, imbricate. *Stamens* 12; filaments long, exsert; anthers ovate, mucronate, extrorse, as long as filaments, hirsute. *Ovary* subglobose, rusty-pubescent, 6-celled; style slender, .3 in. long; stigma capitate. *Fruit* not seen.

PERAK: *Wray* 1104. MALACCA: *Maingay* (K.D.) 995; *Scortechini* 1892; *Hervey*. Vern. "Jongek" (Hervey).

*Wray* says the gutta is sticky and worthless.

12. PALAQUIUM STELLATUM, King & Gamble. A large tree, stems reaching over 100 feet in height; branchlets rather thick, dark brown, rough with the scars of fallen leaves; innovations ferruginous-pubescent. *Leaves* membrano-chartaceous, clustered at the ends of the branchlets; oblong-lanceolate, shortly acuminate at apex, cuneate at base; nearly glabrous above, pale and when young tomentose beneath, rusty-stellate-tomentose (*Scortechini*) on the nerves on both sides; 3 to 6 in. long, 1 to 1.5 in. broad; midrib prominent; main-nerves 10 pairs, starting at about 60° with the midrib and at once curving upwards; reticulations prominent on both sides in an elegant network; petiole .75 to 1 in. long, slender, densely rusty-pubescent. *Flowers* fasciculate, 3 to 5 together in the axils of the upper leaves, forming almost a terminal leafy corymb of about 20 to 25 flowers; pedicels slender, about 1 in. long, densely rusty-pubescent. *Calyx-lobes* 6, densely rusty-pubescent, in 2 series; the outer of 3 valvate, ovate, rounded lobes, the inner of 3 ovate ciliate lobes with scarious margins; both .25 to .3 in. long. *Corolla* campanulate, .3 to .4 in. long, the tube a little shorter than the lobes; the lobes imbricate, twisted in bud, rounded at top, glabrous. *Stamens* 12 in one series; filaments on the base of the tube and attached to it, free above, .2 in. long, thickened below, slender above; anthers oblong-lanceolate, apiculate, extrorse, .1 in. long, glabrous. *Ovary* rusty-pubescent, sub-globose; style slender, .35 in. long; cells 6 (?). *Fruit* not seen. *Dichopsis stellata*, *Scortechini* MS. in Herb. Calc.

PERAK: *Scortechini*, 1855.

A very distinct species, looking very like a *Bassia*. *Scortechini* says it yields good gutta, but in small quantities.

## 8. MIMUSOPS, Linn.

Trees with milky juice. *Leaves* chartaceous or coriaceous, with many usually inconspicuous parallel main-nerves. *Flowers* solitary or fascicled in the axils of the upper leaves on the branchlets. *Calyx-lobes* 6 or 8, in 2 series, the outer valvate enclosing the inner imbricate. *Corolla* with short tube; lobes 18 or 24 or more in 2 rows, one-third of the number in the inner, the rest in the outer, row; lobes of the outer row often divided.\* *Stamens* 6 or 8, attached to the corolla-tube opposite the inner lobes; filaments short, dilated, free or connate in a tube with the staminodes; anthers lanceolate, extrorse, usually apiculate by the production of the connective. *Staminodes* alternate with and as many as the stamens, sub-petaloid, usually fimbriate. *Ovary* hirsute, 6-8-celled. *Fruit* a globose or ovate fleshy berry, epicarp crustaceous; seeds few or solitary. *Seeds* ovate or oblong, often oblique, slightly compressed; hilum basal or lateral; testa hard, shining; albumen fleshy, thin; cotyledons flat, leafy.—DISTRIB. Species about 30; in the tropics of both hemispheres.

Calyx-segments 8; stamens 8; staminodes acuminate, hairy .. 1. *M. Elengi*.  
 Calyx-segments 6; stamens 6; staminodes fimbriate, glabrous .. 2. *M. Kauki*.

1. MIMUSOPS ELENGI, Linn. Sp. Pl. 349 (1753). An evergreen tree, stems reaching 40 to 50 feet in height, and with a large girth; ultimate branchlets with dark brown rusty pubescence. *Leaves* chartaceous; elliptic, shortly acuminate at apex, rounded (often unequally), at base; glabrous on both surfaces, shining above; margins slightly recurved; 3 to 5 in. long, 1.5 to 2.5 in. broad; midrib prominent, raised on both surfaces; main-nerves numerous, the first pair from the base forming intra-marginal nerves, which are looped where they meet the 14 to 16 pairs of main-nerves; secondary nerves like the main-nerves and, with the reticulations, forming an elegant network; petiole .6 to 1 in. long, slender; stipules triangular-subulate, very small, ferruginous-pubescent, very caducous. *Flowers* white, fragrant, solitary or in fascicles of 2 to 6 in the axils of the upper leaves; pedicels .3 to .7 in. long, often deflexed, appressed-ferruginous-pubescent; buds ovoid, acute. *Calyx-lobes* 8, .3 in. long, ovate-lanceolate, acuminate; the 4 outer valvate, broader than the 4 inner imbricate and channelled on the back; all rusty-pubescent without, glabrous within. *Corolla* with a very short tube, scarcely over .05 in. long; lobes 24, in 2 rows, the 16 outer linear-lanceolate, the 8 inner rather broader and shorter, linear-oblong. *Stamens* 8,

\* The outer corolla-lobes are now usually considered to be of the character of stipules to the inner row which constitute the regular petals.

opposite the lobes of the inner row; filaments slender, .05 in. long; anthers oblong, glabrous, apiculate. *Staminodes* alternate with the anthers, oblong-lanceolate, acuminate, toothed, clothed on the back and sides with pale stiff hairs. *Ovary* silky-pubescent, 6-celled; style slender, grooved, as long as corolla. *Fruit* an ovoid berry about 1 in. long; yellow when ripe, 1- rarely 2-seeded. *Seed* oblong, .75 in. long, .5 broad and about .25 thick, rounded above, hollowed at base where is the small oval hilum; testa crustaceous, dark brown, shining; albumen thin; cotyledons oblong, leafy, nearly as large as the seed cavity; radicle inferior. Roxb. Cor. Pl. I. 15. t. 14, and Fl. Ind. II. 236; Gaertn. f. Fruct. I. 198, t. 42; Lamk. Ill. t. 300; Baillon Hist. Pl. XI. 267, figs. 302-309; Engl. & Prantl Pflanzenfam. IV. i. 152, fig. 82 E-J; Burek Ann. Jard. Buit. V. (1886) 61; Wall. Cat. 4146; A. DC. Prod. VIII. 202; Clarke in Hook. f. Fl. Br. Ind. III. 548; Dalz. & Gibs. Bomb. Fl. 140; Wight Ic. t. 1586; Brandis For. Fl. 293; Bedd. Fl. Sylv. t. 40; Kurz in Journ. As. Soc. Beng. XLVI. ii. 231, For. Fl. II. 123; Trimen Fl. Ceyl. III. 86; Prain Beng. Pl. 649; Cooke Fl. Bomb. II. 95. *M. obtusifolia*, Bl. Bijdr. 672. "*Elenqi*" Rheede Hort. Mal. I. 33 t. 20. Rumph. Herb. Amb. II. 189 t. 63.

PERAK: *Scortechini* 1122. MALACCA: *Griffith* (K.D.) 3612; *Maingay* (K.D.) 995/2, 998; *Cuming* 2265.—DISTRIB. India, Ceylon, Burma, cultivated in other tropical regions; the fallen corollas are used to make garlands.

2. MIMUSOPS KAUKI, Linn. Sp. Pl. 349 (1753). A large evergreen tree; branchlets thick greyish-brown, extremities somewhat ferruginous-scaly or -pubescent. *Leaves* coriaceous, clustered towards the ends of the branchlets; obovate or elliptic-obovate, obtuse, emarginate or very slightly acute at apex, cuneate at base; glabrous above, densely and smoothly grey-silky-pubescent beneath; the margins slightly recurved; 2 to 4 in. long, 1.25 to 2.75 in. broad; midrib prominent; main-nerves very indistinct, about 14 to 16 pairs, parallel, meeting near the edge in a looped intramarginal nerve; petiole .5 to 1.5 in. long, moderately thick, channelled above. *Flowers* thickly clustered towards the ends of the branchlets; pedicels .75 to 1 in. long, appressed grey-silky-pubescent, angular. *Calyx-lobes* 6, .25 in. long; 3 outer valvate, ovate, acute, grey-silky-pubescent; 3 inner imbricate, similar but rather thinner. *Corolla* with a very short tube and 18 (or more, exceptionally) lobes in 2 rows; the outer row 12, lanceolate, acute; the inner 6, spatulate; all .1 in. long or nearly so, glabrous. *Stamens* 6 to 8, usually 6, extrorse; filaments .1 in. long, conical, glabrous; anthers .1 in. long, linear, blunt. *Staminodes* alternating with the stamens, .2 to .25 in. long, cuneate, deeply and irregularly fimbriate at apex.

*Ovary* villous, ovoid, 6-celled; ovules elliptic; style exsert, .4 in. long, slender. *Fruit* an ovoid rough berry, .1 in. long, 2-4-seeded. *Seeds* obliquely obovoid, somewhat curved near the base, .6 to .7 in. long by .4 to .5 in. broad and .4 in. thick; hilum lateral towards the base, .35 in. long, linear-oblong; testa thick, crustaceous, chestnut-brown; albumen thin; cotyledons flat, leafy, oblong, .3 to .35 in. long; radicle inferior, rather large. Wall. Cat. 4149E (*upper half*); A. DC. Prod. VIII. 203; Clarke in Hook. f. Fl. Br. Ind. III. 549; Miq. Fl. Ind. Bat. II. 1042; Koord. & Val. Bijdr. I. 156; Burck in Ann. Jard. Buit. V. (1886) 64. *M. Balata*, Gaertn. f. Fruct. III. 133. *M. Balota*, Bl. Bijdr. 673. *M. Hookeri*, A. DC. Prod. VIII. 204. *M. Bojeri*, A. DC. l.c. 205 (*vide Miquel*). *M. dissecta*, R. Br. Prod. 531. *M. Browniana*, Benth. Fl. Austral. IV. 285.—Rumph. Herb. Amb. iii. 19. t. 8 *flor. exc.*

PERAK: *Scortechini*. MALACCA: *Griffith* (K.D.) 3614; *Maingay* (K.D.) 987.—DISTRIB. Amherst in Burma, *Wallich*; Malay Islands; tropical Australia—cultivated elsewhere for its edible fruit.

The following new species from the Andaman Islands seems worthy of description here.

*MIMUSOPS ANDAMANENSIS*, King & Gamble, n. sp. A tree (?); branchlets slender, grey; innovations, with inflorescence and leaf-petioles, covered with appressed pale tomentum. *Leaves* coriaceous; elliptic-obovate, shortly acute at apex, cuneate at base; margins recurved; glabrous on both surfaces; 3 to 4 in. long, 2 to 3 in. broad; midrib slender; main-nerves about 15 pairs, parallel, very inconspicuous, secondary nerves similar to main-nerves, less prominent; petiole slender, .75 to 1 in. long, channelled above. *Inflorescence* of 1-3-flowered sessile umbels in the axils of the upper leaves; pedicels slender, .8 to 1 in. long, angular; buds ovoid-conical, .4 in. long. *Calyx-lobes* 8 in 2 series; outer 4 lanceolate, acuminate, valvate, reflexed when open, .4 to .5 in. long; inner 4 as long, linear-lanceolate, deeply channelled on the back, scarcely imbricate. *Corolla-lobes* 24, the inner series of 8, oblong-lanceolate, glabrous, obtuse, each bearing behind it two narrow acute, simple or deeply bifid lobes, rather shorter than and narrower than the 8 inner lobes. *Stamens* 8, opposite the inner corolla-lobes, and shorter than them; filaments slender, slightly hirsute, .075 in. long; anthers linear-sagittate, the connective produced in a long apiculus, often bifid. *Staminodes* alternate with the stamens and rather shorter than them, densely hirsute, linear-lanceolate, long acuminate, midrib black. *Ovary* rounded, 8-lobed, pubescent; style subulate, glabrous, stigma minutely cleft; cells 8, each with a narrow central ovule. *Fruit* unknown.

Hill jungle near Port Mouat, S. Andaman, *King's Collector*.

In the characters of the corolla-lobes this species seems to be intermediate between *Mimusops* and *Imbricaria*, and, since Engler has recently reduced *Imbricaria* to a section of *Mimusops*, we have no hesitation in describing it under that genus.

## Order LXXII. EBENACEÆ.

Shrubs or trees with usually hard wood. *Leaves* alternate, rarely sub-opposite, entire, usually coriaceous, ex-stipulate. *Flowers* usually diœcious, regular; the females usually (and the males sometimes) solitary; the males (and the females occasionally) in short, usually bracteate, axillary or extra-axillary cymes; pedicels articulated. *Calyx* inferior, gamosepalous, campanulate or tubular, with 3 to 7 valvate, imbricate or contorted, often accrescent, lobes. *Corolla* gamopetalous, variously shaped; the lobes 3 to 7, usually contorted, sometimes imbricate or valvate in bud. *Stamens* in the ♂ and ♀ flowers in a single series, and as many as the corolla-lobes, or 2- or more-seriate and 2 or more times as many; filaments shorter than the anthers, free or in pairs, or variously connate below; anthers linear, usually with longitudinal dehiscence, the connective often apiculate; in the ♀ flowers reduced to staminodes with empty or abortive anthers, or absent. *Disk* none. *Carpels* in the ♂ flowers abortive or absent; in the ♀ or ♀ flowers connate into a sessile superior ovary, with 2 to 8 usually more or less united styles; the cells as many as or twice as many as the styles with imperfect septa; ovules twice as many as the styles, anatropous, pendulous from the inner angles of the cells. *Fruit* a coriaceous or fleshy berry, several- or few-seeded. *Seeds* pendulous, usually oblong, vertically furrowed; testa thin; albumen copious, uniform or ruminant; embryo axial; radicle superior.—DISTRIB. About 320 species, in the tropics generally.

|                                                           |               |
|-----------------------------------------------------------|---------------|
| Flowers often 3-merous; ovary 3- or 6-celled .. ..        | 1. MABA.      |
| Flowers mostly 4-5-merous; ovary 4-5 or 8-10-celled .. .. | 2. DIOSPYROS. |

## 1. MABA, Forst.

Trees or shrubs; leaves alternate, entire. *Flowers* diœcious (monœcious in *M. Maingayi*), axillary, shortly pedicellate or in small dense cymes; usually 3-merous, rarely 4- or 5-merous. *Calyx* 3- to 5-fid or partite, rarely sub-truncate, often cup-shaped and accrescent. *Corolla-tube* usually longer than the calyx; lobes of the limb 3, twisted to the right hand. *Male flowers*: *stamens* 3 to 21; filaments distinct, in pairs or otherwise united; anthers oblong; ovary rudimentary. *Female flowers*: *staminodes* 0 to 12; *ovary* 3-celled or perfectly or imperfectly 6-celled, 6-ovulate. *Fruit* ellipsoid or globose, baccate, glabrous or hairy, 1-6-celled and 1-6-seeded, rather dry or fleshy; albumen not ruminant.—DISTRIB. Species about 70; tropical.

|                                                                                                        |    |    |    |                           |
|--------------------------------------------------------------------------------------------------------|----|----|----|---------------------------|
| Leaves opposite or almost opposite                                                                     | .. | .. | .. | 1. <i>M. Hierniana</i> .  |
| Leaves alternate:—                                                                                     |    |    |    |                           |
| Leaves puberulous on the lower surface, their veins prominent..                                        |    |    |    | 2. <i>M. venosa</i> ..    |
| Leaves densely velvety pubescent on the lower surface, their veins obsolete                            | .. | .. | .. | 3. <i>M. olivacea</i> .   |
| Leaves glabrous or nearly so:—                                                                         |    |    |    |                           |
| Leaves broadly ovate or elliptic, 3 to 5 in. long and 1·65 to 2·65 in. broad; main-nerves 3 to 5 pairs |    | .. | .. | 4. <i>M. merguensis</i> . |
| Leaves oblong to oblong-lanceolate 1·5 to 3 in. long and ·65 to 1·35 in. broad:—                       |    |    |    |                           |
| Main-nerves 6 or 7 pairs; fruit globular                                                               | .. | .. | .. | 5. <i>M. Clarkeana</i> .  |
| Main-nerves obsolete; fruit obliquely ellipsoid                                                        | .. | .. | .. | 6. <i>M. perakensis</i> . |
| Leaves polymorphous (mostly elliptic obovate or sub-rotund); fruit globular, fusiform                  | .. | .. | .. | 7. <i>M. buxifolia</i> .  |

1. MABA HIERNIANA, King & Gamble, n. sp. A small glabrous shrub; young branches much thinner than a goose-quill, pale, glabrous. *Leaves* opposite, thinly coriaceous; oblong-elliptic, the apex shortly acuminate, the base cuneate, the edges slightly recurved when dry; both surfaces hepatic-brown when dry and shining, the reticulations on the upper distinct; main-nerves 8 to 10 pairs, curved, ascending and forming wide arches near the edge, prominent on the lower surface, faint on the upper; the midrib bold on both; length 6 to 10 in.; breadth 2 to 3·5 in.; petioles ·3 to ·6 in. *Male flowers* unknown. *Female flowers* rotate, ·4 in. across, almost sessile, in axillary or extra-axillary fascicles of 2 or 3. *Calyx* spreading, divided almost to the base into 3 to 5 rotund, minutely crenate, slightly imbricate lobes. *Corolla* nearly twice as long as the calyx, deeply divided into 5 broadly oblong blunt lobes with slightly recurved edges; staminodes 3 or 4, with short thick filaments and broad antherodes. *Ovary* depressed-hemispheric, with short, thick, conical style and small stigma. *Fruit* not seen.

PERAK: *King's Collector* 7920.

2. MABA VENOSA, King & Gamble. A tree 15 to 50 feet high; young branches twice as thick as a crow-quill, the bark pale and deciduously cinereous-puberulous. *Leaves* alternate, thinly coriaceous; oblong-elliptic, acute or shortly acuminate, the base slightly cuneate or rounded; both surfaces dark olivaceous when dry; the upper shining, glabrous except the puberulous depressed midrib and main-nerves; the reticulations minute but distinct; lower puberulous everywhere and the midrib prominent; main-nerves 6 to 9 pairs, prominent, curved, spreading, interarching boldly near the edge; length 4·5 to 6·5 in.; breadth 2 to 3 in.; petioles ·35 to ·5 in. *Male* and *female flowers* alike, in densely crowded extra-axillary cymose fascicles of 5 or 6, not longer than the petioles; flowers mostly sessile, one or

two in each fascicle on a short densely hairy pedicel, rotate, .3 or .4 in. in diam. *Calyx* very coriaceous, divided to the base into 3 spreading broadly ovate lobes with broad blunt apices and concave bases, partly adpressed-pilose and partly glabrescent. *Corolla* smaller and less coriaceous than the calyx, tubular, glabrous, its lobes ovate-elliptic. *Male flowers* with 6 stamens in 2 rows, 3 of them small; anthers cordate, filaments flat; rudimentary ovary ovoid, apiculate, with a dense ring of coarse hair at its base. *Female flowers* with a few flat staminodes; the ovary broadly ovoid apiculate, hirsute in its lower part; styles 3, glabrous, distinct, the stigmas broad. *Fruit* ovoid-globular, glabrous, .75 in. long and .6 in. in diam., blunt at apex and base, the latter subtended by the 3- sometimes 4-lobed, thick, almost woody, accrescent calyx, its lobes spreading, their edges reflexed. *Seeds* elliptic, plano-convex. *Diospyros venosa*, Wall. Cat. 4126.

SINGAPORE: *Ridley* 4961; *King's Collector* 3495, 3862, 7643.

3. MABA OLIVACEA, King & Gamble, n. sp. A tree 50 to 70 feet high; young branches half as thick as a goose-quill, puberulous, pale cinereous when dry. *Leaves* coriaceous, alternate; elliptic, shortly and abruptly apiculate, the base rounded or cuneate, the edges much recurved when dry; upper surface olivaceous, shining, glabrous except the depressed rusty-puberulous midrib; lower surface softly velvety-pubescent, olivaceous, the hair on the bold midrib and 5 to 8 pairs of curved spreading rather prominent main-nerves rusty; length 3 to 5.5 in.; breadth 1.5 to 2.25 in.; petiole .4 in., tomentose. *Male flowers* sessile, .15 in. long, in branched condensed axillary and extra-axillary cymes less than 1 in. long; bracteoles broad, blunt, small. *Calyx* .1 in. long, tubular-campanulate, tomentose outside, glabrous inside, divided nearly to the base into 4 broadly ovate obtuse erect lobes. *Corolla* cylindric-campanulate, glabrous except the hairy edges of the 4 oblong lobes. *Stamens* 8 large and 4 small, lanceolate, on short filaments. *Female flowers* not seen. *Fruit* ellipsoid, blunt at each end, the apex crowned by the short style, glabrous, about .5 in. long, and .4 in. in diam. *Calyx* at the base of the fruit thick, spreading, .6 in. across, with 4 ovate, blunt lobes with reflexed edges.

PERAK: *King's Collector* 7877; *Wray* 1269. LANKAWI: *Curtis* 1661.

4. MABA MERGUENSIS, Hiern in Trans. Camb. Phil. Soc. XII. 134 (1873). A small, nearly glabrous tree; young branches thicker than a crow-quill. *Leaves* alternate, thinly coriaceous, ovate or elliptic, shortly and obtusely acuminate, the base cuneate or rounded; main-nerves 3 to 5 pairs, slightly curved, ascending; length 3 to 5.5 in.; breadth 1.65 to 2.65 in.; petiole about .25 in. long. *Male flowers* in dense minutely

pubescent branching axillary cymes only 1 to 1.5 in. in diam. *Calyx* less than .25 in. long, with 3 or 4 obtuse triangular lobes. *Corolla* slightly larger than the calyx, shortly 3- or 4-lobed. *Stamens* 14 to 16, glabrous; rudimentary ovary minute. *Female flowers* 3- or 4-merous. *Calyx* lobed half-way down. *Corolla* 3- or 4-merous; *Staminodes* 3 or 4. *Ovary-cells* 6, 1-ovulate. *Styles* 3, distant, glabrous. *Fruit* sub-globular; its calyx .5 in. in diam. with 3 ovate acute spreading lobes. Kurz in Journ. As. Soc. XLVI., ii. 232, and For. Fl. II. 139; Clarke in Hook. f. Fl. Br. Ind. III. 552.

PENANG: *Helper* (K.D.) 3618; *Curtis* 705, 718.—DISTRIB. Burma.

Very imperfectly represented in Herbaria.

5. MABA CLARKEANA, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, puberulous when young, ultimately glabrous, cinereous with small black striæ. *Leaves* alternate, coriaceous; oblong, the apex blunt and sometimes minutely notched, the base cuneate; upper surface olivaceous, glabrous, shining when dry; lower surface dull, paler, sparsely and deciduously adpressed-pubescent and the minute reticulations rather distinct; main-nerves 6 or 7 pairs, spreading, very faint on both surfaces; midrib bold in the lower, depressed on the upper surface; length 1.5 to 3 in., breadth .65 to 1.25 in.; petioles .1 in. long. *Male flowers* small (only .1 to .15 in. long), crowded in sessile cymes .25 to .5 in. long, in the axils of the upper leaves, with a few oblong bracteoles. *Calyx* sessile or subsessile, adpressed-pubescent outside, glabrous inside, divided half-way down into 3 sub-erect broadly ovate acute lobes. *Corolla* smaller than the calyx, densely sericeous outside, glabrous inside, divided to the base into 3 ovate-lanceolate, with an inner row of 3 or 6 similar but narrower, lobes. *Stamens* 6, in pairs, joined by the bases of their broad filaments; anthers lanceolate. *Female flower* unknown. *Fruit* globular, .35 in. in diam., glabrous. *Calyx* at its base thick, with 3 obtuse angles. *Seeds* 3, 3-sided, .25 in. long.

PERAK: *King's Collector* 4816.

6. MABA PERAKENSIS, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches as thick as a crow-quill, minutely puberulous becoming glabrous, dark-coloured, sub-glaucous. *Leaves* coriaceous, alternate; rather broadly oblong to oblong-lanceolate, the apex acute, the base broad and rounded or slightly cuneate; both surfaces dark olivaceous, the upper shining, the lower dull; main-nerves obsolete; midrib minutely pubescent, prominent on the lower surface, depressed on the upper; length 2.5 to 3 in., breadth .75 to 1.35 in.; petioles

·15 in. long. *Male flowers* about ·15 in. long, 8 or 10 together in dense sessile axillary clusters not much exceeding the petioles. *Calyx* sessile or nearly so, campanulate, slightly pubescent outside, glabrous inside, deeply divided into 3 broadly ovate acute lobes. *Corolla* tubular; adpressed-sericeous externally, glabrous inside, cut half-way down into 3 ovate acute lobes. *Stamens* 12, 6 of them united by the bases of their filaments; anthers of all lanceolate apiculate, their bases cordate. *Female flower* not known. *Fruit* obliquely ellipsoid, the apex shortly apiculate, glabrous; the calyx at the base sub-ligneous, flat, deeply divided into 3 broad ovate-rotund lobes with reflexed edges and blunt tips. *Seeds* 2, oblong.

PERAK: *Wray* 3130; *King's Collector* 3945, 5519.

7. MABA BUXIFOLIA, Pers. Syn. II. (1807) 606. A bush or small tree; young branches puberulous at first, ultimately glabrous. *Leaves* small, alternate, coriaceous; varying from elliptic to obovate, the apex sub-acute or obtuse, the base always narrowed; upper surface olivaceous, the lower brown; the midrib bold; reticulations rather distinct on the upper surface only; main-nerves 4 to 6 pairs, spreading, slightly prominent on the upper surface, indistinct on the lower; edges slightly recurved; length ·35 to 1 in.; breadth ·3 to ·6 in.; larger in the varieties; petiole less than ·5 in. *Flowers* solitary, or 2 to 3 in short cymes, 3-merous. *Calyx* ·1 in. long, campanulate, with short triangular lobes. *Corolla* campanulate with short triangular lobes. *Male flowers*: *stamens* 6 to 12, glabrous; rudimentary ovary hairy. *Female flower*: *stamens* none; *ovary* 3-celled; style at the apex 3-lobed. *Fruit* globose or ellipsoid, ·35 in. long, 1-seeded. *Calyx* at its base cupular, often very short; albumen equable. *Wight* Ic. t. 763; A. DC. Prod. VIII. 240; *Thwaites* Enum. Pl. Ceyl. 183; *Trimen* Fl. Ceyl. III. 89; *Hiern* in Trans. Camb. Phil. Soc. XII. 116; *Kurz* For. Fl. II. 139; *Clarke* in Hook. f. Fl. Br. Ind. III. 551. *M. littorea*, Br. Prod. 527. *M. Cumingiana*, *M. madagascariensis*, *M. guineensis*, *M. Smithiana*, A. DC. l.c. 241. *M. neilgherrensis*, *Wight* Ill. t. 148 bis. E. *M. Ebenus*, *Wight* Ic. tt. 1288-9 (not of Spreng.). *Maba*? *Wall.* Cat. 7461. *Ferreola buxifolia*, *Roxb.* Cor. Pl. I. 35, t. 45, and Fl. Ind. III. 790.

MALACCA: *Maingay* (K.D.) 979; *Griffith* (K.D.) 3641. LANGKAWI: *Curtis* 2557. PENANG: *Curtis* 708.—DISTRIB. Malay Archipelago, Br. India, N. Australia, Philippines, tropical Africa.

A variable species, of which two varieties are recognised by Mr. C. B. Clarke in Hooker's "Flora of British India." Both these have leaves longer than as above described, but neither occurs in our region.

## 2. DIOSPYROS, Linn.

Trees, rarely shrubs. *Leaves* alternate or rarely sub-opposite, entire. *Flowers* dicecious, very rarely polygamous, axillary and short-pedicelled, or in small cymes; the ♀ often, and the ♂ sometimes, solitary; usually 4- or 5-merous, rarely 3-merous. *Calyx* usually deeply-lobed, rarely truncate, often in the ♀ larger than in the ♂ and often accrescent and plicate or auriculate in fruit. *Corolla* tubular with short deep lobes, or salver-shaped, or campanulate; the lobes contorted to the right in bud. *Stamens* in the ♂ flowers 4 to 64, often 16; their filaments distinct, paired or polyadelphous; anthers linear, rarely short; *ovary* rudimentary. In the ♀ flowers, *staminodes* 0 to 16; *ovary* 4-5-celled or imperfectly 8-10-celled; the cells usually with 1, rarely with 2 ovules; styles or stigmas 1 to 4. *Fruit* a globose, ellipsoid or ovoid-conic, berry, usually subtended by the enlarged (sometimes woody) calyx; flesh pulpy or viscid. *Seeds* oblong, usually compressed; albumen equable or (rarely) ruminant.—DISTRIB. About 220 species, chiefly in the tropics.

Leaves membranous or thinly coriaceous, glabrous or hairy; ♂ flowers in small cymes or fascicles, 4-5-merous; stamens usually 8, 12, or 16; flowers sub-solitary; ♀ calyx longer than that of the ♂, not accrescent or but slightly so, in fruit:—

Leaves under 5 in. long:—

Fruit globular, glabrous; stamens 16 .. .. 1. *D. Wrayi*.

Fruit cylindrical or oblong-conical, glabrous; stamens about 16; leaves 1 to 1·4 in. long, and under ·65 in. broad .. 3. *D. microphylla*.

Fruit ellipsoid:—

Stamens 8:—

Fruit puberulous:—

Leaves usually under 2·25 in. long, lanceolate or sub-rhomboidal .. .. 2. *D. subrhomboidea*.

Leaves usually over 2·25 in. long, elliptic-oblong .. 6. *D. Scortechinii*.

Fruit glabrous; leaves 2·5 to 4·5 in. long .. 5. *D. graciliflora*.

Stamens 12; leaves 3·25 to 5 in. long; fruit glabrous .. 7. *D. flavicans*.

Fruit not known; stamens 12; leaves under 2 in. long .. 4. *D. dumosa*.

Leaves over 5 in. long; fruit ovoid-conic, rusty-setose; stamens 6 to 12 .. .. 8. *D. apiculata*.

Leaves coriaceous, upper surface glabrous and shining; flowers mostly 4-merous, a few 5-merous; ♂ flowers in small cymes or clusters; calyx deeply lobed, often larger in the ♀ and differing in shape from that of the ♂:—

Calyx 4-lobed:—

Leaves under 5 in. long:—

Leaves under 1·5 in. broad:—

Calyx of ♀ flower densely sericeous-pubescent, lobes reniform; fruit ovoid or sub-globose, rusty villous, its calyx 1 in. in diam. .. .. 9. *D. lanceafolia*.

- Calyx-margins of ♀ flower tomentose, lobes broadly ovate; fruit globose, ultimately glabrous, .75 in. long 14. *D. lucida*.
- Leaves 1.5 to 2.5 in. broad :—
- Stamens about 12; main-nerves of leaves 8 to 9 pairs 10. *D. pachyphylla*.
- Stamens about 16; main-nerves of leaves 6 to 7 pairs 11. *D. clavigera*.
- Stamens 16, in pairs; main-nerves of leaves 5 pairs 13. *D. styraciformis*.
- Leaves usually more than 5 and less than 7.5 in. long :—
- Leaves under 6.5 in. long, over 2.5 in. broad; fruit olive-shaped, nearly 2 in. long and 1.25 in. in diam. . . 12. *D. bilocularis*.
- Leaves under 2.5 in. broad :—
- Leaves under 6.5 in. long; main-nerves of leaves not visible, probably many pairs; fruit depressed-globose, 1.35 in. in diam.; persistent calyx thick, woody . . 25. *D. oleifolia*.
- Leaves under 7.5 in. long; main-nerves 5 to 8 pairs; fruit ellipsoid, 1 in. in diam.; persistent calyx with large membranous lobes . . . . . 27. *D. paniculata*.
- Leaves usually more than 6 and less than 12 in. long :—
- Leaves beneath covered with appressed sericeous hair; stamens 20 to 24; main-nerves of leaves not visible . . 21. *D. argentea*.
- Leaves beneath glabrous except the midrib, which is covered with dark hair; main-nerves of leaves 7 to 8 pairs; fruit glabrous . . . . . 17. *D. tristis*.
- Leaves beneath glabrous or only minutely puberulous :—
- Leaves usually 3 to 3.5 in. broad :—
- Main-nerves of leaves 8 to 10 pairs; apex caudate-acuminate, base cuneate . . . . . 18. *D. pauciflora*.
- Main-nerves of leaves 10 to 12 pairs; apex acute, base rounded . . . . . 19. *D. ellipsoidea*.
- Leaves reaching 4 in. broad; fruit glabrescent :—
- Main-nerves of leaves 8 to 14 pairs; apex sub-acute 23. *D. Horsfieldii*.
- Main-nerves of leaves 16 to 20 pairs; apex shortly acuminate . . . . . 24. *D. toposioides*.
- Leaves 3.5 to 4.5 in. broad; main-nerves of leaves 8 to 12 pairs; apex acute; fruit densely rusty-tomentose, ridged . . . . . 28. *D. Kunstleri*.
- Leaves 8 to 14 in. long, 2.5 to 5 in. broad; main-nerves 14 to 18 pairs; fruit sub-globose, 1 in. in diam., immersed in the thickened calyx . . . . . 20. *D. Wallichii*.
- Leaves 10 to 18 in. long, 2 to 4 in. broad; main-nerves 14 to 20 pairs; fruit depressed-globose, 2 in. in diam., seated on a cupular calyx . . . . . 22. *D. rigida*.
- Calyx 5-lobed :—
- Leaves glabrous beneath, 7 to 9 in. long, 3 to 3.75 in. broad; main-nerves 16 to 18 pairs . . . . . 15. *D. oblonga*.
- Leaves puberulous on the midrib and main-nerves beneath, 5.5 to 7.5 in. long, 2.5 to 3.25 in. broad; main-nerves 10 to 12 pairs . . . . . 16. *D. Helferi*.
- Leaves glabrous beneath, 5.5 to 9 in. long, 1.5 to 2.5 in. broad; main-nerves 10 to 12 pairs . . . . . 26. *D. brachiata*.
- Leaves thinly coriaceous, glabrous above, puberulous beneath; both ♂ and ♀ flowers in few-flowered cymes, on long, slender, extra-axillary peduncles, pendulous; calyx 5-lobed, not accrescent in fruit . . . . . 29. *D. nutans*.

SPECIES IMPERFECTLY KNOWN.

|                                                                                                                                                                                   |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| Calyx of fruit long, woody, its lobes pointed and much reflexed, leaves glabrous .. .. .                                                                                          | 30. <i>D. reflexa</i> .     |
| Leaves oblong, hairy beneath, cordate at the base. Calyx in fruit small. Fruit globular, rusty-pubescent .. .. .                                                                  | 31. <i>D. penangiana</i> .  |
| Leaves quite glabrous, elliptic, narrowed at each end, not cordate. Fruit globular with small calyx .. .. .                                                                       | 32. <i>D. rufa</i> .        |
| Leaves coriaceous, quite glabrous, oblong, areolar-reticulate. Male flowers in terminal tomentose cymes .. .. .                                                                   | 33. <i>D. areolata</i> .    |
| Leaves membranous, oblong or oblong-elliptic, glabrous. Female flowers in fascicles of about 3. Calyx with reniform lobes; pedicels bi-bracteolate. Corolla salver-shaped .. .. . | 34. <i>D. Curtisii</i> .    |
| Leaves membranous, puberulous beneath. Male flowers in dense short hairy glomeruli. Stamens 8 .. .. .                                                                             | 35. <i>D. glomerulata</i> . |
| Leaves puberulous beneath. Calyx-lobes 4; stamens 16 .. .. .                                                                                                                      | 36. <i>D. caliginosa</i> .  |

1. DIOSPYROS WRAYI, King & Gamble, n. sp. A shrub 4 to 12 feet high; young branches as thick as a crow-quill, cinereous- or rusty-puberulous. *Leaves* small, alternate, membranous; ovate-lanceolate to narrowly elliptic, shortly acuminate, the base cuneate; both surfaces dark olivaceous; the upper very shining and minutely reticulate, glabrous except the puberulous depressed midrib; the lower more brown and dull, the midrib pubescent and prominent, the reticulations less distinct; length 2 to 4 in., breadth .75 to 1.5 in.; petioles .05 to .1 in. *Male flowers* .25 in. long, 2 to 4 together in small axillary cymes, black when dry, puberulous, pedicels very short. *Calyx* less than .1 in. long, narrowly campanulate with 4 deep ovate lobes. *Corolla* three times as long as the calyx, salver-shaped, sub-glabrous; limb with 4 oblong lobes. *Stamens* 16, united in pairs by the bases of the unequal filaments, broadly lanceolate, inserted near the base of the tube. *Female flowers* like the ♂ but longer—especially the calyx. *Staminodes* about 8, lanceolate. *Ovary* glabrescent, ovoid-conic, tapering into a rather long style; stigmas 4, fleshy, short. *Fruit* globular, crowned by the short style, glabrous, shining, black when ripe (when dry); calyx at its base .75 in. across, coriaceous, deeply divided into 4 oblong blunt or sub-acute reflexed lobes.

PERAK: *Scortechini*; Wray 2764, 3272, 3955; King's Collector 2076, 2993.

2. DIOSPYROS SUB-RHOMBOIDEA, King & Gamble, n. sp. A shrub 4 to 6 feet high; young branches thinner than a crow-quill, softly tawny-pubescent, pale brown when dry. *Leaves* small, alternate; lanceolate or ovate-lanceolate or sub-rhomboidal, bluntly acuminate, the base cuneate; both surfaces olivaceous-brown when dry, the upper dark, glabrous except the puberulous midrib, the lower sparsely adpressed pubescent especially on the bold midrib; main-

nerves 4 or 5 pairs, curved, ascending, faint on both surfaces; length 1.5 to 2.25 in., breadth .6 to .8 in.; petiole about .1 in. *Male flower* .6 in. long, solitary, axillary on a short tomentose pedicel with 2 broad bracteoles. *Calyx* less than .1 in. long, pubescent outside, glabrous inside, deeply divided into 4 broad obtuse almost quadrate imbricate lobes. *Corolla* salver-shaped; the tube cylindric, tapering to the apex, tomentose outside; limb as long as the tube but less hairy outside, glabrous inside like the tube, deeply divided into 4 oblong sub-acute lobes with inflexed edges, twisted to the right in bud. *Stamens* 8, attached near the bottom of the tube, 4 shorter than the others; anthers all lanceolate, and on short filaments. *Female flower* not known. *Fruit* ellipsoid, sparsely adpressed-puberulous, crowned by the conic style, .8 or .9 in. long and .4 in. in diam. *Calyx* at its base .25 in. across, flat, with 4 spreading, broad, blunt lobes.

PERAK: *Wray* 4055; *King's Collector* 7302.—DISTRIB. Sumatra, *Forbes* 2004.

3. DIOSPYROS MICROPHYLLA, Bedd. Ic. Pl. Ind. Or. 27, t. cxxxiii. (1874), and Fl. Sylv. Madr. cxlv. A tree 20 to 30 feet high; young branches as thick as a crow-quill or thinner, densely pubescent. *Leaves* thinly coriaceous, alternate, distichous; ovate-lanceolate, sub-rhomboid, the apex sub-acute, the base cuneate; upper surface dark olivaceous-brown, glabrous except the pubescent depressed midrib; the lower dark brown, puberulous, the midrib pubescent; main-nerves obsolete on both surfaces; length 1 to 1.4 in., breadth .45 to .65 in.; petiole .05; the largest leaves towards the ends of the branches. *Male flowers* solitary or 3 together in a minute cyme. *Calyx* .05 long, deeply 4-lobed, tube glabrate. *Corolla* slightly longer than the calyx with 4 rounded lobes. *Stamens* about 16. *Female flowers* .2 in. long, axillary, solitary, pedicellate or in a pair on a short peduncle. *Calyx* campanulate, deeply divided into 4 sub-rotund imbricate very obtuse lobes, sericeous on the middle outside and on the edges, otherwise glabrous. *Corolla* salver-shaped, somewhat longer than the calyx, deeply cut into 4 unequal rotund lobes, adpressed-puberulous on the back of the lobes, otherwise glabrous. *Ovary* ovoid, sericeous near the apex and base; style thick, 2-fid; stigmas 4. *Ovary* 4-celled, ellipsoid, conic, 4-celled, cells 1-ovuled. *Fruit* cylindric or oblong-conical, dry, glabrous, 1-celled, 1- rarely 2-seeded, .75 to 1 in. long. *Clarke* in Hook. fl. Fl. Br. Ind. III. 559. *D. buxifolia*, *Hiern* in Trans. Camb. Phil. Soc. XII. 218. *D. vaccinioides*, *Wall.* Cat. 4130 (*in part*). *Leucoxylum buxifolium*, *Blume* Bijdr. 1169; *Miq.* Fl. Ind. Bat. II. 1050; *Choisy* Mem. Ternstr. 43 t. 2.

MALACCA: *Griffith* (K.D.) 3643; *Walker* 170; *Maingay* (K.D.) 966. SINGAPORE: *Ridley* 6045. PENANG: *Curtis* 1513, 7175. PERAK:

*Scortechini* 2052.—DISTRIB. Andaman Islands, South India, Malay Archipelago.

4. *DIOSPYROS DUMOSA*, King & Gamble, n. sp. A small tree; young branches as thick as a crow-quill, glabrous, dark-coloured when dry. *Leaves* small, alternate, membranous; lanceolate, shortly acuminate, the base cuneate; upper surface dark olivaceous when dry, glabrous; lower yellowish, slightly puberulous on the slightly prominent midrib and 4 or 5 pairs of curved ascending nerves; length 1·5 to 2 in.; breadth ·5 to ·75 in.; petiole ·05 in. *Male flowers* ·5 in. long, in small axillary sessile fascicles of 3 or 4. *Calyx* ·25 in. long, deeply divided into 3 or 4 ovate-lanceolate acuminate lobes, concave along the midrib, and with undulate edges, pubescent. *Corolla* twice as long as the calyx, narrowly tubular, deeply divided into 4 narrow oblong glabrous lobes, the tube pubescent inside and outside. *Stamens* 12, inserted at its base on unequal slender filaments; anthers broadly lanceolate, much apiculate. *Female flowers* solitary, axillary, shortly pedicellate, ·4 in. long. *Calyx* cleft to the base into 4 large broadly ovate reniform bluntly acuminate undulate lobes, sparsely adpressed-pubescent on both surfaces, ·25 in. long and as much across. *Corolla* a little longer but less hairy than the calyx, fleshy, tubular, tetragonous, divided for half its length into 4 narrow oblong lobes. *Staminodes* 8, linear-lanceolate, apiculate, on slender filaments. *Ovary* narrowly ellipsoid, tapering to the rather long style, glabrous. *Fruit* unknown.

PERAK: *Wray* 3508. JUNKSEYLON (Tongka): *Curtis* 2907.

5. *DIOSPYROS GRACILIFLORA*, Hiern in Trans. Camb. Phil. Soc. XII. 191 (1873). A glabrous tree 40 to 50 feet high; young branches less than half as thick as a goose-quill, deciduously puberulous, dark-coloured and striate when dry. *Leaves* thickly membranous, alternate; rather narrowly elliptic, shortly and bluntly apiculate to caudate-acuminate, the base much narrowed and often slightly oblique; both surfaces dull dark olivaceous-brown when dry, glabrous except for some minute hairs on the nerves beneath; main-nerves about 5 pairs, curved, ascending, depressed or obscure on the upper surface, pale and slightly prominent on the lower like the midrib; length 2·5 to 4·5 in., breadth ·75 to 1·35; petioles ·1 to ·2 in. *Male flowers* ·5 in. long, few together, in small axillary cymes about as long as the petioles, sessile, puberulous. *Calyx* large, two-thirds to one-half the length of the corolla, but much wider, deeply divided into 4 large ovate-rotund undulate semi-erect lobes. *Corolla* narrowly tubular, one-third to one-half longer than the calyx; the tube externally with 4 lines of pubescence, otherwise glabrescent; limb with 4 deeply oblong broad blunt glabrous spreading sub-undulate lobes. *Stamens* 8, in two rows,

4 of them smaller than the other 4; anthers linear-lanceolate, apiculate, the filaments flat, very short; rudimentary ovary small, narrowly ovate, glabrous. *Female flowers* like the ♂ and often mixed with them, but sometimes solitary. *Ovary* broadly ovoid, with short style, glabrous. *Fruit* ellipsoid, 1 in. long and .75 in. in diam., glabrous, crowned by the short remains of the style, and subtended by the calyx with 4 spreading, undulate, sub-glabrous lobes. *D. flavicans*, Hiern in Trans. Camb. Phil. Soc. XII. 205 (as to female plant partly). *D. decipiens*, Clarke in Hook. fil. Fl. Br. Ind. III. 563.

MALACCA: *Maingay* (K.D.) 972 (♀ only). PERAK: *Scortechini* 181, 198; *Wray* 1298, 2843, 3214, 4227; *King's Collector* 884, 3298, 3354, 3366, 3588, 3394, 5173, 6742, 7990, 10463. PENANG: *Curtis* 3041.—DISTRIB. Java, *Beccari* 1560.

6. DIOSPYROS SCORTECHINII, King & Gamble, n. sp. A tree 15 to 30 or even 50 feet high; young branches as thick as a crow-quill, tawny-puberulous, angled, pale when dry. *Leaves* alternate, small, membranous; narrowly elliptic-oblong, acuminate, much narrowed at the base to the short petiole; both surfaces olivaceous-brown when dry, the upper glabrous, the lower often puberulous, especially on the midrib; main-nerves 8 to 12 pairs, spreading, curved, ascending, somewhat distinct on the lower surface, faint on the upper as are the transverse reticulations; length 2 to 4 in., breadth .6 to 1.25 in.; petiole .1 to .15 in. *Male flowers* .5 in. long, in shortly pedunculate axillary fascicles of 2 or 3, or solitary and pedicellate. *Calyx* .1 in. long, tomentose outside, glabrous inside, .1 in. long, campanulate, deeply divided into 4 broad almost truncate lobes. *Corolla* coriaceous, .3 in. long, glabrous; tube tapering a little to the apex; lobes 4, oblong, sub-acute, spreading. *Stamens* 8; anthers shortly lanceolate, as long as the filaments. *Female flowers* longer than the ♂, solitary, the pedicel as long as the calyx, tomentose. *Ovary* ellipsoid, densely pilose; style short, conic; stigmas small, glabrous. *Fruit* ellipsoid, crowned by the very short style, puberulous. *Calyx* at its base cupular, .2 in. across, tomentose outside, .75 in. long and .4 in. in diam.

PERAK: *Curtis* 2092; *King's Collector* 2407, 4126, 5002, 5296, 6356; *Scortechini* 377; *Wray* 638.

7. DIOSPYROS FLAVICANS, Hiern in Trans. Camb. Phil. Soc. XII. 205 (1873). A tree 40 to 70 feet high; young branches rather thicker than a crow-quill, cinereous-puberulous becoming glabrous. *Leaves* alternate, thinly coriaceous; elliptic to oblong-elliptic, apex shortly acuminate, the base cuneate; upper surface when dry olivaceous, glabrous, the lower pale brown, densely puberulous on the stout midrib; main-nerves 5 to

7 pairs, curved, ascending; length 3·25 to 5 in., breadth 1·35 to 2·5 in.; petioles ·1 to ·15 in. *Male flowers* ·45 in. long, 2 to 6 together, in axillary or extra-axillary bracteate sessile tomentose fascicles. *Calyx* sub-sessile, campanulate, pubescent outside, glabrous inside; the limb deeply divided into 5 broadly ovate, bluntly acuminate spreading lobes. *Corolla* salver-shaped; tube slightly inflated and glabrous in the lower half outside, cylindric and pubescent in the upper half, inside glabrous; limb with 4 broadly oblong obtuse glabrescent spreading lobes. *Stamens* 12, of different lengths, attached in 3 rows in the tube; anthers lanceolate-cordate, apiculate; filaments slender and of varying length; rudimentary ovary none. *Female flowers* conspicuously bi-bracteate, in cymes like the ♂ but shortly pedunculate. *Calyx* as in the ♂ but less deeply lobed. *Fruit* ellipsoid, not much narrowed at the ends, slightly tetragonous, glabrous, ·75 in. long and about ·35 in. in diam., crowned by the short remains of the style; the calyx clasping its base, about half as long, with 4 deep triangular lobes. *Seeds* 4, ridged. Clarke in Hook. fil. Fl. Br. Ind. III. 562; Kurz in Journ. As. Soc. Beng. XLVI., ii. 236, For. Fl. II. 135. *Guatteria?* *flavicans*, Wall. Cat. 7295. *Ebenacca*, sp. 2, Griff. Notul. IV. 291.

MALACCA: *Griffith* (K.D.) 454, 3623; *Maingay* (K.D.) 972 (as to male plant only); *Helper* (K.D.) 3639? PENANG: *Curtis* 1602. SELANGOR: *Ridley* 10556. PERAK: 2058; *King's Collector* 2480, 3354, 3380, 3774, 6149, 6633, 10007.

8. DIOSPYROS APICULATA, Hiern in Trans. Camb. Philos. Soc. XII. 186 (1873). A shrub or small tree; young branches half as thick as a goose-quill, fulvous-hirsute. *Leaves* alternate, membranous; oblong or elliptic-oblong, sometimes rather oblanceolate, finely caudate-acuminate, slightly narrowed to the rounded or somewhat cuneate base; both surfaces dark olivaceous-brown when dry, transversely reticulate; upper surface sparsely adpressed-pubescent, the midrib and main-nerves pubescent and slightly depressed; lower surface darker, and with many long rather coarse hairs, especially on the prominent midrib and 8 to 10 pairs of slightly curved ascending main-nerves; length 5·5 to 7 in., breadth 1·5 to 2·5 in.; petiole ·1 in., tomentose. *Male flowers* about 3 together, axillary, sub-sessile, ·35 in. long. *Calyx* 4- to 5-partite, about ·25 in. long, pubescent, lobes narrowly lanceolate. *Corolla* tubular, 4-lobed, ·4 in. long, the lobes spreading, oval, obtuse. *Stamens* 6 to 12, unequal, glabrous; anthers linear-oblong, acuminate; filaments often geniculate, dilated and somewhat united at the base, rudimentary ovary small, hairy. *Female flowers* 1 to 3 together on short axillary, minutely hispid cymes.

*Fruit* sub-sessile, solitary, ovoid-conic, finely rusty-setose, especially in the upper half, about 1 in. long and  $\cdot 5$  to  $\cdot 75$  in. across, apiculate. *Seeds* about 4, albumen not ruminant. Clarke in Hook. fil. Fl. Br. Ind. III. 553.

MALACCA: *Maingay* (K.D.) 1514. PERAK: *King's Collector* 5127, 6770. PENANG: *Curtis* 1584.

9. DIOSPYROS LANCEÆFOLIA, Roxb. Hort. Beng. 93 (1814). A tree; young branches twice as thick as a crow-quill, adpressed-puberulous, dark brown when dry. *Leaves* alternate, coriaceous; oblong, lanceolate or oblong-lanceolate, acute or acuminate, the base rounded or cuneate, the edges recurved; both surfaces olivaceous-brown when dry, the upper darker and shining, the lower paler and dull; main-nerves 7 to 9 pairs, spreading, faint on both surfaces; midrib bold on the lower surface, depressed on the upper; length 2 to 3 in.; breadth  $\cdot 65$  to 1 in.; petiole  $\cdot 15$  to  $\cdot 2$  in. *Male flowers* sessile in clusters. *Calyx*  $\cdot 15$  in. long with 4 ovate tawny-sericeous lobes. *Corolla*  $\cdot 35$  to  $\cdot 5$  in. long, narrowed upwards, the lobes  $\cdot 15$  in. long. *Stamens* about 16; anthers linear, glabrous or slightly pilose at the base; filaments minutely pilose. *Female flowers* solitary or in pairs on the branches below the leaves,  $\cdot 5$  in. long. *Calyx*  $\cdot 3$  in. long, very coriaceous, densely sericeous-pubescent on both surfaces, deeply divided into 4 erect, broadly reniform, acute lobes. *Corolla* a little longer than the calyx, densely sericeous-tomentose outside, the tube glabrous inside; lobes of limb 4, oblong, very thick. *Staminodes* 8, linear compressed. *Ovary* broadly ovate, acuminate, densely silky; stigmas 4, glabrous. *Fruit* ovoid or sub-globose, rusty-villous; its *calyx* 1 in. in diam. with thickened tube and spreading lobes. Roxb. Fl. Ind. II. 537; A. DC. Prod. VIII. 232; Hiern in Trans. Camb. Phil. Soc. XII. 213; Kurz in Journ. As. Soc. XLVI., ii. 236, and For. Fl. II. 136; Clarke in Hook. fil. Fl. Br. Ind. III. 562. *D. multiflora*, Wall. Cat. 4144; A. DC. l.c. 231. *D. amœna*, Wall. Cat. 4139; A. DC. l.c. 231.

SINGAPORE: *Ridley* 4964. PAHANG: *Ridley* 1601.—DISTRIB. Assam range of hills, Burma, Sumatra.

The chief characters separating this from *D. lucida*, Wall., are the longer lobes of the calyx of the female flower and the somewhat larger and more hairy fruit. This species is not common within our area, whereas *D. lucida* is a common tree.

10. DIOSPYROS PACHYPHYLLA, Clarke in Hook. fil. Fl. Br. Ind. III. 568 (1882). A tree; young branches rather thinner than a goose-quill, deciduously puberulous, soon glabrous. *Leaves* coriaceous, alternate; elliptic or oblong, sub-acute, the base rounded; both surfaces when

dry rather pale olivaceous-brown, glabrous; the upper shining, the lower glaucous, dull; main-nerves 8 or 9 pairs, curving upwards, faint on both surfaces midrib bold on the lower surface, depressed on the upper; length 3 to 5 in., breadth 1·5 to 2·5 in.; petiole ·25 to ·4 in. *Male flowers* in short rusty-pubescent axillary and extra-axillary cymes from ·5 to ·75 in. long, bracts ovate, ·1 in. long. *Calyx* ·15 in. long, campanulate, adpressed rusty-tomentose on both surfaces, cut half-way into 4 broad triangular erect lobes. *Corolla* tomentose externally (*vide* C. B. Clarke) nearly ·5 in. long, its lobes about ·1 in. *Stamens* about 12; anthers linear, with villous connective and glabrous filaments. *Female flowers* unknown. *Fruit* globular, the apex concave and bearing the short remains of the style, ·65 in. in diam., minutely rusty adpressed-pubescent, becoming glabrous; the *calyx* at its base woody, cupular, with 4 broad lobes with reflexed apices.

MALACCA: *Maingay* (K.D.) 974. SINGAPORE: *Ridley* 5644.

This does not agree with *D. undulata*, Wall., of which Hiern, in Trans. Camb. Phil. Soc. XII. 215, makes it a variety. It comes much nearer to, but is smaller in all its parts than, the plant named by us *D. Wallichii*, which was originally issued as *D. macrophylla*, Wall. Cat. 4141.

11. *DIOSPYROS CLAVIGERA*, Clarke in Hook. fil. Fl. Br. Ind. III. 558 (1882). A tree; all parts glabrous except the minutely pilose-ciliate margin of the calyx. *Leaves* alternate, coriaceous, elliptic, tapering slightly to each end (sub-rhomboidal); both surfaces warm brown when dry, the upper glabrous, shining, the lower dull; main-nerves 6 or 7 pairs, little curved, ascending, slightly prominent on the lower surface, faint on the upper; length 3·25 to 4·5, breadth 1·5 to 2·15 in.; petioles ·15 to ·2 in. *Male flowers* 3 to 16 together in small sub-sessile axillary and extra-axillary cymes. *Calyx* ·15 in. long, deeply divided into 4 obtuse lobes. *Corolla* (in bud) ·35 in. long, clavate, glabrous outside, the upper part very thick, 4-lobed. *Stamens* about 16, glabrous; anthers oblong, shortly apiculate. *Female flower* and fruit unknown. *D. Ebenum*, Hiern (*not of Koenig*) in Trans. Camb. Phil. Soc. XII. 208 (*in part*).

MALACCA: *Maingay* (K.D.) 971; *Griffith* (K.D.) 3635. LANGKAWI: *Curtis* 3418. SINGAPORE: *Maingay* 5066.

12. *DIOSPYROS BILOCULARIS*, Oliver in Hook. Ic. Pl. t. 2336 (1894). A glabrous tree 60 to 80 feet high; young branches about the thickness of a goose-quill, dark purplish when dry and shining, slightly striate. *Leaves* thickly coriaceous; elliptic, sub-acute, the base slightly cuneate, the edges (when dry) recurved; both surfaces olivaceous when dry, the upper shining, the lower paler and dull; midrib inconspicuous and

slightly channelled on the upper surface, bold on the lower; main-nerves 10 to 12 pairs, slightly curved, spreading, interarching far from the edge, faint on both surfaces; length 5 to 6.5 in., breadth 2.5 to 3.25 in. *Male flowers* .65 in. long (in bud) on rusty-pubescent pedicels .3 to .4 in. long, in axillary and extra-axillary fascicles of 2 to 4, with a few tomentose bracteoles at their bases. *Calyx* very coriaceous, .25 in. long and nearly as much in width at the mouth; limb 4-lobed, the lobes very short and broad. *Corolla* narrowly tubular, .4 in. long, very thick; lobes of limb long, narrowly oblong. *Stamens* 16; sub-sessile, linear, sub-equal, apiculate; rudimentary ovary none. *Female flower*; calyx and corolla as in the ♂, staminodes none; *ovary* oblong or oval-ovoid, narrowed at the apex, longer than the calyx, 2-celled; ovules 2 in each cell and pendulous. *Fruit* olive-shaped, shortly apiculate, 1.5 to 2 in. long and 1 to 1.25 in. in diam. at the middle, yellow when ripe; its pedicel obconic, stout, woody, .4 in. long; calyx in ripe fruit flat, with 4 broad blunt lobes. *Seed* solitary; pericarp thin, only .3 in. across, albumen large stellately ruminant. *Maba Maingayi*, Hiern in Trans. Camb. Phil. Soc. XII. 107; Clarke in Hook. fil. Fl. Br. Ind. III. 552.

MALACCA: *Maingay* (K.D.) 976; *Derry* 1092. SINGAPORE: *Ridley* 27, 2755, 4920. PERAK: at elevations of 1,500 to 2,000 feet, *King's Collector* 7383.

13. DIOSPYROS STYRACIFORMIS, King & Gamble, n. sp. A tree (?); young branches rusty-pubescent, slightly thicker than a crow-quill. *Leaves* thinly coriaceous; elliptic to elliptic-lanceolate, the apex sub-acute or acute, the base cuneate; upper surface dark olivaceous, shining, glabrous except the depressed midrib; the lower surface dull, paler, with deciduous rufous pubescence, especially on the prominent midrib; main-nerves about 5 pairs, ascending, little curved, slightly prominent on the lower surface only; length 2.5 to 4 in., breadth 1 to 2 in.; petiole .2 to .35 in. *Male flowers* a few together in short cymes grouped in small axillary clusters. *Calyx* .2 in. long, narrowly campanulate, densely rusty-tomentose externally like the corolla, the mouth with deep narrowly-triangular teeth. *Corolla* .5 in. long, narrowly tubular, cut half-way down into 4 oblong blunt lobes. *Stamens* 16, in pairs, unequal, linear, apiculate; filaments unequal in length; rudimentary ovary none. *Female flowers* solitary, calyx much longer than in the ♂; its 4 lobes thick, broad, reniform, rusty-pubescent. *Corolla* not known; *ovary* hairy. *Fruit* globose with the apex truncate and depressed in the middle, densely but minutely pale rusty-tomentose, .5 in. long and about .65 in. in diam. *Calyx* at its base deeply cupular with 4 spreading triangular teeth. *D. nov. spec.*, C. B. Clarke in Herb.

Kew. *D. hirsuta*, Linn. fil., ? var., Hiern in Trans. Camb. Phil. Soc. XII. 165.

MALACCA: *Maingay* (K.D.) 969. SINGAPORE: *Ridley* 3787.

Ridley's No. 1084, from Bukit Timah, in Singapore, seems to belong to this. The only specimen I have seen is imperfect.

14. DIOSPYROS LUCIDA, Wall. Cat. 4127 (1829). A tree 40 to 50 feet high; young branches from half as thick to as thick as a crow-quill, minutely puberulous, becoming glabrescent, dark-coloured. *Leaves* alternate, coriaceous; oblong or elliptic-oblong, sub-acute or obtuse, the base rounded or cuneate, sometimes a little oblique; both surfaces when dry pale olivaceous-brown, glabrous; main-nerves 5 to 9 pairs, spreading, curved, faint on the lower surface, slightly depressed on the upper; midrib bold on the lower surface, somewhat depressed on the upper; length 1.25 to 4.5 in., breadth .5 to 1.5 in.; petioles .2 to .4 in. *Male flowers* sessile, in small fascicles. *Calyx* nearly .15 in. long, campanulate, with 4 erect broadly triangular lobes, tomentose on both surfaces. *Corolla* narrowly tubular, more than twice as long as the calyx, tetragonous in bud, sericeous-tomentose outside, the tube glabrous inside; limb deeply divided into 4 narrowly oblong thick lobes. *Stamens* 12 to 16, in pairs united by their short filaments and face to face; anthers linear, glabrous, minutely apiculate, and on short sericeous filaments; rudimentary ovary linear. *Female flowers* 1 or 2 together, axillary or extra-axillary, sub-sessile. *Calyx* longer than in the ♂, lobed nearly to the base; lobes broadly ovate, their recurved margins minutely tomentose. *Fruit* globose, .75 in. or more in diam., sub-truncate and slightly umbonate at the apex, adpressed rusty-pubescent at first, ultimately glabrous, 4-6-seeded; the accrescent *calyx* at its base woody, cupular, .6 in. across with 4 short broad reflexed lobes; albumen of seed not ruminant. A. DC. Prod. VIII. 233; Clarke in Hook. fil. Fl. Br. Ind. III. 568. *D. hirsuta*, var. *lucida* Hiern in Trans. Camb. Phil. Soc. XII. 163(not of Linn. fil.)

MALACCA: *Griffith* (K.D.) 3637; *Maingay* (K.D.) 970, 973, 977, 3,500; *Derry* 1439. PERAK: *Scortechini*; *Wray* 3018, 3056. PENANG: *Curtis* 250, 1602; *King's Collector* 1050, 1760. SINGAPORE: *Ridley* 2119, 2749, 3580, 4962, 4963, 6129, 8115, 9212, 9517.

This is probably only a southern form of the Indian species *D. lanceafolia*, Roxb.

15. DIOSPYROS OBLONGA, Wall. Cat. 4124 (1829). A tree; young branches thinner than a goose-quill, purplish-brown when dry, glabrous. *Leaves* alternate, coriaceous, glabrous; oblong-elliptic, shortly and abruptly apiculate, the base rounded or slightly cuneate; both surfaces

faintly reticulate, quite glabrous, shining; main-nerves 16 to 18 pairs, spreading, little curved, interarching boldly at a little distance from the edges, prominent on the lower surface, depressed on the upper; midrib very bold on the lower surface, depressed on the upper; length 7 to 9 in., breadth 3 to 3·75 in.; petiole ·4 in., very stout. *Male flowers* about ·5 in. long, salver-shaped, in short axillary cymes, coriaceous, subsessile, ·5 in. long. *Calyx* and *corolla* everywhere adpressed-tomentose. *Calyx* shorter than the corolla, campanulate, cleft to near the base into 5 oblong, blunt, sub-erect lobes. *Corolla-tube* narrow, not constricted at the throat; limb with 5 large broad rotund lobes with recurved edges. *Stamens* 10, united in pairs by the bases of their filaments, the inner ones smaller, all inserted on the base of the calyx-tube. *Female flowers* 1 to 5 together, ·25 to ·3 in. long, with 5 deep ovate-oblong auriculate sub-plicate lobes. *Corolla* ·35 in. long, densely hairy outside, deeply lobed; staminodes 5; *ovary* 10-celled, rusty-hairy. *Fruit* sub-globose, sub-truncate at base and apex, glabrous when ripe; the hispid accrescent *calyx* ·75 in. across, its lobes auriculate; albumen of seed not ruminate. A. DC. Prod. VIII. 243; Hiern in Trans. Camb. Phil. Soc. XII. 243; Clarke in Hook. fil. Fl. Br. Ind. III. 569; Miq. Fl. Ind. Bat. II. 1045.

MALACCA: *Maingay* (K.D.) 967. PENANG: *Curtis* 1564, 2487. 3658. SINGAPORE: *Ridley* 2747, 3031, 6311. PERAK: *King's Collector* 3794, 4924, 7237, 8278.

16. DIOSPYROS HELFERI, Clarke in Hook. fil. Fl. Br. Ind. III. 569 (1882). A tree 20 to 30 feet high; young branches half as thick as a goose-quill, pale puberulous, the bark dark. *Leaves* alternate, coriaceous; elliptic or elliptic-oblong, sub-acute or obtuse, the base broad or sub-acute; the upper surface dark olivaceous-brown when dry, glabrous except the depressed puberulous midrib, the reticulations minute but distinct; lower brown, glabrescent but puberulous on the rather stout midrib and nerves; main-nerves 10 to 12 pairs, rather faint, spreading, horizontal, interarching boldly about ·25 in. from the edge; length 5·5 to 7·5 in., breadth 2·5 to 3·25 in.; petiole ·4 to ·5 in., stout, pubescent. *Male flowers* unknown. *Female flowers* ·5 in. long, axillary, solitary or 2 together, sessile. *Calyx* coriaceous, densely pubescent inside and out, deeply divided into 5 broadly oblong, sub-acute lobes, accrescent, and becoming concave along the midribs of the lobes. *Corolla* somewhat longer than the calyx, sericeous externally; the tube short, the limb-lobes deep, broadly oblong, blunt; staminodes few, flat. *Ovary* broadly ovoid, densely sericeous-tomentose. *Fruit* ovoid-ellipsoid, nearly 1 in. long, and slightly less in diam., glabrous; the accrescent *calyx* embracing its base deeply 5-lobed, plicate.

MALACCA : *Griffith* (K.D.) 3632. KEDAH : *Curtis* 2596, 8327? ; *Ridley* 327.

17. *DIOSPYROS TRISTIS*, King & Gamble, n. sp. A tree 40 to 50 feet high; young branches half as thick as a goose-quill, covered with deciduous almost black tomentum. *Leaves* alternate, coriaceous; oblong-elliptic, shortly acuminate, the base rounded or cuneate; both surfaces dingy olivaceous-brown when dry, minutely reticulate; upper surface glabrous, shining, the lower dull, the prominent midrib densely clothed with dark hairs; the 7 or 8 pairs of prominent ascending main-nerves and the intermediate spaces with a few similar hairs with bulbous bases; length 6 to 9 in., breadth 2 to 2.75 in.; petioles .4 to .5 in. *Male flowers* .3 in. long, in short axillary cymes .75 in. long, the branches and pedicels densely dark rusty-tomentose outside. *Calyx* glabrous inside; the mouth with 5 broad short obtuse teeth. *Corolla* fleshy, glabrous, like the calyx in shape and of about the same length. *Stamens* 24; anthers lanceolate, shortly appendiculate at the apex, sessile. *Female flowers* unknown. *Fruit* depressed-globose, glabrous, shining, nearly 2 in. in diam.; the *calyx* at its base thick, woody, flat, 1.5 in. across, with 5 spreading triangular lobes.

PERAK : *Wray* 2190 ; *King's Collector* 5521.

18. *DIOSPYROS PAUCIFLORA*, King & Gamble, n. sp. A glabrous shrub or small tree; young branches rather thinner than a goose-quill, their bark dark and rough. *Leaves* rather large, alternate, very coriaceous; oblong-lanceolate or -oblanceolate, shortly caudate-acuminate, the base slightly cuneate; upper surface olivaceous, shining, lower ochraceous, dull; main-nerves 8 to 10 pairs, spreading, curved, and interarching boldly .1 or .2 in. from the slightly recurved edge; length 5 to 10 in., breadth 1.75 to 3 in.; petiole .25 to .3 in., corrugated. *Male flowers* .3 in. long, sessile and in sessile axillary fascicles of from 3 to 6. *Calyx* .25 in. long, narrowly tubular, somewhat narrowed at base and apex, coriaceous, pale in colour, the mouth with 4 broad triangular short erect lobes, outer surface with a layer of minute adpressed tawny tomentum and scattered over it many black adpressed hairs; the interior paler, pustular, with a few similar scattered hairs and a thick ring of them near the base surrounding the rudimentary ovary and clothing it also. *Corolla* slightly longer than the calyx, fleshy, widely tubular, divided for half its length into 4 broad obtuse lobes with a broad line of adpressed black hairs along the midrib of each outside, the rest of the outer surface adpressed-sericeous, the interior quite glabrous. *Stamens* 12, viz., 8 in pairs standing face to face and united by their short filaments, and 4 free; anthers of all linear, densely hairy, on short glabrous filaments. *Female flowers* not seen.

PERAK: *King's Collector* 7363, 7749.

19. *DIOSPYROS ELLIPSOIDEA*, King & Gamble, n. sp. A tree or shrub; young branches somewhat thinner than a goose-quill, deciduously and densely rusty-puberulous. *Leaves* alternate, thinly coriaceous; oblong to elliptic-oblong, rarely slightly oblanceolate, apex acute, base rounded; both surfaces when dry olivaceous-brown, the upper glabrous, the midrib sometimes rusty-puberulous, the lower surface darker, minutely puberulous; midrib and 10 to 12 pairs of curved ascending nerves faintly prominent on the lower and depressed on the upper surface; length 6 to 10 in.; breadth 2.25 to 3.5 in.; petioles .25 to .3 in. *Male flowers* in dense axillary cymes of 6 to 12, not much longer than the petioles; bracteoles few, broad, densely rusty-tomentose. *Calyx* sub-sessile, tomentose externally, glabrous internally, divided into 4 sub-rotund blunt lobes. *Corolla* glabrous, very fleshy towards the apex, with 4 broad deep lobes. *Stamens* at the base of the tube, broadly ovate, apiculate, filaments flattened. *Female flowers* in subsessile clusters of 3 or 4. *Calyx* with 4 rounded lobes, reflexed, coriaceous, and in fruit only .35 in. across. *Fruit* ellipsoid, glabrous, crowned by the short style and subtended by the reflexed broadly-lobed small calyx, 1 to 1.25 in. long and .8 in. in diam. *Seeds* few, ellipsoid, apiculate, two of the sides compressed.

PERAK: *King's Collector* 2233, 3250, 7098, 7269, 7320, 7689, 8215; *Scortechini* 1615.

20. *DIOSPYROS WALLICHII*, King & Gamble. A tree 30 to 60 feet high; young branches covered with minute coarse hair, the older verrucose. *Leaves* alternate, coriaceous; oblong or elliptic-oblong, apex acute, base cuneate or rounded; edges slightly recurved; upper surface glabrous and shining, lower paler, minutely pubescent at first but becoming glabrescent, both olivaceous when dry; midrib depressed on the upper surface, bold on the lower; main-nerves 14 to 18 pairs, slightly curved, spreading, prominent on the lower surface, faint on the upper; length 8 to 14 in., breadth 2.5 to 5 in.; petiole .5 to .75 in. *Male cymes* .5 to .75 in. long, in clusters (often crowded) on the branches, 7-10-flowered; bracteoles broad, blunt, concave, thick like the calyx and corolla, and like them densely rusty-tomentose externally. *Calyx* .1 to .15 in. long, tubular; the mouth with 4 blunt triangular erect teeth; tomentose on both surfaces. *Corolla* thrice as long as the calyx; narrowly tubular, glabrous inside. *Stamens* 16, in 2 rows, the inner attached to the outer at the bases of their filaments; all linear; rudimentary ovary small, hairy. *Female flower* rather larger than the ♂, but in smaller cymes; the *calyx* tetragonous and deeply grooved, very fleshy, becoming woody, very large and boldly 4-angled and

grooved in the ripe fruit. *Corolla* as in the ♂, but somewhat longer. *Staminodes* about 16. *Ovary* conical densely hairy; stigma glabrous, with 4 deep oblong truncate lobes. *Fruit* 1 in. in diam., nearly twice as much across the calyx, sub-globose, deeply immersed in the large thickened calyx, its apex truncate-concave; seeds 4 or 5. *D. macrophylla*, Wall. Cat. 4141 (not of Blume). *D. undulata*, Wall. A. DC. Prod. VIII. 233; Hiern in Trans. Camb. Phil. Soc. XII. 216 (in part); Kurz in Journ. As. Soc. Beng. XLVI. ii. 23, and For. Fl. II. 135 (in part); Clarke in Hook. fil. Fl. Br. Ind. III. 568.

PENANG: *Curtis* 1085; *Ridley* 7174. MALACCA: *Maingay* (K.D.), 974; *Griffith* (K.D.) 3636. PERAK: *Scortechini* 1976; *Wray* 2535, 2865. *King's Collector* 2966, 2982, 4058, 6779, 7459, 7619, 10123. KEDAK: *Curtis* 2594. SELANGOR: *Ridley* 2748, 8544.

This is the plant issued by Wallich as No. 4141 of his Catalogue under the name *D. macrophylla*. Being different from the older *D. macrophylla* of Blume, a new name had to be found for it. This was done by De Candolle, who reduced it, as a variety, to Wallich's *D. undulata* with the type specimen of which in Wallich's own herbarium it does not agree. De Candolle was followed by Hiern, Kurz, and Clarke; we now restore it to specific rank. The true *D. undulata*, Wall., is a Burmese species. It is found also in the Andaman Islands, but it has not as yet been collected in Malaya.

21. DIOSPYROS ARGENTEA, Griff. Notul. IV. 288 (1854). A tree 15 to 50 feet high; young branches about as thick as a goose-quill, covered with sub-deciduous yellowish silky hairs. *Leaves* large, coriaceous; oblong, apex acute, base rather abruptly cuneate or rounded; upper surface warm brown when dry, glabrous and shining, the midrib depressed; lower densely covered with yellowish adpressed sericeous hair, the midrib very stout; main-nerves invisible on both surfaces; length 6 to 10 in.; breadth 1·65 to 3·5 in.; petioles ·1 to ·25 in. *Male flowers* in somewhat supra-axillary few-flowered shortly pedunculate spike-like cymes 1 to 1·25 in. long (peduncle included); bracts ovate ·2 in. long. *Calyx* ·25 in. long, deeply 4-lobed, villous. *Corolla* ·35 in. long, tubular, lobed half-way down, very villous outside. *Stamens* 20 to 24. *Female flower* solitary on a peduncle ·2 in. long; calyx campanulate, ·5 in. long, with ovate lobes. *Corolla* ·65 in. long. *Staminodes* 4 to 5. *Ovary* 4-celled, 8-ovuled, densely hairy; styles 4, erect, hairy. *Fruit* ellipsoid, apiculate, 2 to 2·5 in. long and 1 to 2 in. in diam., densely rusty-tomentose; the *calyx* persistent, its lobes enlarged, broad, very coriaceous, shortly hairy. Hiern in Trans. Camb. Phil. Soc. XII. 262; Clarke in Hook. fil. Fl. Br. Ind. III. 569. *D. discolor*, Wall. Cat. 4131 (not of Willd.).

MALACCA: *Griffith* (K.D.) 3625; *Maingay* (K.D.) 968, 970; *Goodenough*

1301, 1476. SINGAPORE: *Ridley* 3648, 5898; *Hullett* 825. PERAK: *Wray* 172, 1392; *King's Collector* 4812, 5862, 6387, 6896, 8003, 8142; *Scortechini* 498. PANGKORE: *Curtis* 1365. SELANGOR: *Ridley*. 10271. PAHANG: *Ridley* in *Trans. Linn. Soc. Ser. 2, III.* 318 in Tahan woods.

22. *DIOSPYROS RIGIDA*, Hiern in *Trans. Camb. Phil. Soc. XII.* 257 (1873). A tree 30 to 60 feet high; young branches as thick as a goose-quill, minutely dark rusty-tomentose. *Leaves* alternate, very coriaceous, large; oblong or elliptic-oblong, equal-sided, the apex sub-acute, the base rounded and neither oblique nor cordate; upper surface dark olivaceous-brown when dry, shining, minutely reticulate; lower paler olivaceous-brown, covered except the midrib with a very thin film of minute tomentum, minutely reticulate; midrib very bold on the lower surface, pubescent at the sides, slightly depressed on the upper; main-nerves 14 to 20 pairs, spreading, interarching  $\cdot 35$  in. from the edge, slightly distinct on the lower surface, invisible on the upper; length 10 to 18 in., breadth 2 to 4 in.; petiole  $\cdot 4$  to  $\cdot 6$  in., very stout. *Male flowers* when in bud  $\cdot 4$  in. long and nearly  $\cdot 3$  in. in diam., few, in short extra-axillary cymes, densely covered with black tomentum; the pedicels stout, deflexed, about  $\cdot 75$  in. long. *Calyx* densely tomentose, ovoid, tapered to the apex, its mouth with 4 broad shallow blunt teeth. *Corolla* (apparently) not much longer than the calyx, very coriaceous, glabrous, the tube ovoid; the lobes short, oblong, blunt. *Stamens* about 20, inserted at the base of the tube, unequal; anthers lanceolate, apiculate, almost sessile. *Female flowers* unknown. Ripe fruit in cymes, depressed-globose, glabrous, with a woody rind, 1.75 in. in length from base to apex and 2 in. in diam.; remains of style none; *calyx* at base of fruit cupular, 1.5 in. across, divided into 4 reticulate leathery spreading broadly ovate lobes; peduncle  $\cdot 75$  to 1.25 in. long, with dark hispid hairs.

PERAK: *King's Collector* 4024, 5732, 5971, 6801; *Wray* 3708.—  
DISTRIB. Borneo.

23. *DIOSPYROS HORSFIELDII*, Hiern in *Trans. Camb. Phil. Soc. XII.* 193 (1873). A tree 20 to 40 feet high, all parts except the cymes glabrous; young branches thinner than a goose-quill, pale. *Leaves* alternate, coriaceous; oblong-elliptic or ovate-oblong, apex sub-acute, base slightly cuneate or rounded, the edges slightly recurved when dry; upper surface when dry olivaceous-green, lower surface brown; the midrib and nerves depressed; the reticulations, midrib, and 8 to 14 pairs of curved spreading main-nerves very bold and prominent; length 6 to 10 in., breadth 2.5 to 4 in.; petioles  $\cdot 35$  in. *Cymes* 2 to 3 in. long,

covered with black pubescence, few-flowered, collected on extra-axillary or axillary tubercles, sometimes forming small panicles, consisting mostly of ♂ flowers, and often with only a few ♀, with many oblanceolate blunt bracts .25 to .3 in. long, and some smaller bracteoles; branches of the cyme striate when dry. *Calyx* .15 in. long, divided to its base into 4 broadly ovate undulate lobes. *Corolla* in bud cylindric, tetragonous at the base; about .4 in. long, tomentose, deeply divided into 4 narrowly elliptic blunt lobes. *Stamens* about 16 in 2 rows, united into a tube, the anterior row smaller than the posterior, all narrow and apiculate, the filaments short and hairy. *Female flowers* like the ♂ as to calyx, but with corolla somewhat longer and with about 12 flat staminodes. *Ovary* ovoid-conic, tomentose, attenuated into a long style. *Stigma* with several small lobes; ovary 8-celled. *Fruit* when ripe ovoid-globular, 1 to 1.25 in. in diam., glabrescent, subtended by the accrescent calyx with large reticulate undulate lobes. *Seeds* compressed, oblong. Clarke in Hook. fil. Fl. Br. Ind. III. 571. *D. frutescens*, Hassk. Pl. As. Rar. 467 (not of Blume).

MALACCA: Griffith (K.D.) 3620. PERAK: Scortechini 1765; King's Collector 8261.—DISTRIB. Java.

Specimens of this sent from Herbarium Koordersianum, Buitenzorg, have pentamerous flowers; but in other respects they do not differ from the Perak specimens in Herb. Calcutta.

24. DIOSPYROS TOPOSIODES, King & Gamble, n. sp. A glabrous tree 15 to 40 feet high, sometimes only a shrub; young branches rather thinner than a goose-quill, pale brown and striate when dry. *Leaves* alternate, coriaceous; oblong-elliptic, shortly acuminate or acute, base rounded; edges slightly recurved when dry; both surfaces pale olivaceous when dry, minutely but distinctly reticulate, the upper shining, the lower darker and dull; midrib channelled on the upper surface, strong and prominent on the lower; main-nerves 16 to 20 pairs, spreading, little-curved, interarching far from the edge, the intermediate nerves nearly as prominent; length 7 to 11 in.; breadth 2 to 4 in.; petiole .3 to .4 in. long, stout, wrinkled when dry like the midrib. *Male flowers* .25 in. long, on pedicels longer than themselves, in cymose axillary panicles about 1 in. in length. *Calyx* coriaceous, glabrous, campanulate, with wide truncate entire or sub-entire mouth. *Corolla* slightly exceeding the calyx, ovoid, inflated below, contracted to the 4-toothed apex. *Stamens* numerous, linear, slightly auricled at the base, filaments very short. *Female flowers* when in bud .3 in. long, conical. *Calyx* acutely 4-angled in bud; the 4 lobes deltoid, very coriaceous, puberulous outside, rusty-tomentose inside like the ovary and young

fruit, accrescent in fruit. *Corolla* slightly longer than the calyx, tubular, with 4 short erect ovate lobes, quite glabrous. *Staminodes* about 12, flattened, villous behind. *Ovary* conical, densely rusty-tomentose. *Stigma* glabrous, short, with 8 small lobes. *Fruit* in cymes, depressed-globular, 1 to 1.25 in. in diam., much exceeding the minutely reticulate calyx, glabrescent, minutely tuberculate. *Seeds* compressed.

PERAK: *King's Collector* 4106, 4361, 4889, 5769, 8242, 8357; *Scortechini*; *Ridley* 3079, 10302?

The leaves of this in texture and reticulations much resemble those of *D. Toposia*, Ham. The flowers and inflorescence are, however, different from those of that species.

25. DIOSPYROS OLEIFOLIA, Wall. Cat. 4128 (1829). A tree; young branches twice as thick as a crow-quill, almost black when dry, sparsely pubescent. *Leaves* coriaceous, alternate; narrowly oblong to elliptic, sub-acute or acute, the base cuneate; upper surface pale olivaceous, glabrous, shining; the lower yellowish, dull, for the most part glabrous, but usually with sparse adpressed black detachable hairs near the midrib and base; main-nerves invisible on either surface; midrib strong on the lower surface, slightly depressed on the upper, length 6.5 in.; breadth 2 in.; petiole .25 in. long. *Male cymes* on axillary peduncles about .3 in. long, each bearing 3 unequally pedicellate flowers .5 in. long; all very dark in colour and with black hairs like those on the outer surface of the calyx. *Calyx* .4 in. long, tubular-campanulate, densely adpressed rusty-tomentose inside, cut half-way down into 4 triangular erect lobes. *Corolla* tubular, slightly longer than the calyx, very thick, densely tomentose like the interior of the calyx; its lobes 4, very thick, oblong, spreading slightly. *Anthers* attached near the base of the tube, 16, linear-lanceolate, sessile. *Female flowers* on longer panicles than the males; pedunculate calyx with 4 triangular acute lobes, velvety outside, tawny-tomentose inside. *Fruit* depressed-globose, 1.35 in. in diam.; the pericarp woody, glabrous when ripe, tawny-tomentose when young, the persistent *calyx* at its base thick, woody, nearly 1 in. in diam., with dark tomentum outside. A. DC. Prod. VII. 132; Kurz in Journ. As. Soc. Beng. XLI., Pt. II. 72, id. XLVI., Pt. II. 235, and For. Fl. II. 132; Hiern in Trans. Camb. Phil. Soc. XII. 204; Clarke in Hook fil. Fl. Br. Ind. III. 567.

PENANG: *Curtis* 1573. PERAK: *King's Collector* 3876; *Scortechini*. —DISTRIB. Burma, Java.

26. DIOSPYROS BRACHIATA, King & Gamble, n. sp. A glabrous tree

20 to 40 feet high; young branches half as thick as a goose-quill. *Leaves* alternate, coriaceous; elliptic-oblong, acute or shortly acuminate, the base slightly cuneate or rounded; upper surface pale olivaceous when dry, lower pale brown; main-nerves 10 to 12 pairs, curved, ascending, prominent like the midrib on the lower surface, depressed somewhat on the upper; length 5·5 to 9 in.; breadth 1·5 to 2·5 in.; petioles ·3 to ·5 in. *Male flowers* about ·5 in. long. *Calyx* ·2 in. long, campanulate, divided almost to the base into 5 ovate-acute erect lobes, each folded vertically along the midrib so as to form a deep dorsal groove, everywhere minutely rusty-tomentose. *Corolla* twice as long as the calyx, narrowly tubular; the tube 5-angled, externally divided, the 5 lobes twice as long as the tube, linear-oblong, contorted in æstivation, the external half of each lobe tawny-tomentose, the inner half and the whole of the anterior surface glabrous. *Stamens* 14, linear, apiculate, sub-sessile. *Female flowers* ·4 in. long, collected in compound umbellate axillary cymes 1·5 to 1·75 in. long and about as much across, the branches compressed, rusty-puberulous, spreading, bearing a few oblong obtuse bracts; flower-pedicels varying in length from ·1 to ·2 in., bibracteolate. *Calyx* fleshy, tomentose outside, deeply divided into ovate-acuminate erect grooved lobes. *Corolla* tubular, tomentose outside, glabrous inside, very thick, deeply divided into 4 oblong lobes. *Staminodes* about 8, lanceolate, flattened. *Ovary* ovoid, tapering into a short style, tomentose. *Fruit* depressed-globose, puberulous, ·75 to ·9 in diam., and about the same from below the calyx to the somewhat concave apex; *calyx* woody, thick, 1 in. wide, with triangular deeply grooved sub-acute lobes.

PENANG: *Curtis* 1453, 1454, 10230.

27. DIOSPYROS PANICULATA, Dalz. in Hook. Kew Journ. IV. 109 (1852). A tree 50 to 70 feet high; young branches less than half as thick as a goose-quill, rusty-puberulous. *Leaves* thinly coriaceous, alternate; elliptic or elliptic-oblong, shortly and bluntly apiculate or acuminate; the base cuneate or rounded; both surfaces pale olivaceous when dry, the reticulations minute and distinct, especially on the glabrous upper surface; main-nerves 5 to 8 pairs, curving upwards and forming arches far from the edge, bold like the midrib on the lower surface and slightly depressed on the upper; lower surface softly pubescent; length 4 to 7·5 in., breadth 1·65 to 2·5 in.; petiole ·25, stout, channelled, pubescent. *Male and female flowers* not seen. *Fruit* in lax racemoid cymes, ellipsoid, crowned by the small remains of the style, rufous-hirsute when young, ultimately glabrous, 1·5 in. long and 1 in. in diam.; the accrescent calyx at its base with 4 large broadly ovate membranous lobes with many vertical nerves and numerous distinct

minute reticulations, each lobe 1·25 long and nearly as wide. Dalz. & Gibs. Flora Bombay, 141; Bedd. Ic. Pl. Ind. Or. t. cxxv, and Fl. Sylv. Madr. cxliv; Hiern in Trans. Camb. Phil. Soc. XII. 190; Clarke in Hook. fil. Fl. Br. Ind. III. 570.

PERAK: *King's Collector* 7637, 8163.

The scanty specimens from Perak are in fruit only, but the leaves and fruit agree so well with those of *D. paniculata*—a species hitherto known only from the west of the Indian Peninsula—that, in spite of the anomalous geographical distribution, we, temporarily at least, refer the Perak specimens to that species.

28. *DIOSPYROS KUNSTLERI*, King & Gamble, n. sp. A tree 20 to 40 feet high; young branches as thick as a goose-quill, glabrous. *Leaves* alternate, large, thickly membranous; elliptic to elliptic-oblong, acute, the base rounded; both surfaces, when dry, olivaceous-brown, the lower rather darker than the upper, somewhat shining, faintly reticulate; main-nerves 8 to 12 pairs, much curved, spreading, ascending, and forming wide arches ·25 in. from the edge, prominent on the lower surface like the midrib, somewhat depressed on the upper; length 8 to 12 in., breadth 3·5 to 4·5 in.; petioles ·25 to ·35 in. *Male flowers* unknown. *Female flowers* in short axillary and extra-axillary puberulous cymes, nearly 1 in. long, pedicellate; bracts narrow, nearly as long as the pedicels, oblong. *Fruit* in short stout cymes (unripe) depressed-globular, crowned by the short remains of the style, with 4 or 5 vertical ridges, everywhere densely rusty-tomentose, subtended by the accrescent almost woody calyx, with 4 deep reniform-cordate apiculate erect undulate lobes.

PERAK: *King's Collector* 4343, 7633, 8229.

29. *DIOSPYROS NUTANS*, King & Gamble, n. sp. A shrub or small tree 8 to 16 feet high; young branches less than one-third as thick as a goose-quill, deciduously villous, the older much thicker with deeply channelled dark-coloured, sub-glabrous bark. *Leaves* alternate, thinly coriaceous; oblong or sub-oblongate-oblong, apex shortly caudate-acuminate, the base rounded; both surfaces brown when dry, the upper glabrous, the lower puberulous, but often villous on the prominent midrib; main-nerves 7 to 10 pairs, curved, ascending, interarching near the margin, the reticulations distinct; length 5 to 7 in., breadth 1·5 to 2·25 in.; petiole ·15 in. *Cymes* umbellate, few-flowered, borne on the apices of slender slightly supra-axillary flexuous puberulous peduncles much longer than the leaves (often twice as long); bracteoles few, small, lanceolate, concave. *Male flowers* in different cymes from the females, ·5 in. long, on short pedicels less than ·1 in. long. *Calyx* puberulous, campanulate, with 5 long lanceolate lobes. *Corolla* four times as long

as the calyx, narrowly tubular, slightly constricted at the throat, hairy outside, glabrous inside; the limb with 5 deep oblong lobes. *Stamens* 10, linear-elliptic, apiculate, inserted in the bottom of the tube, 5 sessile and 5 with filaments. *Female flowers* shorter than the ♂, with small filamentous staminodes. *Ovary* narrowly ovoid, densely rufous-hirsute, attenuated into a long pubescent style crowned by 5 short glabrous reflexed small stigmas. *Fruit* narrowly ellipsoid, sparsely hairy, .6 to 1 in. long and .5 in. in diam., crowned by the persistent style and subtended by the non-acrescent calyx. *Seeds* few, narrowly ellipsoid.

PERAK: *Scortechini* 674, 1678; *King's Collector* 378, 2675, 2987, 3573, 7087.

Differs from all the other Malayan species by its long peduncled pendulous inflorescence.

#### SPECIES IMPERFECTLY KNOWN.

30. *DIOSPYROS REFLEXA*, King & Gamble, n. sp. A tree 50 to 70 feet high; young branches as thick as a goose-quill, covered with a layer of minute deciduous rusty pubescence. *Leaves* alternate, thickly coriaceous; oblong to elliptic, shortly acuminate, the base cuneate; upper surface olivaceous-brown when dry, the lower pale brown, both minutely reticulate; main-nerves 8 to 10 pairs, spreading, interarching .15 in. from the slightly recurved edges; length 5 to 7.5 in., breadth 1.75 to 3 in.; petiole .4 or .5 in. *Flowers* unknown. *Fruit* hemispheric with depressed truncate apex, under 1 in. in diam.; the calyx embracing the very base of the fruit with 4 fleshy much reflexed revolute triangular fleshy lobes, densely rusty-tomentose like the fruit.

PERAK: *King's Collector* 7676, 7747.

The curious fleshy calyx with much-reflexed lobes distinguishes this from all the other Malayan species.

31. *DIOSPYROS PENANGIANA*, King & Gamble, n. sp. A tree 20 to 30 feet high; young branches twice as thick as a crow-quill, covered with deciduous hair of two sorts, namely, a uniform coat of minute rusty tomentum with long rusty bristle-like hairs protruding through it. *Leaves* alternate, coriaceous; oblong, shortly and bluntly acuminate, narrowed below the middle to the rather broad auriculate cordate base; upper surface when dry pale brown, shining, glabrous except the puberulous depressed midrib; lower surface reddish-brown, transversely reticulate, with pubescence like that of the young branches on the stout midrib and 10 to 14 pairs of ascending rather straight main-nerves, otherwise glabrescent; length 5.5 to 7.5 in., breadth 1.25 to 2.25 in.; petioles .15 to .2 in. long, hispid. *Male and female flowers* unknown.

*Fruit* sessile, globular, from .75 to 1 in. in diam., densely covered with minute rufous tomentum, crowned by the short remains of the style and subtended by the small calyx with 5 broad reflexed lobes.

PENANG: *Curtis* 2221.

Collected only in Penang. In leaves this resembles the Bornean plant named by Hiern *Maba? cordata*. The 5-cleft calyx of this is suggestive rather of *Diospyros* than of *Maba*.

32. *DIOSPYROS RUFa*, King & Gamble, n. sp. A tree 60 to 80 feet high; young branches about half as thick as a goose-quill or thicker, glabrous, brown and rough when dry. *Leaves* alternate, thickly coriaceous; oblong-elliptic, sometimes oblanceolate, the apex shortly and bluntly acuminate, the base much narrowed; upper surface warm brown when dry, glabrous, very shining; the lower dull, glabrous or slightly puberulous towards the base; main-nerves 7 to 10 pairs, spreading, little curved, interarching near the slightly incurved edges, slightly prominent on the lower surface and somewhat depressed on the upper when dry; length 5.5 to 7.5 in., breadth 1.75 to 2.25 in.; petioles .4 to .6 in., stout, channelled. *Male and female flowers* unknown. *Fruit* globular-ovoid, blunt, 1.25 to 1.5 in. long and about 1.15 in. in diam., densely rusty-tomentose. *Calyx* at base flat, 4-angled, .4 in. in diam., rusty-tomentose.

PERAK: *King's Collector* 3330, 4945, 5409, 6712.

33. *DIOSPYROS AREOLATA*, King & Gamble, n. sp. A tree 50 to 60 feet high; young branches thinner than a goose-quill, rusty-puberulous becoming glabrous. *Leaves* alternate, very coriaceous; oblong, sub-acute, the base rounded; both surfaces glabrous except the puberulous midrib and sometimes the main-nerves, hepatic-brown when dry; the upper shining, minutely and faintly areolate; the lower dull and boldly areolar-reticulate; midrib bold on the lower surface, slightly depressed on the upper; main-nerves about 7 pairs, curved, ascending abruptly, faint on the lower surface, almost invisible on the upper; length 4.5 to 6 in.; breadth 1.5 to 1.75 in.; petioles .5 or .6 in. *Male flowers* (only buds seen) under .5 in. in length, collected near the ends of the branches in tomentose cymes .5 to 1 in. long. *Calyx* coriaceous, on a thick pedicel shorter than itself, ovoid in bud; the mouth with triangular short teeth. *Corolla* like the calyx, but glabrous and fleshy. *Stamens* about 21; anthers linear, apiculate, nearly uniform, sub-sessile or on short broad flat filaments, sometimes slightly attached in groups of 3. *Female flower* probably solitary, much broader than the ♂. *Calyx* velvety outside and inside, divided nearly to the base into 4 ovate-triangular very acute lobes .4 in. long. *Corolla* fleshy, glabrous, .6 in. long, its

tube wide with staminodes like the anthers of the ♂ but not so numerous; limb about as long as the tube, with 4 deep, broad, subquadrate spreading lobes. *Ovary* ovoid-conic, densely rusty-pilose. *Stigmas* 4, oblong, fleshy, glabrous. *Fruit* unknown.

PERAK: *Scortechini* 476; *King's Collector* 5813.

34. *DIOSPYROS CURTISII*, King & Gamble, n. sp. A tree (?); young branches rather thicker than a goose-quill, rugulose and dark-coloured when dry, glabrous. *Leaves* alternate, thinly membranous; oblong or oblong-elliptic, shortly and bluntly acuminate, base rounded or slightly cuneate; both surfaces glabrous, the upper olivaceous when dry, the lower brown; main-nerves 7 to 9 pairs, slightly curved, ascending, faint on both surfaces; the midrib prominent on the lower surface, slightly so on the upper; length 2.5 to 5 in., breadth 1.25 to 2 in.; petioles .2 in. *Male flowers* not seen. *Female flowers* .25 in. long, in extra-axillary or axillary fascicles of about 3 on the younger branches; pedicels about .2 in. long, cinerous-pubescent, each with 2 oblong obtuse bracteoles at its base, about .5 in. long. *Calyx* coriaceous, nearly .2 in. broad at the base, deeply divided into 4 triangular-reniform glabrescent lobes. *Corolla* partially glabrous, about as long as the calyx, salver-shaped; tube short; limb divided into 4 deep, broadly ovate, spreading lobes. *Staminodes* about 4, linear-lanceolate, compressed. *Ovary* narrowly oblong, tapering into the short thick style, densely tawny-tomentose. *Fruit* unknown.

PULAU POONGAH: *Curtis* 2942.

35. *DIOSPYROS GLOMERULATA*, King & Gamble, n. sp. A tree 40 to 60 feet high; young branches rather thicker than a crow-quill, densely clothed with minute rufous pubescence. *Leaves* membranous, alternate; elliptic, shortly and bluntly apiculate, the base rounded or slightly cuneate; upper surface olivaceous when dry, glabrous; the lower brown, puberulous, midrib bold; main-nerves 5 or 6 pairs, slightly curved, ascending; length 2.25 to 3.5 in., breadth 1.25 to 1.75 in.; petiole about .1 in. *Male flowers* .2 in. long, crowded in dense sessile axillary and extra-axillary globular capitules .4 in. across. *Calyx* sessile, campanulate, tomentose, deeply divided into 4 broadly triangular subacute erect lobes. *Corolla* tubular, tetragonous, thick, about as long as the calyx; tube glabrous, the 4 lobes pubescent outside, oblong. *Stamens* 8, separate. *Anthers* broadly lanceolate, apiculate, filaments short. *Female flowers* and *fruit* not known.

PERAK: *King's Collector* 8590.

The following description of a *Diospyros* from Pahang is taken from Ridley's account of the Flora of the Eastern Coast of the Malay Peninsula.

36. *DIOSPYROS CALIGINOSA*, Ridley in Trans. Linn. Soc. Ser. 2, III. 318 (1893). A graceful lofty tree; bark black; branches pubescent. *Leaves* alternate, elliptic-oblong, acute; 8 in. long, 3 in. broad; main-nerves 13 pairs; glabrous above, minutely pubescent beneath on the midrib and nerves; petiole .25 in. long, minutely pubescent. *Flowers* on old wood, fascicled; peduncles short, covered with a black pubescence. *Calyx* of ♂ flower patelliform; sepals 4, broadly ovate, obtuse, covered without and on the margin with black hair. *Corolla* urceolate, white, silky, .5 in. long; lobes 4, short, ovate, recurved. *Stamens* 16, collected in pairs; filaments thick, minutely hispid; anthers glabrous, long-conical with acute tips. *Ovary* abortive, 4-lobed, irregular, the lobes furrowed; style conical. *Flowers* of ♀ not seen. *Fruit* small, globose, surrounded by the accrescent sepals.

PAHANG: in thick woods at Kota Glanggi and Kwala Tembeling, Ridley.

We are unable, having seen no specimen, to make quite sure of the place of this species. It seems to come very near to No. 17 *D. tristis*, King & Gamble.

#### Order LXXIII. STYRACEÆ.

Trees or shrubs. *Leaves* alternate, simple; stipules none. *Flowers* in simple or branched axillary or terminal racemes or spikes, sometimes solitary; usually white, rarely red; bracts small, often minute or obsolete. *Calyx* gamosepalous, the tube more or less adnate to the ovary, so that it may be superior or inferior; limb 4-5-toothed or truncate, persistent. *Corolla* of 4 to 5 petals, the tube usually short, sometimes none; petals imbricate or sometimes valvate or contorted. *Stamens* adnate to the petals, equal in number to them or double or very many; 1-many-seriate; filaments free or connate; anthers round or linear, dehiscing laterally. *Ovary* inferior or superior, 2-5-celled or sometimes, by the separation of the septa, 1-celled; style filiform, sometimes thick; stigma capitate, entire or lobed; ovules 1 or more, on the inner angle of each cell, pendulous or erect. *Fruit* drupaceous, indehiscent, 1-, rarely 2-3-seeded. *Seeds* albuminous, testa thin or coriaceous, hilum generally broad; embryo straight or curved, cotyledons terete or flattened; radicle cylindrical or short.—*DISTRIB.* Warmer regions of Asia, Australia, and America, absent from Africa; genera 7 or 8, species about 350.

|                                 |    |    |    |    |               |
|---------------------------------|----|----|----|----|---------------|
| Stamens many, in several series | .. | .. | .. | .. | 1. SYMPLOCOS. |
| Stamens 10, in one series       | .. | .. | .. | .. | 2. STYRAX.    |

1. SYMPLOCOS, Linn.

Trees or shrubs. *Leaves* alternate, often turning yellow when dry, entire or toothed. *Flowers* white, sometimes red, in axillary simple or compound spikes or racemes, sometimes in few-flowered fascicles, occasionally reduced to one flower; bracts small, solitary at the base of the pedicels; bracteoles 1 to 3, small, at the base of the flower. *Calyx-tube* adnate, short when in flower, campanulate, often enlarged in fruit; lobes 5, imbricate. *Petals* 5 in one series, or 6 to 10 in two series, free or somewhat connate, or sometimes connate in a tube, imbricate. *Stamens* adnate to the corolla, at the base of the petals or higher up the tube, numerous, many-seriate, the outer the longest; filaments filiform, or sometimes flattened; anthers short, dehiscing in longitudinal parallel cells. *Ovary* inferior, or semi-superior, 2-5-celled; style filiform; stigmas capitate, slightly lobed; ovules 2, pendulous from the inner angle of each cell. *Fruit* an oblong, ovoid or sub-globose drupe; endocarp woody or thin, often ridged or ribbed, 1-3-seeded. *Seeds* usually 1 only (by abortion); embryo terete, straight or curved, in the centre of fleshy albumen; cotyledons much shorter than the radicle.—**DISTRIB.** Warmer regions of Asia, Australia and America, species about 290 to 300.

Filaments more or less pentadelphous; corolla-tube divided nearly to the base (Subg. I. HOPEA):—

Fruit (where known) more or less ampulliform; embryo curved (Sect. i. PALURA):—

Inflorescence compound, branching at any rate at the base:—

Branches of the inflorescence paniculately racemose, drupe nearly .5 in. long .. .. . 1. *S. odoratissima*.

Branches of the inflorescence racemose:—

Racemes densely ferruginous-tomentose; pedicels scarcely .05 in. long, thick .. .. . 2. *S. fulvosa*.

Racemes ferruginous-villous; pedicels .2 in. long, slender; leaves elliptic, under 4 in. long .. .. . 3. *S. nivea*.

Racemes pulverulent; pedicels .2 in. long, slender; leaves obovate .. .. . 4. *S. pulverulenta*.

Racemes glabrous or slightly pubescent; pedicels longer than .05 in., slender:—

Leaves over 4 in. long and 2 in. broad; calyx-lobes glabrous .. .. . 5. *S. monticola*.

Leaves under 4 in. long and 1.5 in. broad; calyx-lobes pubescent .. .. . 6. *S. fasciculata*.

Branches of the inflorescence spicate:—

Leaves beneath and inflorescence glabrous or nearly so; endocarp of seed thin .. .. . { 7. *S. spicata*.  
var. *malasica*.

Leaves beneath and inflorescence ferruginous-villous; endocarp of seed hard, bony .. .. . 8. *S. ferruginea*.

- Inflorescence simple, racemose; racemes very short, almost reduced to fascicles .. .. . 9. *S. Ridleyi*.
- Fruit (where known) ovoid-oblong, not ampulliform; embryo straight (Sect. ii. *LODIPRA*):—
- Inflorescence paniculate, branching usually from the base only:—
- Branches of the inflorescence racemose, more than .5 in. long:—
- Leaves glabrous or nearly so; fruit glabrous:—
- Leaf-margins prominently broad-crenate, apex shortly and bluntly acuminate .. .. . 10. *S. celastrifolia*.
- Leaf-margins obscurely crenate or entire:—
- Leaf-margins prominently glandular, texture almost coriaceous .. .. . 11. *S. adenophylla*.
- Leaf-margins not glandular, texture chartaceous .. 12. *S. perakensis*.
- Leaves very hairy; fruit villous .. .. . 13. *S. Brandiana*.
- Branches of the inflorescence racemose, under .5 in. long; leaf-margins entire or nearly so .. .. . 14. *S. concolor*.
- Inflorescence unbranched:—
- Inflorescence racemose:—
- Racemes 2 to 3 in. long, slender, few-flowered .. 15. *S. calycodactylos*.
- Racemes very short:—
- Leaves coriaceous, acute or rounded or emarginate at apex; fruit ovoid-oblong, under .5 in. long .. 16. *S. ophirensis*.
- Leaves chartaceous, long-acuminate at apex, cuneate at base; fruit cylindrical-oblong, over .5 in. long .. 17. *S. Curtisii*.
- Leaves chartaceous; fruit not known:—
- Leaves 6 to 7 in. long, abruptly acuminate at apex, usually sub-cordate at base, quite glabrous .. 18. *S. crasipes*.
- Leaves 4 to 7 in. long, long acuminate at apex, rounded at base, ferruginous-pilose beneath .. 19. *S. penangiana*.
- Inflorescence spicate:—
- Drupes large, over 1 in. in length; endocarp with 8 prominent sharp ridges; leaves nearly glabrous:—
- Leaves usually under 6 in. long and 2 in. broad; young inflorescence without prominent bracts .. 20. *S. cerasifolia*.
- Leaves usually over 6 in. long and 2 in. broad; young inflorescence prominently bracteate so as to appear strobilate .. .. . 21. *S. rigida*.
- Drupes small, under .5 in. long; endocarp with faint ridges only; leaves rusty-pubescent beneath; young inflorescence strobilate .. .. . 22. *S. rubiginosa*.
- Filaments connate in a staminal tube; corolla-tube elongate (Subg. II. *CORDYLOBLASTE*):—
- Corolla-tube scarcely .3 in. long .. .. . 23. *S. confusa*.
- Corolla-tube about 1 in. long:—
- Inflorescence densely rusty-tomentose; leaves pubescent beneath .. .. . 24. *S. Maingayi*.
- Inflorescence slightly grey-pubescent; leaves glabrous .. 25. *S. Scortechinii*.

## Subgenus I.—HOPEA.

1. SYMPLOCOS ODORATISSIMA, Choisy ex Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 60 to 70 feet in height and 18 to 24 in. in diam. of stem; branches grey, stout; branchlets dark greyish-brown, angled, striate, minutely puberulous; leaf-buds acuminate, .15 in. long. *Leaves* thinly coriaceous; elliptic or elliptic-obovate or elliptic-oblong, shortly acuminate at apex, cuneate or slightly rounded at base; glabrous on both surfaces; margin entire or serrate, blackish-brown when dry; 3 to 6 in. long, 2 to 2.5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 8 to 10 pairs, arching upwards to and along the margin where they meet in an intramarginal looped nerve near it; reticulations transverse, not prominent; petiole .4 to .6 in. long, flattened above. *Inflorescence* of grey-pubescent panicles, 1.5 to 2 in. long, axillary to the upper leaves, longer in fruit and stouter; branches paniculately racemose; bracts very small, deciduous; bracteoles 2, below the calyx-tube, ovate-acute, reflexed, .05 in. long; pedicels .15 in. long. *Calyx-tube* .05 in. long, pubescent; lobes 5, as long as tube, rounded. *Corolla-tube* very short; lobes ovate-obtuse, .15 in. long, pubescent on back, ciliate, white. *Stamens* in 5 bundles opposite corolla-lobes, very many, 80 to 100 in all; filaments slender; anthers rounded. *Ovary* villous; style thick, .075 in. long, stigma lobed; cells 3, ovules 2 in each cell. *Fruit* an ampulliform drupe, .4 to .5 in. long, .25 in. broad, lower part rounded, upper cylindrical, crowned by the calyx-rim and connivent lobes, the calyx-rim .075 in. broad; exocarp corky, rusty-brown, slightly pubescent; endocarp hard. *Seeds* 1 to 3, usually 1 only perfect; testa membranous, albumen fleshy; embryo slightly curved, .15 in. long, radicle long. Miq. Fl. Ind. Bat. I. Pt. 2, 468; Koord. & Val. Bijdr. VII. 148; Brand Monog. Sympl. 35. *Dicalyx odoratissimus*, Blume Bijdr. 1116.

PERAK: *King's Collector* 10030, 10411, 10777. SINGAPORE: *Ridley* 4428 (this latter specimen has leaves up to 8 in. long and 3.5 in. broad).—DISTRIB. Sumatra (*Beccari* 834), Java, Borneo (*Beccari* 4014).

This is var. *divaricata*, Brand, which seems to us hardly separable, unless by the leaves being almost entire. In the Java and Sumatra specimens of *G. odoratissima* the leaves are markedly serrate.

2. SYMPLOCOS FULVOSA, King & Gamble, n. sp. A very large tree, reaching 150 feet in height (*Scortechini*); branchlets dark-brown, young ones and innovations densely ferruginous-tomentose. *Leaves* chartaceo-coriaceous; elliptic, abruptly long blunt-acuminate at apex the acumen often curved, cuneate or attenuate at base; glabrous and shining above,

glabrous and dull beneath, ferruginous-brown when dry; margins faintly crenate-serrate, with a row of glands, slightly recurved; 3 to 4.5 in. long, 1.25 to 2 in. broad; midrib slender, slightly impressed above; main-nerves 6 to 8 pairs, the lowest pair close to the margin, the rest gradually more distant upwards, curved upwards to and along the margin where they meet in a looped intramarginal nerve; reticulations many, forming an elegant network; petiole .75 in. long. *Inflorescence* of tripartite sessile panicles of racemes, the racemes 1 to 2 in. long, densely ferruginous-tomentose; bracts and bracteoles minute, hidden in the tomentum; pedicels thick, .05 in. long; flowers white, then yellowish. *Calyx-tube* short; lobes very short, rounded, densely tomentose without. *Corolla-tube* short; lobes ovate-oblong, glabrous, .15 in. long, 3-5-nerved. *Stamens* many, obscurely separated in bundles; filaments slender; anthers very small rounded. *Ovary* and disk glabrous, style glabrous, .075 in. long, stigma capitate; cells 3. *Fruit* unknown.

PERAK: *Scortechini* 563, 567.

3. SYMPLOCOS NIVEA, Brand Monog. Sympl. 36 (1901). A tree, reaching 50 to 60 feet in height; branchlets slender, rounded, dark brown, glabrous; leaf-buds ovate-acuminate, tawny-pubescent. *Leaves* chartaceo-coriaceous; elliptic or elliptic-oblong, acute or acuminate at apex, cuneate at base; glabrous and shining above, glabrous and pale beneath, dark olive-brown when dry; margins obscurely undulate-crenate, recurved; 3 to 4 in. long, 1 to 1.75 in. broad; midrib slender, impressed above; main-nerves 5 to 6 pairs, irregularly spaced and often branched, at first straight then curved upwards to and along the margin where they anastomose in a looped intramarginal nerve; reticulations obscure; petiole slender, .3 to .4 in. long. *Inflorescence* an axillary panicle of villous racemes 2 to 3 in. long, the racemes 12-15-flowered; bracts and bracteoles ovate-lanceolate, villous, quickly caducous; pedicels slender, .2 in. long. *Calyx-tube* adnate to the ovary; lobes 5, oblong-obtuse, .1 in. long, glabrous, persistent. *Corolla* pure white; lobes twice as long as those of the calyx. *Stamens* about 60, as long as the corolla. *Ovary* glabrous, 1-celled, ovules apparently 2; style slender from a conical villous base. *Fruit* unknown.

PENANG: at Pulau Boetong, Government Hill and Muka Head, *Curtis* 715.

4. SYMPLOCOS PULVERULENTA, King & Gamble, n. sp. A tree (?); ultimate branchlets and inflorescence grey- or golden-pulverulent-scaly; leaf-buds lanceolate-acuminate. *Leaves* membranous; obovate, abruptly short acuminate at apex, cuneate often unequally at base; glabrous on both surfaces except on the nerves, olive-green when dry; margins

entire; 5 to 7 in. long, 2 to 3 in. broad; midrib slender, impressed above; main-nerves 8 to 9 pairs, curving upwards to and along the margin; reticulations transverse, prominent and slightly raised above; petiole .7 to .8 in. long, smooth, pulverulent-pubescent. *Inflorescence* of axillary panicles of racemes about 2 in. long; main rachis .7 in. long; branches sub-opposite, about 2 pairs, .5 to 1 in. long; bracts short, ovate, caducous; bracteoles 2, ovate-acute, under the calyx-tube; pedicels slender, .15 to 2 in. long; flowers yellow, buds globose. *Calyx-tube* funnel-shaped, .06 in. long; lobes 5, short, rounded. *Corolla-tube* short; lobes 5, ovate, obtuse, pulverulent-pubescent. *Stamens* very numerous, probably 200 at least, in 5 bundles opposite the corolla-lobes; filaments slender; anthers very small, rounded. *Ovary* and disk pubescent; style stout, stigma capitate; cells 2, ovules several. *Fruit* not known.

SINGAPORE: at Chanchukam, *Ridley* 4786.

5. *SYMPLOCOS MONTICOLA*, King & Gamble, n. sp. A shrub or small tree reaching 20 feet in height and 3 in. in diam. of stem; branchlets somewhat slender, pale brown, sinuous; leaf-buds small, acuminate. *Leaves* chartaceous; elliptic or elliptic-oblong, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces, greenish-brown when dry; margins serrate except near the base, slightly recurved; 4 to 6 in. long, 2 to 2.5 in. broad; midrib slender, pale, impressed above; main-nerves 6 to 8 pairs, close near the base, gradually more distant, curved upwards to meet in a looped intramarginal nerve; secondary nerves few, reticulations transverse; petiole .25 in. long, channelled above. *Inflorescence* a fascicle of racemes either from the axils of leaves a little below the last, or from the new wood below them; racemes .5 to 1.5 in. long, 6-8-flowered, all parts nearly glabrous; bracts ovate, very minute; pedicels 0 to .1 in. long; bracteoles 2, ovate, acute, ciliate, .05 in. long, at the base of the calyx-tube. *Calyx-tube* short; lobes as long (.1 in.), thin, glabrous, round. *Corolla-tube* very short; lobes 5, thin, oblong, obtuse, .2 in. long, 3-nerved. *Stamens* many, more than 80, in 5 bundles opposite the corolla-lobes; filaments slender; anthers rounded. *Ovary* and disk glabrous or slightly pubescent; style short, .1 in. long; stigma capitate; cells 3. *Fruit* not known.

PERAK: *Scortechini* 533; *King's Collector* 3804, 6927, in dense jungle on the summits of mountains at 4,000 to 4,600 feet.

6. *SYMPLOCOS FASCICULATA*, Zoll. Syst. Verz. 136 (1854). A tree with spreading branches reaching 40 to 50 feet in height and 10 to 15 in. in diam. of stem; branchlets pale greyish-brown, slender, innovations greyish-pubescent. *Leaves* thinly chartaceous or membranous; oblong-lanceolate, long acuminate at apex, the acumen curved and mucro-

nate, rounded or obtusely rhomboid at base; glabrous and shining above, glabrous beneath except on the midrib, yellowish when dry; margins entire or obscurely and distantly serrate, slightly recurved; 2 to 4 in. long, .7 to 1.5 in. broad; midrib slender, impressed above, minutely pilose beneath; main-nerves about 5 to 7 pairs, indistinct, curved upwards and meeting in an intramarginal looped nerve rather distant from the margin; secondary nerves and reticulations slender, obscure; petiole .2 in. long, bordered above by the decurrent margin of the blade and minutely pilose. *Inflorescence* a short fascicle of axillary cymes or racemes .5 to .7 in. long, ashy-pubescent; bracts very minute; pedicels slender, .15 in. long; bracteoles 3, minute, ovate, acute, ciliate. *Calyx-lobes* 5, rounded, obtuse, .05 in. long, pubescent without. *Corolla-lobes* oblong, obtuse, .1 to .15 in. long, glabrous, 5-nerved; tube very short or almost none. *Stamens* in 5 bundles opposite the corolla-lobes, about 20 to 25 or sometimes more; filaments slender, outer ones exsert; anthers minute, rounded, emarginate. *Ovary* depressed at top, disk glabrous, cells 3; style slender, .075 in. long, ending in a flattened 3-lobed stigma. *Fruit* an ampulliform drupe, ovoid below for .2 in. in length, .15 in. in diam., glabrous, 5-6-ribbed, tipped by a cylindric beak .05 in. long and by the persistent calyx-lobes; exocarp thin, endocarp hard, furrowed, furnished within with 3 to 6 strong ribs, enclosing a much-lobed seed; testa thin; albumen fleshy; embryo very slightly curved, .15 in. long. Miq. Fl. Ind. Bat. I. Pt. 2. 467; Clarke in Hook. f. Fl. Br. Ind. III. 574; Koord. & Val. Bijdr. 7. 150; Brand Monog. Sympl. 34. *Dicalyx tinctorius*, Bl. Bijdr. 1116.

PENANG: *Curtis* 3171. PERAK: *Wray* 1865, 2418, 2466, 2739, 3561; *Scortechini* 128, 1527; *King's Collector* 1042, 2021, 3003, 4739, 5175, 5337, 10525. SELANGOR: *Ridley* 8209. MALACCA: *Maingay* (K.D.) 958; *Griffith* (K.D.) 3665; *Holmberg* 867. JOHORE: *G. King*. SINGAPORE: *Murton* 143; *Ridley* 3626A, 8209.—DISTRIB. Sumatra (*Forbes* 2355, 2358, 2563, 2812); Java (*Forbes* 218); Borneo (*Beccari* 2380; *Haviland* 1024, 1545).

After a great deal of trouble the seed with albumen and embryo were separated. The walls of the shell of the fruit are furnished inside with projecting ribs, so that the seed resembles that of a small walnut and the embryo is slightly curved, long and narrow, and might be called straight. Koorders & Valetton's description is thus confirmed.

7. SYMLOCOS SPICATA, Roxb. Hort. Beng. 40 (1814), and Fl. Ind. II. 541; Wall. Cat. 4417; A. DC. Prod. VIII. 254; Wight Ill. t. 150; Miq. Fl. Ind. Bat. I. Pt. 2. 465; Bedd. Fl. Sylv. Madr. cxlix; Brandis For. Fl. 300; Kurz in Journ. As. Soc. Beng. XLVI. ii. 239 and For. Fl. II. 146; Clarke in Hook. f. Fl. Br. Ind. III. 573; Trimen Fl. Ceyl. III. 104;

Cooke Fl. Bomb. II. 108; Koord. & Val. Bijdr. VII. 144. *S. polycarpa*, Wall. Cat. 4423; DC. l.c. 255; Kurz ll.c. *S. Loha*, Don Prod. 144; DC. l.c. 255. *S. racemosa*, Wall. Cat. 4418 (*in part, not of Roxb.*)

VAR. *malasica*, Clarke in Hook. f. Fl. Br. Ind. III. 573. A small tree with spreading branches, reaching 30 to 40 feet in height and 1 foot in diam. of stem; branchlets dark grey-brown, smooth, innovations glabrous; buds lanceolate acuminate. *Leaves* coriaceous-chartaceous, alternate; elliptic- or oblong-lanceolate, acute or acuminate at apex, cuneate at base; entire or serrate, glabrous on both surfaces, turning yellow when dry; margin distantly and slightly denticulate, glandular; 4 to 7 in. long, 1.5 to 2.5 in. broad; midrib thick, impressed above; main-nerves about 10 pairs, irregular, curved upwards and branching towards the margin; secondary nerves few; reticulations prominent on the under surface; petiole .4 to .7 in. long, channelled above. *Inflorescence* an axillary panicle of spikes, the branches mostly near the base; spikes 1.5 to 4 in. long, glabrous or slightly pubescent; bracts very small, deciduous; bracteoles under each flower 3, ovate, acute or obtuse, ciliate, .05 in. long. *Calyx-lobes* 5, rounded, imbricate, glabrous, tube as long as lobes, the latter .05 in. long. *Corolla* 5-lobed, white or yellowish; tube very short; lobes ovate-orbicular, .1 to .15 in. long. *Stamens* indefinite, about 40, the outer ones longer than the petals, inserted on the corolla-tube; filaments slender; anthers short, rounded. *Ovary* inferior, 3-celled; ovules 3 to 4 in each cell; style thick, .1 in. long, stigma capitate. *Fruit* a globose drupe .15 to .2 in. long, surmounted by a rim formed by the short calyx-lobes, smooth, olive-coloured, exocarp and endocarp thin, ribbed. *Seed* 1, testa thin, albumen rather scanty; embryo curved.

PERAK: Wray 2798; Scortechini; King's Collector 6299, 6903. MALACCA: Griffith; Maingay (K.D.) 957; Derry 506.

VAR. *acuminata*, Brand Monog. Sympl. 40. *Leaves* long acuminate, blunt at the tip, serrulate, 3 to 5 in. long, 1 to 2 in. broad; main-nerves 7 to 8 pairs, all nerves and reticulations, except the impressed midrib, prominent on the upper surface in young leaves. *Flowers* sometimes pedicellate. *Fruit* somewhat urceolate, ribbed. *Symplocos acuminata*, Miq. Fl. Ind. Bat. I. Pt. 2. 467. *Dicalyx acuminatus*, Bl. Bijdr. 1119.

PERAK: Scortechini 1556. — DISTRIB. Java, Sumatra (*Forbes* 3208).

VAR. *attenuata*, Clarke in Hook. f. Fl. Br. Ind. III. 573. *Leaves* long acuminate at apex, long attenuate at base, 3 to 4 in. long, 1 to 1.25 in. broad; margins serrate. Spicate branches of the inflorescence slender, usually short. *Fruit* small, often only .1 to .15 in. in diam.

*S. attenuata*, Wall. Cat. 4426; A. DC. Prod. VIII. 256; Brand Monog. Sympl. 39.

KEDAH: *King's Collector* 1764.—DISTRIB. Assam, Burma.

8. SYMPLOCOS FERRUGINEA, Roxb. Hort. Beng. 40 (1814), Fl. Ind. II. 542. A tree with spreading branches reaching 50 to 60 feet in height and 1 foot in diam. of stem; branchlets stout, dark brown, smooth, innovations densely ferruginous-villous. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acuminate at apex, cuneate at base; glabrous and shining above, ferruginous-villous especially on the nerves beneath, turning yellow when dry; margins serrulate, denticulate or almost entire, recurved; 5 to 8 in. long, 1.5 to 3 in. broad; midrib stout, very prominent beneath, impressed above; main-nerves 12 to 14 pairs, prominent beneath, parallel at first and straight for some distance then arching near the margin; secondary nerves few; reticulations obliquely transverse, not prominent; petiole .3 to .5 in. long, densely rusty-villous, thick. *Inflorescence* an axillary panicle of spikes, 2 to 6 in. long, the spikes and panicle short in bud, longer in flower, much elongated in fruit, the branches of the panicle mostly near the base, densely ferruginous-villous; bracts very small, ovate-acute, villous; bracteoles under each flower 3, the central one .12 in. long, ovate-acuminate, the two outer shorter, ovate-acute, the three together as long as the calyx. *Calyx* 5-lobed; lobes ovate-obtuse, .1 in. long, pubescent without. *Corolla* 5-lobed, white, rotate; tube .05 in. long; lobes .1 in. long, oblong-obtuse, 3-nerved. *Stamens* indefinite, 40 to 70, in 5 fascicles inserted on the corolla-tube; filaments slender, gradually increasing in length from the inside outwards, the outer ones a little longer than the petals; anthers rounded, short. *Ovary* depressed, disk glabrous; cells 3; style thick, .1 to .2 in. long, stigma 3-lobed; ovules several in each cell. *Fruit* a globose or ampulliform drupe, faintly ribbed, .15 to .2 in. long, surmounted by the persistent calyx with enlarged connivent teeth; exocarp thin; endocarp very hard, bony, about 12-14-ribbed, globose below, cylindric and very short above. *Seed* 1, testa thin, albumen rather scanty; embryo curved, .1 to .15 in. long. Wall. Cat. 4412; A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Clarke in Hook. f. Fl. Br. Ind. III. 574 (*var. exc.*); Koord. & Val. Bijdr. VII. 141; Brand Monog. Sympl. 40. *S. mollis*, Wall. Cat. 4433; G. Don Gen. Syst. IV. 3. *S. Verhuelii*, Jungh. & de Vriese Pl. Nov. Ind. Or. 12; Miq. l.c. 467. *S. javanica*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 239 (*syn. S. rubiginosa exc.*) and For. Fl. II. 145. *S. lachnobotrya*, and *S. Horsfieldiana*, Miq. Fl. Ind. Bat. Suppl. 475. *Dicalyx javanicus*, Blume Bijdr. 1117.

PENANG: *Wallich* 4433; *Phillips*; *Curtis* 206; *King's Collector* 448

1353. PERAK: *Wray* 3387; *Scortechini* 900; *King's Collector* 925, 4376, 4395, 4683, 5235, 6219, 7091, 8646, 11019. PAHANG: *Ridley* in *Trans. Linn. Soc. Ser. 2, III.* 318. MALACCA: *Maingay* (K.D.) 956.—  
DISTRIB. Assam, Burma, Java (*Forbes* 682, 798, 861, 1203), Sumatra (*Forbes* 2614, 2691, 3150; *Beccari* 842), the Moluccas, the Philippines, and S. China.

The leaves in this species are very variable; for instance, those of *King's Collector* Nos. 4395, 4683 have oblong-lanceolate leaves 6 to 8 in. long and about 2 in. broad, with more distant nerves, and are nearly glabrous beneath; but some of the leaves approach very nearly to those of other specimens, and we cannot therefore separate it as a variety. The marked elongation of the fruiting inflorescence is another source of difficulty in superficial identification.

9. *SYMPLOCOS RIDLEYI*, King & Gamble, n. sp. A medium-sized tree; branchlets glabrous, angled, striate; leaf-buds acuminate, glabrous. *Leaves* coriaceous; ovate or oblong, acuminate at apex, attenuate at base; glabrous on both surfaces, shining above, greenish-yellow when dry; margins entire or remotely and faintly denticulate, recurved; 3 to 4 in. long, 1 to 1.5 in. broad; midrib slender, raised above; main-nerves 8 to 9 pairs, raised on both surfaces, straight, meeting in a looped intramarginal nerve; secondary nerves few; reticulations prominent, raised above; petiole .3 in. long, channelled above. *Inflorescence* of sessile or very short few-flowered axillary racemes, as long as the petiole; rachis silky-pubescent; bracts and bracteoles orbicular, ciliate, pubescent; pedicels none or very short. *Calyx-lobes* orbicular, thin, ciliate, .1 in. broad, concave; tube very short. *Corolla-tube* very short, lobes ovate, .12 to .15 in. long, 3-5-nerved, white. *Stamens* about 50, in bundles opposite the corolla-lobes; filaments slender, the outer ones a little longer than the corolla-lobes; anthers rounded. *Ovary* villous, 3-celled, ovules 2 in each cell; disk glabrous; style thick, .1 in. long, stigma capitate, lobed. *Fruit* not known.

SINGAPORE: *Ridley* 5684.

A species very closely allied to *S. phyllocalyx*, Clarke, of N. India and China, and to *S. japonica*, A. DC. of Japan.

10. *SYMPLOCOS CELASTRIFOLIA*, Griff. MS.; Clarke in Hook. f. *Fl. Br. Ind.* III. 575 (1882). A tree (?); branchlets smooth, slender, glabrous. *Leaves* chartaceous; elliptic or elliptic-oblong, shortly and bluntly acuminate at apex, cuneate at base; glabrous on both surfaces, greenish-brown above, yellowish beneath when dry; margins crenate, slightly recurved; 2.5 to 5 in. long, 1.5 to 2.25 in. broad; midrib slender, impressed above; main-nerves 6 to 8 pairs, irregular, not prominent, at first straight, then curving upwards and branching to meet

near the margin in an intramarginal network; reticulations obscure; petiole .2 to .3 in. long, bordered by the decurrent margins of the blade. *Inflorescence* a few- and basally-branched pubescent panicle of long slender racemes, 2.5 to 3 in. long; racemes 12-16-flowered; pedicels .1 in. long; bracteoles 2, lanceolate, .05 in. long, ciliate, pubescent. *Calyx-tube* .05 in. long; lobes 5, oblong, obtuse, .075 in. long. *Corolla* white, sweet-scented; tube very short; lobes ovate-oblong, .2 in. long. *Stamens* in 5 bundles opposite the corolla-lobes, 40 to 70, the outermost the longest and equal to the corolla-lobes. *Ovary* depressed, disk glabrous; cells 3; style .125 in. long, stigma capitate. *Fruit* an ovoid-ellipsoid drupe, .25 in. long, smooth, tipped with the rim and erect teeth of the persistent calyx. *Seeds* 1 to 3, testa membranous; embryo slender, straight, .1 in. long. Brand Monog. Sympl. 48.

PENANG: *Curtis* 3459. MALACCA: *Griffith* (K.D.) 3651.—DISTRIB. Borneo (*Teysmann*, *Motley*, *Beccari* 2374, *Haviland* 509B, 1642, 3706).

11. SYMPLOCOS ADENOPHYLLA, Wall. Cat. 4427 (1829). A tree reaching 50 to 60 feet in height, stem 15 to 20 in. in diam.; branchlets dark brown, smooth, upper parts and innovations dark rusty-glandular-pubescent. *Leaves* chartaceo-coriaceous; narrowly lanceolate to elliptic-lanceolate and elliptic; obtusely long caudate-acuminate at apex, cuneate or attenuate at base; glabrous on both surfaces, shining or not, olive-brown or dark reddish-brown when dry; margins crenate or subentire, the crenatures with large glands, sometimes recurved; 3 to 5 in. long, .7 to 1.5 in. broad; midrib slender, impressed above; main-nerves 5 to 8 pairs, distant, arching upwards to join in a looped intramarginal nerve at about two-thirds of the distance to the margin; secondary nerves and reticulations obscure; petiole .3 to .5 in. long, often bent. *Inflorescence* a 3- and basally-branched axillary panicle of racemes, glandular-rusty-pubescent, 1 to 2 in. long, racemes about 12-flowered; bracts ovate-acute, caducous; pedicels .05 to .1 in. long; bracteoles minute, thin, obtuse. *Calyx-tube* glabrous or minutely pubescent, .05 in. long; its teeth very minute, triangular or rounded, rusty-pubescent. *Corolla* yellowish-white, tube short; lobes oblong, rounded, about .15 in. long, incurved at tip. *Stamens* 40 to 50, in 5 bundles opposite the corolla-lobes, outer ones as long as those lobes; filaments slender; anthers small, rounded. *Ovary* depressed, disk glabrous, cells 3; style slender, .1 in. long; stigma capitate. *Fruit* an oblong-cylindrical or ellipsoid drupe .3 to .35 in. long and half as broad, smooth, pale yellowish-brown, crowned with the minute, inconspicuous, much-incurved, persistent calyx-teeth; exocarp smooth, thin; endocarp bony, ribbed. *Seed* 1; embryo straight, pendulous. G. Don Gen. Syst. IV. 3; A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2, 466;

Clarke in Hook. f. Fl. Br. Ind. III. 575; Brand Monog. Sympl. 48; Stapf in Trans. Linn. Soc. 2nd Ser. IV. 204. *S. itcophylla*, Miq. Fl. Ind. Bat. Suppl. 476; Brand l.c. *S. bancana*, Miq. l.c.

KEDAH: *Ridley* 5533. PENANG: *Wallich* 4427A; *Maingay* (K.D.) 959; *Curtis* 402, 445. PERAK: *Wray* 1119, 3842, 3925, 4123; *Scortechini* 490; *King's Collector* 1269, 2606, 6873. SELANGOR: *Ridley* 7553, 8549. MALACCA: *Griffith* (K.D.) 3649. SINGAPORE: *Wallich* 4427B; *G. Thomson*; *Hullett* 828; *Walker* 255; *Ridley* 3635A, 3809.—DISTRIB. Sumatra (*Beccari* 147); Bangka (*Horsfield* 39); Borneo (*Beccari* 2115, *Lobb*, *Haviland* 1187).

A variable species as regards the leaves and the length of the inflorescence; the prominent glands on the margins of the leaves are a noticeable character.

12. SYMPLOCOS PERAKENSIS, King & Gamble, n. sp. A tree with spreading branches reaching 50 to 60 feet in height; stem 15 to 20 in. in diam; branchlets dark brown, very slender. *Leaves* chartaceous; elliptic, long caudate-acuminate at apex, cuneate at base; glabrous on both surfaces, green when dry; margins entire, recurved; 2 to 3.5 in. long, 1 to 1.5 in. broad; midrib slender; main-nerves 6 to 7 pairs, the two lowest near the margin and produced upwards along it, the others curved upwards to meet in a looped intramarginal nerve, which is rather prominent; secondary nerves and reticulations obscure; petiole .2 in. long, channelled above. *Inflorescence* a sessile 3-branched panicle of racemes axillary to the upper leaves or on the branchlets below them, 1 to 2 in. long or less; panicle branches and racemes very slender, the latter about 8-10-flowered; rachis grey-pubescent; 1 bract and 2 bracteoles, ovate-acute, scarcely .05 in. long, persistent; pedicels about .05 in. long. *Calyx-tube* short; lobes 5, rounded, grey-pubescent, ciliate, .05 in. long, as long as tube. *Corolla-tube* short; lobes oblong, white, .125 in. long. *Stamens* about 40, in 5 bundles opposite the corolla-lobes; filaments slender, exsert; anthers rounded, minute. *Ovary* villous; cells 3; style rather thick, villous, .1 in. long, stigma small. *Fruit* a cylindrical glabrous drupe, .4 to .5 in. long, .25 in. in diam., the top rusty-hirsute and crowned by the persistent rusty-hirsute calyx-lobes, the calyx-rim .1 in. broad; exocarp fleshy, endocarp hard, bony. *Seeds* 3, testa rather thick, embryo straight.

PERAK: *Scortechini* 646; *Wray* 2593, 2944; *King's Collector* 4446, 4570, 4586, 7863, 10163, 10501, 10515, 10801, 10985. SELANGOR: *Ridley* 10223.

This species is very near to *S. adenophylla*, but the leaves are entire, much thinner and smaller, and not glandular, and the inflorescence is more compound, more slender, grey- and not rusty-pubescent, and has rounded calyx-lobes.

13. *SYMPLOCOS BRANDIANA*, King & Gamble, n. sp. A small tree reaching 15 to 25 feet in height; stem 4 to 6 in. in diam.; branchlets round, densely covered with soft ferruginous tomentum and long stiff hispid hairs; innovations densely ferruginous-silky-tomentose. *Leaves* membranous; ovate-oblong, long acuminate at apex, rounded or cordate at base; pilose on both surfaces, at length glabrescent above, paler beneath, olive-brown when dry; margin entire, recurved, thickly villous; 3 to 6 in. long, 1 to 2 in. broad; midrib slender, prominent beneath; main-nerves about 8 pairs, much curving upwards to join as a looped intramarginal nerve, raised beneath; reticulations obscure; petiole scarcely  $\cdot 1$  in. long. *Inflorescence* of axillary few-flowered racemes or panicles up to 1.5 in. long, lax-flowered; rachis slender, thickly ferruginous-villous, as are the bracts and calyx; bracts leaf-like, cuspidate-acuminate,  $\cdot 2$  to  $\cdot 4$  in. long; bracteoles 2, similar but smaller; pedicels  $\cdot 1$  in. long; flowers white. *Calyx-tube* very short; lobes linear-lanceolate,  $\cdot 1$  to  $\cdot 2$  in. long. *Corolla-tube* very short; lobes elliptic-obtuse, glabrous, 3-nerved,  $\cdot 15$  in. long. *Stamens* 60 to 70 or even more, in 5 bundles opposite the corolla-lobes; filaments slender; anthers small, rounded. *Ovary* and disk villous, style slender, stigma capitate. *Fruit* oblong-cylindrical, light blue, constricted above the middle, villous,  $\cdot 8$  in. long,  $\cdot 3$  in. broad; exocarp fleshy, endocarp crustaceous; cells 3, the lower one bearing 1 seed; albumen fleshy; embryo slightly curved.

PERAK: *Curtis* 2030; *Scortechini* 346, 349 on Maxwell's Hill, 3,000 feet; *Wray* 677 at Waterfall Hill, Larút; *King's Collector* 1887, in dense jungle on rocky creeks.

We have named this handsome species in honour of the author of the most recent monograph of the genus.

14. *SYMPLOCOS CONCOLOR*, Brand Monog. Sympl. 65 (1901). A tree, reaching 30 to 40 feet in height; branchlets dark brown, innovations tawny-pubescent. *Leaves* thinly coriaceous; oblong or oblong-obovate, abruptly acuminate at apex, the acumen mucronate, attenuate at base; glabrous on both surfaces, shining above; margins entire or obscurely dentate; 3 to 4 in. long, 1–1.5 in. broad; midrib slender, slightly raised above; main-nerves 6 to 7 pairs, rather obscure, arching upwards to anastomose near the margin; reticulations prominent; petiole about  $\cdot 1$  in. long. *Inflorescence* of sessile or very shortly peduncled, 3-branched panicles up to  $\cdot 5$  in. long, all golden-pubescent, about 10–12-flowered; bracts ovate-acute, small; bracteoles smaller, 2 to each pedicel; pedicels slender, about  $\cdot 1$  in. long. *Calyx-tube* funnel-shaped,  $\cdot 05$  in. long; lobes 5, rounded, short. *Corolla-tube* very short; lobes oblong,  $\cdot 1$  in.

long. *Stamens* about 60, scarcely exsert. *Ovary* and disk silky-pubescent; style slender, stigma capitate, 3-4-lobed. *Fruit* an oblong glabrous drupe, .3 in. long, .15 to .2 in. broad, surmounted by the slightly depressed disk which is shortly overtopped by the calyx-lobes.

PENANG: on Penam Bukit at 2,000 feet, *Curtis* 1039.

15. *SYMPLOCOS CALYCODACTYLOS*, Brand Monog. Sympl. 63 (1901). A tree (?); branchlets villous with long tawny spreading bristles, innovations densely villous. *Leaves* membranous; oblong-lanceolate, long-acuminate at apex, rounded at base, sometimes almost cordate; both surfaces covered sparsely with tawny bristles, especially on and along the nerves beneath; margins distantly long glandular denticulate; 4 to 5.5 in. long, 1.5 to 2 in. broad; midrib slender, impressed above; main-nerves about 8 pairs, curving slightly upwards at an angle of about 30° with the midrib to anastomose near the margin; reticulations prominent, primary ones transverse parallel; petiole stout, villous, .15 to .2 in. long. *Inflorescence* a slender, axillary, tawny-villous raceme, 2 to 3 in. long, with about 4 to 5 flowers; bracts lanceolate-acuminate, .25 in. long, caducous; pedicels .5 in., very slender, ending in a dense tuft of tawny bristles beneath the calyx. *Calyx-tube* short; lobes 5, linear oblong, densely tawny-bristly without, glabrous within, .25 in. long. *Corolla-tube* short; lobes 5, obovate, glabrous, as long as calyx-lobes or slightly longer. *Stamens* about 80, 5-adelphous, filaments flattened; anthers small, rounded. *Ovary* and disk villous; style slender, .1 in. long; stigma small, capitate. *Fruit* unknown.

PERAK: at Waterloo, 3,000 feet, *Curtis* 1330.

16. *SYMPLOCOS OPHIRENSIS*, Clarke in Hook. f. Fl. Br. Ind. III. 479 (1882). A bush (Wray), or more probably a small tree; branches terete, nearly black, glabrous; innovations appressed-tawny-pubescent; buds ovate-acuminate, silky, .1 in. long. *Leaves* coriaceous; elliptic or elliptic-lanceolate, acute or rounded or sometimes emarginate at apex, cuneate or rounded at base; glabrous and usually shining above, sparsely pubescent beneath when young, afterwards glabrous, reddish-brown when dry; margins entire or very obscurely denticulate, recurved; 2 to 4 in. long, 1 to 1.5 in. broad; midrib stout, impressed above; main-nerves 8 to 10 pairs, raised on both surfaces, straight at first, then curving upwards and joining in an intramarginal looped nerve; secondary nerves many, similar, reticulations prominent; petiole stout, .1 to .2 in. long. *Inflorescence* of very short racemes, from the axils of the upper leaves or from the new wood below them; racemes .3 to .4 in. long, silky-pubescent, 5-7-flowered; bracts and bracteoles very small, ovate, acute; pedicels 0 to .1 in. long. *Calyx-lobes* 5, silky-pubescent, ovate-acute, ciliate, .6 in. long; tube .1 in. long. *Corolla-tube* short; lobes

white, oblong-obtuse, .2 in. long, 5-nerved. *Stamens* in bundles of 6 to 12 each opposite the corolla-lobes, 30 to 60 in all; filaments slender, outer as long as petals; anthers rounded, very small. *Ovary* and disk nearly glabrous at top; style slender, .15 to .2 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* ovoid-cylindric, blueish-purple when ripe, .3 to .4 in. long, .2 in. broad, surmounted by calyx-rim with patent lobes, nearly as wide as the top of the fruit; exocarp crustaceous; endocarp very hard, bony, obscurely ribbed and irregularly indented. *Seed* 1, testa membranous, albumen fleshy, embryo straight. Brand Monog. Sympl. 58. *Symplocos* No. 42, Herb. Ind. Or. Hook. f. & Th.

PERAK: on Gunong Bubu, 5,000 feet, *Wray* 3919; *Scortechini*.

MALACCA: on Mount Ophir, *Griffith* (K.D.) 3650; *Ridley* 10083; *Derry* 623; *Lobb*.

The specimens of *Wray* and *Scortechini* have the leaves rounded at both ends, but there seems no reason to keep them as a separate variety from the specimens from Mount Ophir which are acute at apex and cuneate at base.

17. *SYMPLOCOS CURTISII*, Oliv. in Hook. Icon. t. 1757 (1888). A shrub or small tree, reaching 10 to 15 feet in height; branchlets slender, pale brown, glabrous; leaf-buds small, acuminate, pubescent. *Leaves* chartaceous; elliptic, abruptly long acuminate at apex, cuneate at base; glabrous on both surfaces, pale greenish-brown when dry; margins obscurely denticulate, slightly recurved; 4 to 9 in. long, 1.5 to 3 in. broad; midrib slender, raised beneath, impressed above; main-nerves 5 to 7 pairs, the lowest pair very near the margin, the rest gradually more and more distant, all curving upwards to and along the margin, where they form an intramarginal looped nerve; secondary nerves very few or none; reticulations transverse, fairly prominent, rather distant; petiole .2 to .4 in. long, channelled above. *Inflorescence* of short (up to .4 in. long) racemes axillary to the upper leaves or on the young wood below them; racemes about 5-flowered; bract ovate-acute, .1 in. long, keeled, villous; bracteoles 2, similar but smaller; pedicels stout, about .05 in. long. *Calyx-tube* about .1 in. long; lobes 5, ovate, obtuse, as long as tube, all minutely pubescent without. *Corolla-tube* very short, lobes elliptic-oblong, .2 in. long, 5-nerved, white. *Stamens* many, 60 or more; filaments slender, longer than corolla-lobes; anthers rounded, minute; staminal bundles only noticeable in bud. *Ovary* villous, disk glabrous; style slender, .2 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* a cylindric oblong berry, bright blue when ripe, .5 to .8 in. long, somewhat constricted at about one-third distance from the top; the top surmounted by the calyx-rim and connivent teeth; exocarp

crustaceous, endocarp woody; cells 1 to 3. *Seed* usually 1, testa membranous, albumen fleshy, embryo straight. Brand Monog. Sympl. 69.

PENANG: *Curtis* 1099. PERAK: *Wray* 692, 2830; *Scortechini* 328, 646, 1423; *King's Collector* 2084, 2099, 2406, 8431.

18. SYMPOLOS CRASSIPES, Clarke in Hook. f. Fl. Br. Ind. III. 580 (1882). A tree (?); branchlets stout, smooth, grey. *Leaves* stoutly chartaceous; large, elliptic-lanceolate, abruptly acuminate at apex, subcordate or obtusely rhomboid at base; glabrous on both surfaces; margins sub-entire, slightly recurved; 6 to 7 in. long, 2 to 3 in. broad; midrib prominent, thick; main-nerves 10 to 12 pairs, irregular and at irregular angles, usually only slightly curved upwards to meet in a looped intramarginal nerve .25 in. from margin; secondary nerves and few transverse reticulations prominent; petiole very stout, .15 to .2 in. long. *Racemes* axillary, 4-flowered; pedicels very small, .1 in. long at most; bracts ovate-acute, like the rachis and calyx densely ferruginous-pubescent. *Calyx-tube* very short; lobes ovate, .075 in. long. *Corolla-tube* short; lobes .1 to .15 in. long, oblong-obtuse. *Stamens* about 30, slightly exsert. *Ovary* 3-celled; disk fulvous-pilose. *Fruit* not known. Brand Monog. Sympl. 52.

MALACCA: on Mount Ophir; *Maingay* (K.D.) 960.

19. SYMPOLOS PENANGIANA, King & Gamble, n. sp. A small tree (?); branchlets rounded, upper ones and innovations densely dark ferruginous-hirsute. *Leaves* chartaceous; lanceolate, long acuminate at apex, somewhat rounded at base; glabrous above, sparsely pilose beneath with long stiff ferruginous hairs especially on and along the nerves; greenish-brown when dry; margins distantly but sharply serrate in the middle part, entire on the acumination and near the base, revolute; 4 to 7 in. long, 1 to 1.25 in. broad; midrib prominent beneath, impressed above; main-nerves 4 to 6 pairs, irregularly distant, curving upwards and meeting about .2 in. from the margin in a looped intramarginal nerve; secondary nerves and transverse reticulations scanty but prominent; petiole short, .15 in. long, stout, hirsute. *Inflorescence* a sessile very short raceme or panicle of flowers on the young branches; bracts several, very small, densely rusty-hirsute. *Calyx-tube* short; lobes 5, oblong, obtuse, .125 in. long, glabrous within, densely rusty-hirsute without. *Corolla-tube* short; lobes 5, oblong, rounded, .2 in. long. *Stamens* about 30; filaments slender; anthers rounded. *Ovary* villous; style slender, pubescent, .15 in. long; stigma capitate. *Fruit* unknown.

PENANG: at West Hill, 2,500 feet, *Curtis* 325.

20. SYMPOLOS CERASIFOLIA, Wall. Cat. 4434 (1829). A tree, reaching 60 feet and even 80 feet in height; stem with a diam. of 20 in.; branchlets glabrescent, smooth, somewhat angled, reddish-brown; leaf-

buds nearly globose, scales rounded, acuminate. *Leaves* coriaceous-chartaceous; oblong or elliptic-oblong, acuminate at apex, cuneate or attenuate at base; glabrous above, sparsely pilose on the nerves beneath otherwise glabrous, dark greenish-brown when dry; margins crenately serrate except at the very base and on the acumination, slightly recurved; 5 to 7 in. long, 1 to 2 in. broad, midrib slender, impressed above; main-nerves 6 to 8 pairs, conspicuous, at once curving upwards and round to join each other in a well-marked looped ring .2 to .3 in. from the margin; reticulations transverse; petiole .5 to .7 in. long, slender, channelled above. *Inflorescence* of axillary and sub-terminal pubescent spikes; the rachis stout, angular; bracts broad, round, villous, early caducous; bracteoles 2, ovate-acute, .075 in. long, villous; flowers about 12 in each spike. *Calyx-tube* short, .05 in. long; lobes lanceolate, acute, pilose, .125 in. long. *Corolla-tube* short; lobes oblong-acute, 3-nerved, .2 in. long. *Stamens* about 30, or very numerous—over 100 (Scortechini), on the corolla-tube, fascicles not well separated; filaments very slender; anthers rounded, very minute. *Ovary* and disk slightly hairy; style slender, curved, .2 in. long, stigma capitate; cells 3, ovules 2 to 3 in each cell. *Fruit* a cylindric oblong drupe 1.5 to 2 in. long, 1 in. broad, truncate at both ends and tipped above by the persistent calyx-tube and lobes, the rim about .2 in. broad; smooth, yellowish-brown; exocarp thick, corky; endocarp woody with 7 to 8 sharp star-like ridges. *Seed* 1, testa membranous; albumen thin, embryo straight, pendulous; radicle long. A. DC. Prod. VIII. 257; Clarke in Hook. f. Fl. Br. Ind. III. 580; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Brand Monog. Sympl. 52. *Bobua cerasifolia*, Miers in Journ. Linn. Soc. XVII. 304.

PENANG: *Wallich* 4434; *Curtis* 1503, 3096. PERAK: *Wray* 445, 3003; *Scortechini* 515; *King's Collector* 6283, 6950. MALACCA: *Maingay* (K.D.) 962

Scortechini considered his No. 515 to represent a species separate from *S. cerasifolia*, but with a large series of specimens before us we find it difficult to agree to this.

21. SYMPLOCOS RIGIDA, Clarke in Hook. f. Fl. Br. Ind. III. 581 (not of Wall.) (1882). A tree with spreading branches, reaching 60 to 80 feet in height and 18 to 24 in. in diam. of stem; branchlets stout, dark brown, glabrous, angled when dry, marked with the prominent round raised scars of fallen leaves; branch-buds large, covered with oblong glandular-serrate stipular scales, softly silky on the back; leaf-buds acuminate, .3 to .5 in. long, silky-pubescent. *Leaves* coriaceous-chartaceous; oblong or oblong-lanceolate, acute or shortly acuminate at apex, attenuate at base; glabrous on both surfaces

and usually shining, dark greenish-brown when dry; margins entire or very shortly serrate, recurved when dry; 6 to 12 in. long, 2·5 to 5 in. broad; midrib stout, much raised beneath, impressed above; main-nerves 10 to 13 pairs, raised beneath, curving upwards to and along the margin; secondary nerves few or none; reticulations transverse, parallel, not prominent; petiole ·7 to 1·3 in. long, stout, glabrous. *Inflorescence* of simple spikes, strobilate when young and scarcely ·5 in. long, in flower 1·5 to 2 in. long with pubescent rachis, in fruit reaching 3 in. long with stout nearly glabrous rachis, in the axils of upper leaves or the young branchlets below them; bracts broadly ovate, acute, concave, minutely grey or tawny-pubescent; bracteoles 2, lanceolate-acute, ·1 in. long, all early deciduous; buds ovoid, grey-pubescent. *Calyx-tube* ·075 in. long; lobes 4, ovate-acute, blunt, ·1 to ·15 in. long, both grey-pubescent. *Corolla-tube* short, lobes 5, white, oblong, acute, ·25 in. long, 5-nerved. *Stamens* in 5 bundles opposite the corolla-lobes, about 60; filaments very slender, outer ones longer than corolla-lobes; anthers rounded, minute. *Ovary* and disk glabrous; style curved, ·25 in. long, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* ovoid-oblong, 1 to 1·5 in. long, ·75 to 1 in. broad, waxy greenish-white when half ripe, dark blue when ripe; pale brown, shining, smooth, obscurely angled when dry; surmounted by the calyx-rim ·15 in. broad with erect calyx-teeth; exocarp thick, fleshy; endocarp very hard, woody, with 8 sharp star-like ridges; cells 3. *Seeds* 1 to 3, testa thin fibrous, albumen fleshy, embryo straight, radicle long. Brand Monog. Sympl. 52. *Doxomma rigidum*, Miers in Trans. Linn. Soc. Ser. 2. Bot. I. 104. *Barringtonia rigida*, Clarke in Hook. f. Fl. Br. Ind. II. 510.

PERAK: *Wray* 1294, 3207; *Scortechini* 2046; *King's Collector* 4246, 4277, 4613, 5045, 5048, 6095, 6179, 7260, 7898, 8543, 10013. SELANGOR: *Ridley* 10544. MALACCA: *Maingay* (K.D.) 767, 965. SINGAPORE: *Cantley* 50; *Ridley* 1798, 5960.

22. SYMPLOCOS RUBIGINOSA, Wall. Cat. 4432 (1829). A large shrub or a tree sometimes reaching 70 to 100 feet in height and 15 to 20 in. or more in diam. of stem; branches stout, grey, nearly glabrous; branchlets stout, angled, glabrous or cinnamomeous- or ferruginous-hirsute; leaf-buds lanceolate, ·3 to ·4 in. long. *Leaves* coriaceous-chartaceous; obovate-oblong, acute or shortly and abruptly acuminate at apex, cuneate at base; glabrous above, pubescent especially on the nerves beneath, the pubescence pale rusty-brown, pale greenish-brown when dry; margins shortly dentate especially on the upper half, sometimes nearly entire, recurved; 5 to 11 in. long, 2 to 4 in. broad; midrib stout, prominent beneath, impressed above; main-

nerves 10 to 13 pairs, parallel, very prominently raised beneath and usually impressed above, curving upwards to and along the margin; secondary nerves few or none; reticulations many, prominent, transverse, parallel; petiole thick, densely pubescent, .5 to 1 in. long. *Inflorescence* of simple erect spikes, from the axils of upper leaves or from the young branchlets below them; spikes 1 to 2 in. long, softly cinnamomeous-pubescent, the rachis stout especially in fruit; flowers about 12 to 16 in each spike, each flower supported by a broad ovate rounded bract .175 in. long and two ovate-acute bracteoles .1 in. long. *Calyx-lobes* ovate-lanceolate, acute, .06 to .07 in. long; tube as long as lobes. *Corolla-tube* short, lobes white, oblong, .15 in. long, 3-nerved, glabrous. *Stamens* in 5 bundles opposite to the corolla-lobes, usually about 30; filaments unequal, the outer ones longer than the corolla-lobes; anthers minute, round. *Ovary* and disk glabrous, style slender, about .15 in. long, stigma capitate or lobed; cells 3. *Fruit* an ovoid-oblong drupe, .4 in. long, .25 in. broad, surmounted by the calyx-rim .1 in. in diam., pale brownish-yellow when dry, glabrous or softly pilose; exocarp thin, crustaceous, fragile; endocarp woody, faintly ridged; seeds usually 3. A. DC. Prod. VIII. 257; Miq. Fl. Ind. Bat. I. Pt. 2. 466; Clarke in Hook. f. Fl. Br. Ind. III. 580; Brand Monog. Sympl. 53. *Lodhra rubiginosa*, Miers in Journ. Linn. Soc. XVII. 299.

PENANG: *Wallich* 4432; *Curtis* 528, 1692; *G. King*. PERAK: *Scortechini* 1825; *King's Collector* 5192, 5771, 7112, 8105, 10015, 10021. MALACCA: *Maingay* (K.D.) 955; *Griffith* (K.D.) 3652. JOHORE: *Ridley* 11115. SINGAPORE: *Cantley* 72; *Ridley* 4117.—DISTRIB. Sumatra (*Forbes* 1991), Borneo (*Beccari* 1216, *Haviland* 1679, 3480).

#### Subgenus II.—CORDYLOBLASTE.

23. SYMPLOCOS CONFUSA, Brand Monog. Sympl. 88 (1901). A shrub, 5 to 8 feet high (Lobb); branchlets rough, dark brown, marked with prominent cushion-like scars, uppermost ones and innovations ferruginous-pubescent. *Leaves* chartaceous; variable in shape, elliptic-oblong to ovate-lanceolate bluntly acute at apex, attenuate often unequally at base; margins entire or slightly undulate, recurved; glabrous on both surfaces; 3 to 4 in. long, 1.5 to 2 in. broad; midrib slender; main-nerves irregular, about 6 pairs; secondary nerves and reticulations also irregular, indistinct; petiole .2 to .3 in. long, slightly pubescent. *Inflorescence* of very short, 1-4-flowered, axillary, grey-silky racemes about .25 in. long; bracts very small, ovate-acute; bracteoles also minute, 2 to each pedicel; pedicels .05 to .1 in. long; flowers white, sweet-scented. *Calyx-tube*

campanulate, grey-silky, .1 in. long; lobes 5, short, rounded, ciliate. *Corolla-tube* funnel-shaped, .2 to .3 in. long, glabrous; lobes 5, oblong, obtuse, spreading, .15 in. long. *Stamens* very many (40 to 60), inside a staminal tube somewhat longer than the corolla-tube; filaments very short, slender; anthers small, rounded. *Ovary* and disk villous; style slender, hirsute or glabrescent, .3 to .5 in. long; stigma large, capitate. *Fruit* not known. *S. Henschelii*, Benth. & Hook. f. ex Clarke in Hook. f. Fl. Br. Ind. III. 588; Forbes & Hemsl. in Journ. Linn. Soc. XXVI. 73.

MALACCA: on Mount Ophir, *Griffith* (K.D.) 3644; *Lobb*; *Maingay* (K.D.) 954.—DISTRIB. Borneo (*Beccari* 2405), China.

This species, which in the Fl. Br. Ind. was placed under *S. Henschelii*, has been separated by Brand, who considers the true *S. Henschelii* (*Cordyloblaste Henschelii*, Moritzi in Bot. Zeit. vi. 604 (1848), to be a Java plant only. It is not thought necessary to maintain Clarke's var. *hirtistylis*.

24. SYMPLOCOS MAINGAYI, Benth. ex Clarke in Hook. f. Fl. Br. Ind. III. 588 (1882). A tree with spreading branches reaching 40 to 60 feet in height and 10 to 15 in. in diam. of stem; branches stout, light brown; branchlets and innovations densely ferruginous-velvety-pubescent. *Leaves* chartaceous; elliptic-oblong, shortly acuminate at apex, broadly attenuate or rounded at base; glabrous or with a few scattered hairs above, sparsely pubescent beneath except the nerves which are hirsute, marked also beneath by numerous faint transverse lines; margins entire; 4 to 6 in. long, 2 to 2.5 in. broad; midrib stout, very prominent beneath, impressed above; main-nerves 8 pairs, curving upwards and joining in a looped intramarginal nerve, impressed above; secondary nerves few and with the reticulations irregular; petiole .3 to .5 in. long, stout, densely ferruginous-pubescent. *Inflorescence* of stout densely ferruginous-pubescent racemes, 1 to 1.5 in. long, bearing about 8 to 10 flowers, in the axils of the upper leaves; bract 1, ovate, acute, .2 in. long; bracteoles 2, similar but smaller; pedicels stout, .1 to .15 in. long. *Calyx-tube* campanulate, densely rusty-pubescent; teeth 5, rounded, .05 in. long. *Corolla-tube* narrow funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without; lobes .5 in. long, oblong, reflexed. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it; top of tube truncate, 15–20-lobed, the lobes separable as ligules; stamens inserted irregularly on the tube and lobes, about 40 to 60; free part of filaments short, slender; anthers ovoid. *Ovary* and disk hairy; style slender, as long as corolla-tube, stigma capitate; cells 3. *Fruit* obovoid, obtuse, glabrous, 1.75 in. long, 1.25 in. broad, crowned

with the remains of the calyx-rim  $\cdot 125$  in. wide, pericarp very thick, woody. Brand Monog. Sympl. 90.

PERAK: *King's Collector* 6728. MALACCA: *Maingay* (K.D.) 961.

25. SYMLOCOS SCORTECHINII, King & Gamble, n. sp. A tree (?); branchlets pale brown, slender, scurfy; innovations sparsely grey-pubescent. *Leaves* chartaceous; oblong-lanceolate, attenuately blunt-acuminate at apex, cuneate at base; glabrous on both surfaces dark brown when dry, margins entire; 4 to 5 in. long, 1.5 to 2 in. broad; midrib slender, raised beneath, impressed above; main-nerves 8 to 10 pairs the lowest close to the margin, the others curved upwards to meet in a looped intramarginal nerve; secondary nerves many and, with the reticulations, irregular, fairly prominent; petiole  $\cdot 5$  in. long, channelled above, slightly pubescent when young. *Inflorescence* of axillary or pseudo-terminal racemes,  $\cdot 7$  to 1 in. long, sometimes giving the appearance of a terminal panicle; rachis grey-pubescent, angular; bract and 2 bracteoles lanceolate-acuminate,  $\cdot 1$  to  $\cdot 15$  in. long; pedicels  $\cdot 2$  in. long. *Calyx-tube* campanulate,  $\cdot 2$  in. long, grey-pubescent without, as are the rounded obtuse  $\cdot 05$  in. long teeth. *Corolla-tube* slender, funnel-shaped, 1 to 1.5 in. long, densely white-tomentose without; lobes  $\cdot 5$  in. long, oblong-obtuse, much imbricate in bud. *Staminal-tube* adnate to the corolla-tube as far as the lobes, then free above it, top of tube truncate, about 15-lobed, the lobes separable as ligules; stamens inserted irregularly on the tube and lobes, about 40 to 50; free part of filaments short, slender; anthers rounded. *Ovary* and disk hairy; style slender, as long as corolla-tube, stigma capitate; cells 3, ovules 2 in each cell. *Fruit* obovoid-oblong, obtuse, glabrous, 1.75 in. long, 1.2 in. broad, crowned with the remains of the calyx-rim  $\cdot 1$  in. in diam.; pericarp thick, corky; seed 1.

PERAK: *Scortechini*.

This species comes very near to *S. Maingayi* in respect to its flowers and fruit, but the branches are much more slender, the dense ferruginous tomentum is absent, and the leaves are different, so we have no hesitation in describing it as a new species.

The following Bornean species seems worthy of description here: it may possibly be found also in the Peninsula:—

SYMLOCOS HAVILANDI, King & Gamble, n. sp. A small tree (?); branchlets stout, somewhat flattened, yellowish-brown; leaf-buds conical, glabrous. *Leaves* coriaceous; elliptic, abruptly acuminate at apex, acute at base; glabrous on both surfaces, orange-brown when dry; margins entire, recurved; 3 to 4 in. long, 1.25 to 1.75 in. broad; midrib stout, impressed above; main-nerves 7 to 8 pairs, the lowest pair near the margin and more acutely angled (about  $45^\circ$ ) than the others, straight at first at an angle of  $60^\circ$ , then curved to meet in a widely looped intramarginal nerve, prominently raised above when dry; secondary-nerves and reticulations also raised; petiole  $\cdot 4$  to  $\cdot 5$  in. long, stout, rough, the upper half winged by the decurrent margin of the blade. *Inflorescence* a nearly sessile, few-branched panicle of racemes, about 1.5 in. long

flowers about 12; rachis glabrous, flattened; bracts and bracteoles minute, caducous; pedicels none or very short, scarcely .05 in. long; buds globose. *Calyx-tube* .05 in. long; lobes orbicular, ciliate, as long as tube. *Corolla-tube* very short; lobes 5, .15 in. long, ovate-oblong, ciliate. *Stamens* about 50, in 5 bundles of about 10 each, opposite the corolla-lobes; anther-cells orbicular; filaments slender, the longest as long as the petals. *Ovary* conical, glabrous; style slender, .1 in. long, stigma capitate. *Fruit* not known.

BORNEO: in Sarawak, near Kuching, *Haviland* No. 1954.

## 2. STYRAX, Linn.

Trees and shrubs, usually more or less lepidote or stellate-tomentose on all parts except the upper-surface of the leaves, rarely glabrous. *Leaves* various in shape, entire or serrulate. *Flowers* generally white, in lax axillary or terminal, simple or compound, often pendulous racemes; bracts very small. *Calyx* campanulate, free or slightly adnate to the base of the ovary, truncate or 5-toothed. *Corolla-tube* short; lobes 5, erecto-patent, elliptic-oblong, imbricate or valvate. *Stamens* 10, 1-seriate at the base of the corolla-tube; filaments more or less flattened, continuous with the connective; anthers large, linear, the cells parallel, erect. *Ovary* nearly free, at first 3-celled, later often 1-celled; style subulate; stigma capitate, somewhat 3-lobed; ovules few in each cell, in free ovaries nearly all erect from the lower basal angle, in half-adnate ovaries upper pendulous lower erect. *Fruit* globose or ellipsoid, seated on the cupuliform or patelliform calyx, breaking up irregularly. *Seeds* 1 or rarely 2 or more, integuments 2, the outer chartaceous or hardened, the inner membranous; albumen fleshy, copious; embryo straight, axile or excentric; cotyledons broad, with a longish terete radicle.—DISTRIB. Warmer regions of Asia and America, a few extending to temperate Asia and South Europe, species about 60.

Leaves green beneath, slightly stellate-pubescent .. .. 1. *S. serrulatum*.

Leaves white or greyish-white beneath, with occasional rusty-stellate hairs:—

Leaves small, under 5 in. long and 2.5 in. broad; calyx about one-third of the length of the corolla .. .. 2. *S. Benzoin*.

Leaves large, over 5 in. long and 2.5 in. broad; calyx about half of the length of the corolla .. .. 3. *S. crotonoides*.

1. STYRAX SERRULATUM, Roxb. Fl. Ind. II. 415 (1832). A shrub or small tree, reaching 50 feet in height; branches slender, branchlets stellately grey-pubescent. *Leaves* membranous; ovate or ovate-lanceolate, acuminate at apex, rounded or cordate, sometimes acute at base; nearly glabrous above, glabrescent beneath, but with stellate hairs on both sides of the nerves; margins sparingly and irregularly serrate, sometimes sub-

entire, slightly revolute; 1·5 to 5 in. long, 1 to 2 in. broad; midrib slender; main-nerves 6 to 8 pairs, curving upwards and anastomosing near the margin; secondary nerves and reticulations prominent, the latter transverse; petiole ·2 in. long, stellate-pubescent. *Racemes* terminal or from the axils of the uppermost leaves of the branchlets, 6–8-flowered or fewer, sometimes reduced to 1 only, sometimes paniculate from the absence of leaves, 1 to 2 in. long; rachis slender, densely white-stellate-pubescent; pedicels ·2 in. long; bracteoles linear, nearly as long as pedicels; flowers white. *Calyx* campanulate; tube white-pubescent without, glabrous within, ·15 in. long; teeth 5, ·05 in. long, irregular, repand-dentate, white-pubescent on both sides. *Corolla-tube* ·15 in. long, cylindric; lobes 5, ·25 in. long, oblong, sub-acute, densely white-pubescent without and within except the lower part of the tube. *Stamens* 10, 2·5 in. long; filaments inserted on the corolla-tube, wide and white-tomentose at the base, narrower and glabrous above, continued in the connective; anthers broadly linear, erect, as long as the filaments, rounded at top, cells 2 parallel. *Ovary* densely white-villous; style slender, ·3 in. long; stigma small, capitate; cells 3. *Fruit* ellipsoid, ·4 to ·5 in. long, ·3 in. broad, white- or grey-pubescent, supported by the patelliform calyx; pericarp fleshy, rather thin, irregularly breaking up. *Seeds* 1, rarely 2 or more; outer integument smooth, hard, shining, brittle; inner one membranous, brown; albumen firm, grey; embryo erect, nearly as long as the endosperm; cotyledons cordate, ·15 in. long; radicle thick, terete, as long as cotyledons. Wall. Cat. 4402; A. DC. Prod. VIII. 267; Hook. f. in Bot. Mag. t. 5950 (*syn. excl.*); Kurz in Journ. As. Soc. Beng. XLVI. ii. 237 and For. Fl. II. 142; Clarke in Hook. f. Fl. Br. Ind. III. 588; Prain Beng. Plants I. 656. *S. Porterianus*, Wall. Cat. 4401; A. DC. l.c.; Miq. Fl. Ind. Bat. I. Pt. 2, 463. *S. floribunda*, Griff. Notul. IV. 287.

PENANG: *Wallich* 4401; *Phillips*; *Curtis* 1187, 1538; *Ridley* 7176. PERAK: *King's Collector* 1662.—DISTRIB. India, at 3,000 to 7,000 feet from Nepal to Assam, Chittagong and Burma.

The plant is frequently affected by galls.

2. STYRAX BENZOIN, Dryand. in Phil. Trans. Vol. LXXVII. 308, t. 12 (1787). A tree with slender drooping branches, reaching 60 to 80 feet in height and 2 to 3 feet in diam. of stem; branches rounded, glabrous; upper branchlets rusty-grey-stellate-pubescent. *Leaves* chartaceous; elliptic, acuminate at apex, attenuate or rounded at base; glabrous above, densely grey-stellate-pubescent beneath; margins entire or rarely slightly denticulate; 4 to 5 in. long, 1·5 to 2·5 in. broad; midrib slender, prominent beneath, impressed above; main-nerves 6 to 8 pairs, curving

upwards to and along the margin; reticulations transverse, regular, prominent; petiole .3 to .5 in. long, channelled above, densely grey-stellate-pubescent. *Racemes* paniculate, terminal or axillary to the upper leaves, grey-stellate-pubescent; bracts ovate, caducous; pedicels slender, angular, .1 to .2 in. long; bracteoles linear, as long as the pedicels or nearly so; flowers silvery-white. *Calyx* cupular, .15 in. long, densely grey-stellate-pubescent without; teeth 5, minute. *Corolla-tube* .15 in. long, cylindrical; lobes 5, .3 in. long, oblong-linear, acute, white-pubescent without and more or less within, recurved. *Stamens* 10, .3 in. long, attached to the tube of the corolla; filaments flattened, .15 in. long, white-pubescent, continued in the connective; anthers linear, slender, erect, acute at tip, as long as filaments, cells parallel. *Ovary* conical, villous above; style slender, .3 in. long; stigma small, capitate; cells 3, ovules 2 or more in each cell, placentas central. *Fruit* depressed-globose, variable in size, reaching .8 in. in diam. and .6 in. in height; white-pubescent, supported by the flattened persistent patelliform calyx; pericarp corky, rather thick, irregularly dehiscent. *Seed* usually 1, pale-brown with a broad basal hilum; outer integument hard, brittle, inner membranous; albumen firm; embryo horizontal or oblique, nearly as long as the endosperm; cotyledons flattened, oblong-cordate, .2 in. long; radicle smooth, .15 in. long, cylindrical. Blume Bijdr. 671; Roxb. Fl. Ind. II. 416; A. DC. Prod. VIII. 260; Benth. & Trim. Med. Pl. III. t. 169; Miq. Fl. Ind. Bat. I. Pt. 2, 463; Clarke in Hook. f. Fl. Br. Ind. III. 589; Gürke in Engl. & Prantl Pflanzenfam. IV. i. 178, fig. 93; Koord. & Val. Bijdr. VII. 132.

PERAK: *Wray* 808, 1208; *Scortechini* 1998; *King's Collector* 4459, 7840, 7884, 8615, 10203, 10305. MALACCA: *Maingay* (K.D.) 963, 964; *Griffith* (K.D.) 3668. SINGAPORE: *Ridley* 2650.—DISTRIB. Sumatra (*Beccari* 699; *Forbes* 3120A); Java (*Forbes* 1183).

This species gives the gum "Benzoin," or "Benjamin," of commerce. The plant is often affected by galls, causing curious tassel-like excrescences on the branches. The tree has the odour of violets (*Wray*).

3. STYRAX CROTONOIDES, Clarke in Hook. f. Fl. Br. Ind. III. 589 (1882). A tree, 60 to 80 feet high and 15 to 20 in. in diam. of stem; branches spreading and drooping; branchlets rather thick, grey, ultimate ones and innovations densely clothed with whitish-grey and rusty-stellate tomentum, the rusty hairs large and scattered among the rest. *Leaves* chartaceo-coriaceous; broadly oblong or elliptic-oblong, abruptly acuminate at apex, attenuate or cuneate at base; glabrous above except on the nerves, densely white-tomentose beneath, and with scattered rusty-stellate hairs; margins entire or undulate; 5 to 7 in. long, 2.5 to

4 in. broad; midrib prominent beneath, impressed and stellate-pilose above; main-nerves about 10 pairs, prominent, arched upwards to and along the margin; reticulations prominent, transverse; petiole .3 to .4 in. long, stellate-pubescent. *Racemes* in terminal and axillary panicles, 4 to 8 in. long, densely white-tomentose and rusty-stellate-pilose, including calyx; pedicels very short, 0 to .15 in. long; bracts oblong-lanceolate, glandular-dentate, .25 in. long; bracteoles 2, linear-subulate, .15 in. long; flowers creamy-white. *Calyx-tube* cupular, .2 to .25 in. long, truncate; teeth 5, very minute. *Corolla-tube* short, .15 long, glabrous at the very base, appressed white-pubescent above; lobes 5, valvate, .3 in. long, linear-oblong, acute, afterwards recurved. *Stamens* 10, about .3 in. long; filaments short, flat, glabrous, continued in the connective which is white-pubescent on the back; anthers .2 in. long, linear, mucronate, cells parallel. *Ovary* 5-lobed, white-villous, conical; style slender, as long as corolla; stigma capitate; cells 3, ovules 5 to 6, erect. *Fruit* ovoid, grey-pubescent, mucronate, .75 to 1 in. in diam., supported by the cupuliform calyx; pericarp thick, corky. *Seed* 1, outer integument pale brown, smooth, crustaceous, with a broad basal hilum, inner integument membranous; albumen firm, endosperm cushion-like; embryo somewhat oblique; cotyledons cordate, .2 in. long; radicle thick, terete, as long as cotyledons. *Crotoni affinis* sp. Wall. Cat. 7348.

PERAK: *Scortechini* 179; *King's Collector* 7775, 7967, 8558, 10734. SINGAPORE: *Wallich* 7848; *Cantley* 60.

This species, like the others, is also frequently found with large tassel-like insect galls in place of the inflorescence.

#### Order LXXIV. OLEACEÆ.

Erect or climbing shrubs or trees, unarmed. *Leaves* usually opposite, rarely alternate or verticillate, simple or pinnately 3-few-foliolate, entire or toothed; stipules none. *Inflorescence* sometimes dichotomously cymose and centrifugal, sometimes trichotomously paniculate, some or all branches centripetal; cymes or panicles axillary or terminal. *Flowers* hermaphrodite, often dimorphous, sometimes polygamous or diceious, regular. *Calyx* free, usually small, campanulate, 4- or more-toothed or -lobed, rarely 0. *Corolla* gamopetalous; tube long or short; lobes or petals 4 to 12, imbricate or induplicate-valvate in bud. *Stamens* usually 2, sometimes 4, inserted on the corolla, or hypogynous if the petals are free or 0; filaments usually short; anthers rather large, ovate or oblong, rarely linear, dehiscing on the margin. *Ovary* free, 2-celled; style short or long; stigma simple or 2-lobed; ovules 1 to 2, rarely more, in each cell, attached to the inner angle near

the apex or base. *Fruit* capsular, loculicidally 2-valved or indehiscent, or a berry or drupe. *Seeds* solitary or 2 in each cell, erect or pendulous; testa thin or bony; albumen fleshy or horny or 0; embryo straight; radicle inferior or superior.—DISTRIB. Tropical and temperate regions of the world; genera about 18, species about 280.

Corolla-lobes imbricate :—

- |                                             |    |    |               |
|---------------------------------------------|----|----|---------------|
| Seeds exalbuminous; usually climbing shrubs | .. | .. | 1. JASMINUM.  |
| Seeds albuminous; small trees..             | .. | .. | 2. OSMANTHUS. |

Corolla-lobes valvate :—

Radicle superior; trees or erect shrubs :—

- |                                                |    |    |               |
|------------------------------------------------|----|----|---------------|
| Corolla-tube very short, petals often in pairs | .. | .. | 3. LINOCIERA. |
| Corolla tubular, sometimes absent              | .. | .. | 4. OLEA.      |
| Radicle inferior; climbing shrubs              | .. | .. | 5. MYXOPYRUM. |

*Nyctanthes Arbor-tristis*, Linn., is found in gardens in cultivation.

### 1. JASMINUM, Linn.

Erect or climbing shrubs. *Leaves* opposite or rarely alternate, simple trifoliolate or imparipinnate, generally entire; petiole usually articulate. *Flowers* often handsome, white pink or yellow, often sweet-scented, in 2- or 3-chotomous or simple cymes or sometimes solitary, axillary or terminal, inflorescence centrifugal; bracts linear and small or ovate, sometimes petaloid, bracteoles usually linear. *Calyx-tube* usually funnel-shaped or campanulate; lobes 4 to 9, linear, long or short or 0. *Corolla-tube* narrow, more or less elongate; lobes 4 to 9, spreading, much imbricate. *Stamens* 2, usually included in the corolla-tube; filaments short; anthers oblong, attached to the filaments at the back near the base, cells parallel, connective broad, usually produced in a mucronate point. *Ovary* 2-celled; ovules usually 2 in each cell, attached near the base; style filiform, long or short, often both in different flowers on the same plant; stigma oblong or capitate, generally bifid. *Berry* didymous or simple by suppression of one carpel; carpels globose, ellipsoid or elongate, pericarp usually of two layers, the outer (exocarp) membranous, the inner (endocarp) fleshy or fibrous. *Seeds* usually 1 in each carpel, sometimes 2, testa very thin; albumen none; cotyledons plano-convex; radicle inferior, very small, included within the cotyledons or slightly exsert.—DISTRIB. Tropical and warm temperate regions of Asia, Africa, and Australia, one species in Europe, many in cultivation: about 90 species in all.

Leaves simple :—

Leaves penninerved, basal pair of nerves not opposite nor produced to form an intramarginal nerve :—

Inflorescence terminal :—

- |                           |    |    |    |                       |
|---------------------------|----|----|----|-----------------------|
| Erect or straggling shrub | .. | .. | .. | 1. <i>J. Sambac</i> . |
|---------------------------|----|----|----|-----------------------|

Climbing shrubs :—

Calyx-lobes .2 in. long or longer ; leaves rather large :—

Leaves chartaceous :—

Leaves and branchlets fulvous-pilose, main-nerves

10 to 12 pairs .. .. . 2. *J. Griffithii*.

Leaves and branchlets glabrous, main-nerves 6 to

8 pairs .. .. . 3. *J. Maingayi*.

Leaves membranous :—

Calyx-lobes spreading, .25 in. long or longer ; fruit-

ing pedicels thickened .. .. . 4. *J. Wrayi*.

Calyx-lobes erect, .5 in. long ; pedicels very short .. 5. *J. Curtisii*.

Calyx-lobes under .2 in. long, pubescent ; leaves small :—

Corolla-tube short, .25 in. long .. .. . 6. *J. decussatum*.

Corolla-tube .6 to .8 in. long .. .. . 7. *J. bifarium*.

Inflorescence axillary .. .. . 8. *J. adenophyllum*.

Leaves penninerved, basal pair of nerves opposite, produced to form an intramarginal nerve :—

Basal pair of nerves prominent, branchlets round :—

Flowers in few-flowered long-peduncled cymes ; pedicels

1 to 1.5 in. long .. .. . 9. *J. longipetalum*.

Flowers in many-flowered short-peduncled cymes ; pedi-

cels under .5 in. long .. .. . 10. *J. smilacifolium*.

Basal pair of nerves not prominent, branchlets 4-angular .. 11. *J. insigne*.

Leaves 3-foliolate .. .. . 12. *J. Scortechinii*.

1. JASMINUM SAMBAC, Ait. Hort. Kew. I. 8 (1789). A sub-erect, straggling, scarcely climbing shrub ; branches terete, smooth ; branchlets slender, pubescent. *Leaves* membranous ; variable, usually ovate, often broadly so, acute or obtuse at apex, cuneate or rounded or cordate at base ; glabrous above, pubescent on the nerves beneath, often with tufts of hair in the axils of the main-nerves ; margins recurved ; 1.5 to 4.5 in. long, 1 to 2.5 in. broad ; midrib slender, impressed above, raised beneath ; main-nerves 4 to 6 pairs, arching upwards to and along the margin, raised beneath ; reticulations distinct on both sides ; petiole .1 to .25 in. long, pubescent, articulate in the middle. *Flowers* white, very fragrant, solitary or in 2-3-flowered terminal pubescent cymes ; bracteoles linear-subulate ; pedicels .25 in. long, pubescent. *Calyx*-tube campanulate, .1 in. long ; teeth 5 to 9, linear-subulate, .1 to .25 in. long. *Corolla*-tube slender, funnel-shaped, .5 in. long ; lobes 8 to 9, spreading, as long as tube, oblong acute or obtuse. *Stamens* included in the tube ; filaments short ; anthers oblong. *Ovary* rounded ; style slender ; stigmas 2, clavate. *Berry* didymous or with 1 carpel only by suppression ; carpels black, .25 in. in diam., sub-globose, surrounded by the sub-erect persistent calyx-teeth. Bot. Reg. t. 1 ; Bot. Mag. t. 1785 ; Wall. Cat. 2368 ; A.D.C. Prod. VIII. 301 ; Wight Ic. t. 704 ; Dalz. & Gibs. Bomb. Fl. 137 ; Brandis For. Fl. 311 ; Kurz in Journ. As. Soc.

Beng. XLVI. ii. 242, and For. Fl. II. 153; Clarke in Hook. f. Fl. Br. Ind. III. 591; Blume Bijdr. 677; Miq. Fl. Ind. Bat. II. 542; Cooke Bomb. Fl. II. 111; Prain Beng. Plants 659. *J. fragrans*, Salisb. Prod. 12. *J. undulatum*, Willd. Sp. Pl. I. 36 (not of Ker). *J. Sambac*, Roxb. Hort. Beng. 2, and Fl. Ind. Ed. Carey & Wall. I. 87. *J. quinqueflorum*, Heyne; Wall. Cat. 2878; A.DC. l.c. 302. *J. pubescens*, Wall. Cat. 2880, not of Willd. *Nyctanthes Sambac* and *undulatum*, Linn. Sp. Pl. 8. *Mogorium Sambac*, Lamk. Dict. IV. 210; Ill. t. 6, fig. 1. *M. undulatum*, Lamk. Dict. IV. 212. "Kudda-mulla," Rheede Hort. Mal. VI. tt. 50, 51. Burm. Thes. Zeyl. t. 58, fig. 2.

PERAK: *Scortechini* 997.—DISTRIB. India, Ceylon, Burma, Siam.

Much cultivated in India and in all tropical regions. The cultivated forms have many-flowered cymes and rounded corolla-lobes, and they are often found with double flowers.

2. *JASMINUM GRIFFITHII*, Clarke in Hook. f. Fl. Br. Ind. III. 593 (1882). A slender climbing shrub; branchlets densely and patently fulvous-villous. *Leaves* chartaceous; ovate- or elliptic-oblong, bluntly acute or acuminate at apex, rounded or cordate at base; fulvous-pilose on both surfaces, sparsely above, more densely beneath but glabrescent when old, the uppermost often whitened; 4 to 6 in. long, 1.5 to 3.5 in. broad; midrib prominent beneath; main-nerves 10 to 12 pairs, at first straight then arching upwards to join in a prominent looped intramarginal nerve; secondary nerves few; reticulations rather indistinct; midrib and all nerves impressed above and pilose, raised and densely fulvous-villous beneath, tufted in the axils; petiole stout, .2 to .4 in. long. *Flowers* creamy-white, in terminal, many-flowered, fulvous-pilose cymes, 1 to 1.5 in. long and up to 2 in. broad; bracts leafy, lanceolate, about .5 to 1 in. long, few; bracteoles many, linear, similar to calyx-lobes, of various lengths. *Calyx-tube* slender, .1 in. long; lobes 5, linear, .2 in. long. *Corolla-tube* slender, slightly enlarged above, .75 in. long; lobes 5, spreading, .25 in. long, elliptic, apiculate; lobes and tube minutely pubescent without. *Stamens* included or slightly exsert; filaments broad; anthers oblong-lanceolate with a broad connective, .15 to .2 in. long. *Ovary* glabrous; style slender; stigma clavate. *Berry* didymous; carpels waxy-white, globose, .3 to .4 in. in diam., pericarp crustaceous, glabrous. *Seed* usually one, testa fibrous; cotyledons thick, plano-convex, .2 in. in diam.

PERAK: *King's Collector* 10229. MALACCA: *Griffith* (K.D.) 3704. SINGAPORE: *Ridley* 8455.

VAR. *cuspidata*, King & Gamble. *Leaves* thinner than in the type, oblong, abruptly and sharply cuspidate-acuminate at apex, attenuate and

abruptly rounded at base, 5 to 5·5 in. long, 1·5 to 2 in. broad, much less pilose, main-nerves 8 to 10 pairs; seeds 1 to 2, testa crustaceous.

PENANG: *Curtis* 2787. MALACCA: *Maingay* (K.D.) 998. JOHORE: at Gunong Palai, 1,400 feet, *G. King*.

3. *JASMINUM MAINGAYI*, Clarke in Hook. f. Fl. Br. Ind. III. 594 (1882). A climbing shrub; branchlets light brown, terete, internodes somewhat elongate, innovations and inflorescence tawny-pubescent. *Leaves* chartaceous; ovate or ovate-oblong, acuminate and often mucronate at apex, rounded or attenuate or cuneate at base; glabrous on both surfaces; margins recurved; 3 to 6 in. long, 2 to 2·5 in. broad; midrib stout; main-nerves 6 to 8 pairs, arching upwards to join in a looped intramarginal nerve about ·2 in. from the margin; secondary nerves few; reticulations distant, obscure; all nerves strongly impressed above and raised beneath; petiole ·5 to ·7 in. long, articulate in the middle, twisted, the bases of each pair connected by a raised nodal line. *Flowers* in terminal or axillary, paniculate, tawny-pubescent, trichotomous cymes, 1·5 to 2 in. long, sessile or peduncled; bracts oblong or spatulate, leafy; bracteoles linear, about ·25 in. long or less; pedicels blueish, ·15 in. long; flowers white, sometimes slightly tinged with pink. *Calyx-tube* campanulate, ·07 to ·1 in. long; teeth 6, linear-subulate, ·325 in. long. *Corolla-tube* slender, ·5 to ·7 in. long, glabrous; lobes 8 to 10, spreading, rotate, oblong-lanceolate, apiculate, ·4 in. long, with prominent nerves. *Stamens* included in the corolla-tube; filaments slender, appressed to the tube; anthers oblong, mucronate, ·15 in. long, connective broad. *Ovary* cylindrical, glabrous; style slender, ·4 to ·5 in. long; stigma clavate. *Fruit* of one carpel, oblong, ·5 in. long, ·3 in. broad, exocarp thin shining, endocarp fibrous. *Seeds* 2, testa thin. Hook. f. Bot. Mag. t. 7823.

PENANG: *Maingay* (K.D.) 1000; *Curtis* 643. PERAK: *Scortechini* 139, 304; *Curtis* 2032; *King's Collector* 2761, 2762, 3975.—DISTRIB. Borneo (*Haviland & Hose* 911).

VAR. *kedahensis*, King & Gamble. *Branchlets* and inflorescence thickly rusty-pubescent. *Leaves* more ovate, rounded at base, nerves fewer, rarely 3 to 4 pairs, the two lower pairs very strong. *Drupe* nearly globose.

KEDAH: *Ridley* 5535.

A well-marked variety which may prove, when better known, to be a species.

4. *JASMINUM WRAYI*, King & Gamble, n. sp. A slender climbing shrub; branchlets pale brown, slender, terete. *Leaves* membranous; oblong or obovate-oblong, acuminate at apex, attenuate or rounded, sometimes slightly auricled at base; glabrous on both surfaces except

for tufts of tawny hairs in the axils of the main-nerves beneath; 3 to 7 in. long, 1.5 to 2.5 in. broad; midrib very slender, raised beneath; main-nerves about 7 pairs, curving upwards to and along the margin where they are obscurely connected in an intramarginal looped nerve, usually slightly impressed above and raised beneath; secondary nerves and reticulations obscure; petiole .3 to .5 in., slender, twisted. *Flowers* cream-coloured, in terminal, about 15–20-flowered corymbose cymes 2 to 3 in. long; peduncle 1 to 1.5 in. long, branches at right angles to rachis in fruit, .7 to 1 in. long; bracts lanceolate-acuminate, .5 in. long; bracteoles linear-subulate, .2 to .3 in. long; pedicels slender in flower, clavately-thickened in fruit and then .3 to .5 in. long. *Calyx-tube* very short; lobes 5, linear-subulate, spreading, curved, .25 in. long, glabrous or slightly pilose. *Corolla-tube* slender, .75 in. long, slightly enlarged above; lobes 8 to 9, narrow, .3 to .4 in. long. *Stamens* included in the corolla-tube; filaments short; anthers oblong, long-mucronate. *Ovary* cylindric, depressed; style slender; stigma slightly clavate. *Fruit* didymous; carpels ovoid-globose, greenish-white, .25 to .5 in. long, exocarp thin shining, endocarp fibrous. *Seed* 1, testa very thin, membranous; cotyledons plano-convex, thick.

PERAK: Wray 2297, 2905, 3147; King's Collector 1838, 2484.

VAR. *hispid*, King & Gamble. Upper branchlets and inflorescence including calyx sparsely hispid, also midrib and main-nerves of leaves beneath; under-surface of leaves often pubescent; main-nerves up to 10 pairs.

PERAK: King's Collector 5893, on limestone hills. SELANGOR: Curtis 3774.

VAR. *axillaris*, King & Gamble. *Leaves* rather small, sparsely pubescent, especially on the midrib and main-nerves; inflorescence axillary, few-flowered (5 to 7), calyx hispid; fruit large, up to .5 in. in diam.

PERAK: on Maxwell's Hill, 3,000 feet—a slender climber, *Scortechini* 273.

5. *JASMINUM CURTISII*, King & Gamble, n. sp. A climbing shrub (?); branchlets slender, terete, minutely rusty-pubescent. *Leaves* membranous; ovate or ovate-oblong, acuminate at apex, rounded at base; glabrous on both surfaces except for pubescence on the nerves above and tufts of hair in the axils of the main-nerves beneath; 3 to 5 in. long, 1 to 2 in. broad; midrib slender; main-nerves 5 to 6 pairs, distant, curving upwards and joining in a looped nerve .1 to .2 in. from the margin, raised and prominent on both surfaces; secondary nerves and reticulations few, irregular; petiole .4 in. long, pubescent, twisted, articulate in the middle, the bases of each pair connected by a faint

nodal line. *Flowers* in a terminal trichotomous rusty-pubescent cyme, supported by pale (white?) leafy, ovate-lanceolate, pubescent bracts 1 to 1·25 in. long; bracteoles similar but smaller; pedicels ·15 in. long; flowers in each cyme about 15 to 20. *Calyx-tube* campanulate, ·15 in. long; lobes 6, linear-subulate, ·5 in. long. *Corolla-tube* slender, cylindrical, 1 in. long; lobes 8 to 9, spreading or recurved, ·5 in. long, oblong-lanceolate, acute. *Anthers* oblong, ·125 in. long, mucronate. *Ovary* cylindrical, glabrous; style slender; stigmas 2, clavate. *Fruit* not known.

PERAK: at Ipoh, *Curtis*.

A remarkable species, distinguished by the very long hair-like calyx-lobes and the coloured or white large leafy bracts and bracteoles.

6. *JASMINUM DECUSSATUM*, Wall. Cat. 2860 (1829). A climbing shrub; branchlets slender, densely rusty-pubescent. *Leaves* chartaceous; ovate or ovate-lanceolate, acuminate at apex, rounded at base; sparsely pubescent above, more densely so beneath; 2 to 4 in. long, 1 to 1·5 in. broad; midrib rather stout; main-nerves 4 to 5, lowest pair obscure, rest curved upwards to meet near the margin, impressed above, raised beneath; petiole ·3 to ·4 in. long, pubescent, articulate near the base, the bases of each pair of petioles (as also branchlets) joined by a raised nodal line on either side. *Flowers* in densely pubescent axillary and terminal trichotomous corymbose cymes about 1 to 2 in. long, supported by a pair of large leaf-like bracts; bracteoles linear-subulate; pedicels ·1 to ·2 in. long. *Calyx-tube* short; teeth 6, subulate, ·1 in. long. *Corolla-tube* slender, ·25 in. long; lobes 8 to 9, as long as tube, oblong-lanceolate, apiculate. *Stamens* included in the corolla-tube; filaments short; anthers oblong, ·1 in. long, mucronate. *Ovary* rounded, glabrous; style slender, longer than the corolla-tube (in short-stamened flowers); stigmas two, clavate. *Fruit* of one ellipsoid carpel, ·2 to ·3 in. long, glabrous. A.D.C. Prod. VIII. 306; Kurz in Journ. As. Soc. XLVI. ii. 241, and For. Fl. II. 151; Clarke in Hook. f. Fl. Br. Ind. III. 596.

PENANG: *King's Collector* 1425, at Trang, 100 to 300 feet.—DISTRIB. Burma (*Wallich* 2860, *Griffith* 3699).

7. *JASMINUM BIFARIUM*, Wall. Cat. 2866 (1829). A climbing shrub; branchlets slender, terete, brown when dry, pubescent or nearly glabrous. *Leaves* chartaceous, usually bifarious; ovate or ovate-oblong, acuminate at apex, rounded or truncate sometimes almost cordate at base; pubescent or sometimes nearly glabrous on both surfaces; 2 to 3 in. long, 1 to 1·5 in. broad; midrib slender, pubescent, impressed above, raised beneath; main-nerves 4 to 6 pairs, pubescent, prominent beneath, arched upwards to join in an intramarginal nerve; secondary nerves and reticulations very obscure; petiole ·2 to ·3 in. long, twisted, articu-

late in the middle, the bases of each pair connected (as are the branchlets) on either side by a raised nodal line. *Flowers* white, in few- (4-12-) flowered, pubescent, sub-capitate cymes, sub-sessile in the axils of the two uppermost bract-like leaves; bracteoles linear-subulate, .15 in. long; pedicels .1 in. long. *Calyx-tube* campanulate; teeth 5 to 7, linear-subulate, .1 to .15 in. long. *Corolla-tube* slender, cylindric, .6 to .8 in. long; lobes 6 to 9, ovate-oblong, spreading, apiculate, .2 to .3 in. long. *Stamens* included in the corolla-tube; filaments short, slender; anthers oblong, mucronate, .1 to .15 in. long, connective broad. *Ovary* cylindric, glabrous; style slender, exsert; stigmas 2, clavate. *Fruit* a didymous berry; carpels ovoid, .5 in. long, .2 in. broad; exocarp membranous shining, endocarp fibrous. *Seed* conform to carpel, testa very thin, membranous. A.D.C. Prod. VIII. 305; Clarke in Hook. f. Fl. Br. Ind. III. 595. *J. bracteatum*, Wall. Cat. 2867. *J. nummularoides*, Blume Mus. Lugd. Bat. I. 275; Miq. Fl. Ind. Bat. II. 537.

PENANG: *Wallich* 2866, 2867; *Curtis* 1920; *Ridley* 9361. PERAK: *Wray* 4180; *King's Collector* 860, 4920, 10699; *Deschamps*; *Scortechini* 59, 144, 238. SELANGOR: *Ridley* 7550, 8567. PAHANG: *Ridley* in Trans. Linn. Soc., Ser. 2, III. 319.—DISTRIB. Java.

VAR. *glabra*, Clarke in Hook. f. Fl. Br. Ind. III. 595. *Leaves* larger, elliptic, rhomboid or rounded at the base, more glabrous, less bifarious; calyx-teeth rather longer. *J. Lessertianum*, A.D.C. Prod. VIII. 304.

JUNKSEYLON (Tongka): *Curtis* 2911. PENANG: *Maingay* (K.D.) 999; *Deschamps*. PERAK: *Wray* 4180; *Scortechini*; *Kunstler* 122. MALACCA: *Griffith* (K.D.) 3708; *Goodenough* 1995. JOHORE: *Ridley* 4217. SINGAPORE: *Lobb*; *Ridley* 10760.—DISTRIB. Sumatra.

8. JASMINUM ADENOPHYLLUM, Wall. Cat. 2876 (1829). A very slender wiry climber; branchlets extensively twining, glabrous. *Leaves* membranous; ovate-lanceolate to elliptic-oblong, variable, acuminate and mucronate at apex, cuneate at base; glabrous above except on the midrib, glabrous beneath except the tuft of tawny hairs in the axils of the main-nerves; margins somewhat undulate; 1.5 to 5 in. long, .75 to 1.5 in. broad; midrib slender; main-nerves very slender, obscure, about 6 pairs, curving upwards to meet in a faint intramarginal looped nerve; petiole slender, twisted, articulate in the middle, .2 to .3 in. long, hispid. *Flowers* white, solitary, or 2 to 3 together in a slender, sometimes leafy, umbel from the axils of the leaves; peduncle .75 to 1.25 in. long, flattened above and with a pair of opposite bracts near the middle; bracts of umbel 2, linear-subulate, .3 in. long; pedicels very slender, .75 to 1 in. long, clavately enlarged in fruit. *Calyx-tube* campanulate, glabrous, ribbed, .1 in. long; lobes linear-subulate, keeled on the back,

sparsely hispid, .4 to .5 in. long, points recurved. *Corolla-tube* slender, funnel-shaped, .75 in. long; lobes as long or slightly longer, 8 to 9, recurved, oblong-ligulate, about .25 to .3 in. broad. *Stamens* included in the corolla-tube; filaments short, slender; anthers oblong, mucronate, .15 in. long, connective broad. *Ovary* cylindrical; style slender; stigma clavate. *Fruit* globose, shining, young carpels .25 in. in diam. A.D.C. Prod. VIII. 314; Clarke in Hook. f. Fl. Br. Ind. III. 597.

PENANG: *King's Collector* 1736.—DISTRIB. Khasia Hills (*Wallich*).

This species is clearly quite a small climber, and while the Penang specimens have only small leaves those from the Khasia Hills show comparatively large ones, but this is not unnatural, and we believe the identification to be correct.

9. *JASMINUM LONGIPETALUM*, King & Gamble, n. sp. A large climbing shrub, reaching 30 to 40 feet; branchlets slender, terete, pale brown. *Leaves* chartaceo-coriaceous, 3-nerved; elliptic, acute or shortly acuminate at apex, attenuate or cuneate or slightly rounded at base; glabrous on both surfaces; margins slightly recurved; 2 to 6 in. long, 1.5 to 3 in. broad; midrib slightly impressed above, shortly raised beneath; main-nerves 7 to 8 pairs, the basal pair opposite, at about 25° with the midrib produced in an intramarginal nerve about .25 in. from the margin, looped where the others, which are at about 65° with the midrib, join it; secondary nerves and reticulations very indistinct; petiole .2 to .4 in. long, twisted. *Flowers* white tinged with pink, fascicled 3 to 6 together in the axils of the upper leaves, forming sessile umbellate cymes; bracts very small, ovate-acute, deciduous; pedicels 1 to 1.5 in. long, very slender, summit enlarged in fruit. *Calyx-tube* short; lobes 6, glabrous, linear-subulate, .1 in. long, margins inflexed. *Corolla-tube* very slender, .75 in. long; lobes 9, linear-oblong, acute, 3-5-nerved, .75 to 1 in. long, much recurved in flower. *Stamens* within the tube; filaments short, slender; anthers oblong, .175 in. long, obtuse. *Ovary* glabrous, 2-celled; style slender; stigma flattened, minutely pubescent. *Fruit* didymous; carpel usually 1 only by suppression, black, globose, .4 to .5 in. in diam.; pericarp fleshy, glabrous. *Seeds* 2, testa very thin, cotyledons plano-convex.

PERAK: *King's Collector* 2765, 6005—on rich soil at 300 to 800 feet elevation, scarce. SINGAPORE: *Ridley* 10937.

A particularly handsome and well-defined species, which is well worthy of garden cultivation.

10. *JASMINUM SMILACIFOLIUM*, Griff. MS., Clarke in Hook. f. Fl. Br. Ind. III. 600 (1882). A large glabrous climbing shrub; branchlets pale brown, terete. *Leaves* coriaceous, 3-nerved; ovate, abruptly caudate-

acuminate at apex, obtuse or nearly cordate at base; margins entire, recurved; 5 to 7 in. long, 3 to 4 in. broad; midrib very prominent, impressed above, much raised beneath; two lowest main-nerves very prominent, similar to the midrib, curved upwards to form a pair of intramarginal nerves meeting at the apex; remaining main-nerves irregular, 3 to 4 pairs, inconspicuous; secondary nerves and reticulations raised above; petiole .75 in. long, twisted, articulate in the middle. *Inflorescence* of axillary 5-20-flowered cymes; rachis jointed, terete; bracts spatulate, .1 to .2 in. long; bracteoles smaller, linear; pedicels .2 to .3 in. long, greatly enlarged in fruit; flowers white, tinged with pink. *Calyx* campanulate, tube .15 in. long; teeth 5, .05 in. long. *Corolla-tube* slender, cylindrical, .75 to 1 in. long; lobes oblong, acute or apiculate, .75 in. long, .2 in. broad. *Stamens* inserted in the throat of the tube; filaments short; anthers linear-oblong, .25 in. long, mucronate. *Drupe* didymous; carpels ellipsoid, .1 in. long, .3 to .4 in. broad, smooth, shining.

MALACCA: *Griffith* (K.D.) 3698; *Maingay* (K.D.) 997.

11. JASMINUM INSIGNE, Blume Mus. Bot. Lugd. Bat. I. 278 (1849).

An extensively climbing shrub; branches obscurely quadrangular with pale-grey corky bark; branchlets acutely quadrangular, glabrous, the edges pale-corky-winged. *Leaves* chartaceo-coriaceous; opposite, occasionally whorled; elliptic or elliptic-oblong, acute at apex, cuneate at base; glabrous on both surfaces; margins recurved; 2 to 8 in. long, 1 to 4 in. broad; midrib slender, raised beneath; main-nerves 6 to 7 pairs, the basal pair faint, opposite, at about 30° with the midrib, produced in an intramarginal nerve .1 to .2 in. from the margin, looped where the others, which are at 50° to the midrib, join it; secondary nerves and reticulations obscure; petiole .4 to 1.2 in. long, twisted, the upper part bordered for a short distance by the decurrent margins of the blade. *Flowers* white, in compact, many-flowered, glabrous cymes from the axils of the leaves or (more usually) from the stem; bracteoles subulate, .1 to .15 in. long, caducous; pedicels stout, .2 in. long, somewhat angular. *Calyx-tube* campanulate, .25 in. long; lobes 4 to 5, linear-subulate, unequal, .25 to .35 in. long, points hooked. *Corolla-tube* slender, .75 to 1 in. long, somewhat inflated above; mouth slightly thickened; lobes 4 to 5, spreading, ovate-oblong, apiculate, .5 in. long, .3 to .4 in. broad. *Stamens* in the tube of the corolla; filaments flattened; anthers oblong, mucronate, .25 to .3 in. long. *Ovary* glabrous, rounded; style slender, clavate, obscurely cleft in 2 short stigmas; cells 2. *Fruit* didymous; carpels oblong, smooth, white when ripe. Miq. Fl. Ind. Bat. II. 541. *J. cauliflorum*, Scortechini MS. in Herb. Calcutta.

PERAK : at Theripay Taipay, *Scortechini*; *Wray* 2840; *Cantley* 23; *King's Collector* 2890, 3398, 7059.—DISTRIB. Sumatra, *Forbes* 2906.

A very fine species of well-marked characters.

12. *JASMINUM SCORTECHINII*, King & Gamble, n. sp. A slender climbing shrub, reaching 60 feet in length; branchlets dark-coloured, glabrous. *Leaves* thin when young, almost coriaceous when old, 3-sometimes 1-foliolate, opposite or sub-opposite; terminal leaflet ovate or lanceolate, acuminate at apex, rounded at base; glabrous on both surfaces, upper surface shining, nearly black when dry, lower surface dull, reddish when dry; 2·5 to 4 in. long, 1 to 1·5 in. broad; lateral leaflets similar but slightly smaller and often lanceolate; midrib slender, raised beneath; main-nerve very indistinct, apparently 6 to 8 pairs; petiole ·75 in. long, petiolule of end leaflet ·5, of side leaflets ·3 in. long, all grooved, slender, articulate below the leaflet. *Flowers* white, in axillary or terminal trichotomous cymes, terminal ones often paniculate; peduncles ·5 to 1 in. long; bracts ovate-acute or subulate, ·1 in. long; cymes sparsely scaly; bracteoles at the base of the calyx minute; pedicels ·1 to ·2 in. long, very much enlarged in fruit and then reaching ·5 to ·7 in. in length and ·3 in. in diam. at top. *Calyx-tube* campanulate, ·125 in. long; teeth 5, very short, triangular. *Corolla-tube* slender, enlarged above, ·4 to ·6 in. long; lobes 5, ovate-cordate, obtuse, ·3 to ·4 in. long, spreading. *Stamens* included in the corolla-tube; filaments short; anthers oblong, mucronate, ·15 in. long, connective broad. *Ovary* cylindrical, glabrous, 2-celled; style slender, as long as the corolla-tube; stigma clavate. *Fruit* didymous; carpels ellipsoid, ·75 to 1 in. long, ·5 in. broad; pericarp thin, crustaceous, blackish-brown. *Seed* nearly filling the cavity; testa thin, fragile; cotyledons oblong-obtuse, slightly auricled at base, ·5 to ·6 in. long by ·25 in. broad, plano-convex.

PENANG : *Curtis* 1227, 2031. PERAK : *Scortechini* 383, 479; *Ridley* 10679; *King's Collector* 7006, 7009; *Curtis* 169.

The description is largely after *Scortechini* MS. The species comes very near *J. lanceolaria*, Roxb., but differs in its more slender habit, thinner leaves, and large ellipsoid carpels.

*Ridley's* No. 8325 from Lankawi Island, Kedah, is a twiggy, apparently erect shrub with trifoliolate leaves, the leaflets all obovate-orbicular emarginate, the end one reaching 1·7 in. long and 1·3 in. broad, the side ones only about ·6 in. long and broad. The fruits are of one carpel about the size of a small pea, and the flowers are unknown. It may possibly not be a *Jasminum* (Herb. Kew).

The following species from Borneo is of interest, and may perhaps be found later on in the Peninsula :—

*JASMINUM SARAWACENSE*, King & Gamble, n. sp. A climbing shrub; branchlets pale brown, terete; internodes rather long. *Leaves* opposite, chartaceous; elliptic-

oblong, long-acuminate at apex, cuneate at base; both surfaces glabrous; margins recurved; 4 to 7 in. long, 1.75 to 2.75 in. broad; midrib strong, impressed above, raised beneath; main-nerves 4 pairs, the lowest pair near the margin at an angle of about 30° with the midrib, the remaining pairs at about 50°, curving upwards to meet in an intramarginal looped nerve, which is also met by secondary nerves above the fourth pair; reticulations irregular, not prominent; petiole .5 to .75 in. long, twisted in the middle. *Inflorescence* of axillary, long-peduncled, trichotomous, pubescent, corymbose cymes, about 1 in. broad at top, usually 1 pair from each node; peduncle terete, 2 to 3 in. long, sometimes branched, minutely pubescent; branches very short, .2 in. long; pedicels clavate, .1 to .15 in. long; bracts and bracteoles linear-subulate, .25 in. long, one pair of bracteoles to each terminal fascicle of 3 flowers; flowers white, buds clavate, 1 in. long. *Calyx-tube* campanulate, .15 in. long; lobes 6, linear-oblong, applicately infolded at the middle inwards, .15 to .2 in. long, pubescent. *Corolla-tube* cylindrical, 1 in. long; lobes 6, spreading, oblong, rounded at top, .4 to .5 in. long, prominently 3-5-nerved. *Stamens* 2, inserted at about the middle of the tube within; filaments short, decurrent within the tube; anthers linear-oblong, .2 in. long. *Ovary* cylindrical, truncate and depressed at top, 2-celled; style very slender; stigma clavate. *Fruit* not known.

BORNEO: near Kuching in Sarawak, *Haviland & Hose* 3489.

## 2. OSMANTHUS, Lour.

Trees or shrubs, glabrous. *Leaves* opposite, evergreen, entire or dentate. *Flowers* small, axillary or terminal, fascicled or in very short racemes, hermaphrodite or polygamous. *Calyx* short, 4-toothed or -lobed. *Corolla-tube* short or long; lobes 4, broad, obtuse, imbricate. *Stamens* 2, more rarely 4, inserted on the corolla-tube; anthers ovate, sub-extrorsely dehiscent. *Ovary* 2-celled, ovules 2 in each cell, pendulous from its apex; style short or cylindrical, 2-lobed or sub-entire. *Drupe* ovoid or globose; exocarp fleshy, endocarp bony or crustaceous. *Seeds* usually solitary, pendulous; testa thin; albumen fleshy; cotyledons flat; radicle short, superior.—DISTRIB. N.W. Himalaya and eastwards to China and Japan, also in Western North America; about 8 to 10 species.

OSMANTHUS SCORTECHINII, King & Gamble, n. sp. A tree, reaching 40 to 50 feet in height, and 10 to 15 in. in diam. of stem; branchlets terete with pale grey, somewhat corky, bark. *Leaves* coriaceous; lanceolate, shortly acuminate at apex, cuneate at base; both surfaces glabrous; margins entire, recurved; 2 to 4 in. long, .75 to 1.25 in. broad; midrib thick, impressed above, raised beneath; main-nerves very obscure, about 5 to 6 pairs; petiole broad, .3 to .6 in. long, channelled above and bordered by the decurrent margins of the blade. *Flowers* in very short, close, axillary racemes, reaching .5 in. long in fruit, supported by a pair of ovate, acute, coriaceous bracts; pedicels slender, .05 in. long. *Calyx* membranous, .06 in. long; lobes 4, slightly serrate. *Corolla* campanulate, tube .05 in. long; lobes .1 in. long, oblong, obtuse, margins incurved.

*Stamens* 4, slightly exsert, inserted between the corolla-lobes at the top of the tube; filaments slender; anthers small, ovate, cells dehiscing on the margins or somewhat extrorsely. *Ovary* conical, glabrous; style slender, subulate, .04 in. long; cells 2, ovules in each cell apparently 2. *Drupe* globose, .2 to .3 in. in diam.; dark greenish-blue when ripe, exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa membranous; albumen fleshy, ruminant; cotyledons oblong, flat, narrow; radicle superior.

PERAK: *Scortechini* 414—at Thaipeng; *Wray* 682; *King's Collector* 5029, 6978.

The structure of the wood, so far as the examination of a very small branch goes, confirms the placing of this plant in the genus *Osmanthus*.

To this species seems also to belong *King's Collector* 3663, which has a bright red drupe reaching .5 in. in length, slightly ribbed and with a spatulate embryo having the radicle nearly as long as the cotyledons, each .1 in. It may be called VAR. *oblonga*.

### 3. LINOCIERA, Swartz.

Shrubs or trees. *Leaves* opposite, entire. *Flowers* small, in axillary or extra-axillary, rarely terminal, panicles or cymes; bracts generally small, sometimes rather enlarged and leafy; bracteoles very small. *Calyx* small, 4-fid or -toothed. *Corolla* of 4 petals, long or short, nearly free or cohering by pairs or very shortly connate, induplicate-valvate in bud. *Stamens* 2, rarely 4, inserted at the base of the petals and usually between the two cohering ones; filaments short; anthers elliptic or oblong, dehiscing on the margin or slightly extrorse; connective broad, often apiculate. *Ovary* 2-celled, ovules 2 in each cell, pendulous from its apex; style short; stigma bifid or entire. *Drupe* globose or ellipsoid; exocarp fleshy, thin, endocarp bony or crustaceous. *Seed* usually solitary, pendulous; testa thin; albumen fleshy or 0, if fleshy the cotyledons flattened, radicle superior.—DISTRIB. Tropics of both hemispheres, species about 40.

Leaves over 4 in. long, main-nerves prominent beneath:—

|                                              |    |    |                           |
|----------------------------------------------|----|----|---------------------------|
| Panicles 4 to 6 in. long, drupe .75 in. long | .. | .. | 1. <i>L. pauciflora</i> . |
| Panicles 2 to 4 in. long, drupe 1.7 in. long | .. | .. | 2. <i>L. macrocarpa</i> . |
| Panicles 1.5 to 2 in. long, drupe not known  | .. | .. | 3. <i>L. paludosa</i> .   |

Leaves under 4 in. long, main-nerves obscure beneath, cymes

scarcely 1 in. long .. .. . 4. *L. caudata*.

1. LINOCIERA PAUCIFLORA, Clarke in Hook. f. Fl. Br. Ind. III. 609 (1882). A small tree, reaching 30 to 40 feet in height and 1.5 to 2 feet in diam. of stem; branches moderately stout, pale grey, smooth, swollen at the nodes, internodes slightly angular; branchlets darker coloured,

slender; leaf-buds linear-lanceolate. *Leaves* coriaceous; elliptic-oblong, rounded or shortly obtusely acuminate at apex, cuneate at base; glabrous on both surfaces, but with prominent raised glandular papillæ; 4 to 9 in. long, 2 to 4 in. broad; midrib stout, slightly impressed above, prominently raised beneath; main-nerves 11 to 13 pairs, fairly prominent and regular, curving upwards to and along the margin near which they anastomose; secondary nerves and reticulations obscure; petiole .7 to 1.3 in. long, thickened at base. *Flowers* pale yellow or white, in compound axillary panicles, 4 to 6 in. long; main branches 1 to 2 in. long; rachis slender, glabrous, somewhat angular; bracts leafy, ovate or spatulate, .5 to 1 in. or sometimes longer; bracteoles ovate-acute, very small; pedicels slender, .05 to 1.5 in. long, much thickened and pale in fruit even when quite young. *Calyx-tube* short; teeth 4, ovate-acute, .05 in. long. *Corolla-lobes* in two pairs, oblong, .1 to .15 in. long, slightly hairy within. *Stamens* .05 in. long; filaments short, broad, anthers elliptic, emarginate, with a gland on the front of the connective. *Drupe* ellipsoid, .75 in. long, .3 to .4 in. broad, blueish-black when ripe; exocarp fleshy, endocarp thin, crustaceous. *Seed* 1, testa pergamaceous; albumen none; cotyledons fleshy, .55 in. long; radicle very small, superior. *Olea* (?) *pauciflora*, Wall. Cat. 2812; A.DC. Prod. VIII. 288. *Chionanthus palembanica*, Miq. Fl. Ind. Bat. Suppl. 558; Kurz For. Fl. II. 159, and Journ. As. Soc. Beng. XLVI. ii. 243.

KEDAH: *Curtis*. PENANG: *Wallich* 2812A, B; *G. King*; *Curtis* 695, 2773; *King's Collector* 1693; *Ridley* 10178. PERAK: *Ridley* 7160; *Scortechini* 952; *King's Collector* 4172, 4834. SINGAPORE: *Ridley* 5079. —DISTRIB. Tenasserim, Andamans, Borneo (*Haviland* 1766).

2. LINOCIERA MACROCARPA, King & Gamble. A small tree; branchlets pale greyish-brown, stout, lenticellate; innovations ashy-pubescent. *Leaves* coriaceous; obovate-oblong or obovate-lanceolate, obtuse or very shortly and bluntly acuminate at apex, long cuneate at base; glabrous on both surfaces; margins entire or slightly recurved; 6 to 10 in. long, 2 to 3.5 in. broad; midrib very stout, broad and plane above, much raised beneath; main-nerves 14 to 17 pairs, prominent beneath, curved only near the margin to meet in a faint looped intramarginal nerve; secondary nerves and reticulations obscure; petiole 1 to 1.5 in. long, enlarged at base. *Flowers* in ashy-pubescent panicles, 2 to 4 in. long; bracts leafy, sometimes oblong-lanceolate, more generally spatulate; bracteoles linear-subulate, short; pedicels variable, often 0; rachis and pedicels much enlarged in fruit. *Calyx* pubescent; tube short; lobes ovate-acute, .05 in. long. *Corolla-tube* very short; lobes oblong-linear, .1 to .15 in. long, margins much incurved. *Stamens* .075 in. long; anthers oblong; filaments very short,

connective produced in a conical acumen. *Ovary* pubescent; style short; stigma 2-lobed. *Drupe* oblong-ellipsoid, 1·7 in. long, 1 to 1·2 in. broad; exocarp thick, granular; endocarp hard, ·15 in. thick, obscurely ridged outside. *Seed* 1, testa membranous, albumen fleshy. *L. insignis*, Clarke in Hook. f. Fl. Br. Ind. III. 610. *Chionanthus macrocarpa*, Blume Mus. Bot. I. 319 (1849); Koord. & Val. Bijdr. VIII. 239. *C. insignis*, Miq. Fl. Ind. Bat. Suppl. 559 (1862). *C. montanus*, Kurz in Journ. As. Soc. Beng. XLVI. ii. 243, and For. Fl. II. 159.

SINGAPORE: at Bukit Mandai, *Ridley* 4580.—DISTRIB. Tenasserim (*Helper* (K.D.) 3688), Martaban (*Kurz*), Sumatra (*Teysmann*, *Beccari* 826), Borneo (*Beccari* 725).

3. *LINOCIERA PALUDOSA*, King & Gamble, n. sp. A small tree (*Wray*), large tree, 60 to 80 feet high, and 15 to 20 in. in diam. of stem (*King's Collector*); branchlets thick, pale greyish-brown. *Leaves* coriaceous; oblong, bluntly acute at apex, also at base; glabrous on both surfaces except on the nerves which are minutely pubescent; margins recurved; 6 to 12 in. long, 2 to 4 in. broad; midrib thick, prominent, slightly raised above, strongly so beneath main-nerves 11 to 15 pairs, impressed above, prominently raised beneath, ·75 to 1 in. apart, at first straight then curving upwards to and along the margin to anastomose and form a prominent looped intramarginal nerve; secondary nerves few; reticulations transverse, not prominent; petiole stout, wrinkled, ·5 in. long. *Flowers* yellow, with a brown centre, in pubescent panicles 1·5 to 2 in. long from the branchlets between the leaf-nodes in the axils of small tubercles; peduncles stout, grey-pubescent, ·2 in. long; bracts ovate, grey-pubescent; bracteoles ovate-acute, recurved; pedicels 0·5 in. long. *Calyx-tube* short, lobes ovate-acute or triangular, ciliate, ·025 in. long, one lobe sometimes enlarged. *Corolla-lobes* in 2 pairs, linear-oblong, obtuse, ·2 in. long, ·05 in. broad, glabrous. *Stamens* ·05 in. long; filaments broad, short; anthers rounded, connective with an obscure gland. *Ovary* conical, glabrous; style short; stigmas 2. *Fruit* not known.

PERAK: at Sungie Larút, *Wray* 2424; on low wet ground, *King's Collector* 6476.

4. *LINOCIERA CAUDATA*, King & Gamble, n. sp. A tree, reaching 30 to 40 feet in height and 5 to 7 in. in diam. of stem; branches slender, pale grey, ultimate branchlets darker. *Leaves* chartaceous; lanceolate, caudate-acuminate at apex, cuneate at base; glabrous on both surfaces; margins entire, recurved; 3 to 4 in. long, 1 to 1·25 in. broad; midrib slender, raised above, scarcely raised beneath; main-nerves very obscure, about 4 to 5 pairs, curving sharply upwards to meet in an intramarginal looped nerve; petiole ·1 to ·2 in. long, grooved above.

*Flowers* in axillary or extra-axillary, few-flowered, trichotomous, paniculate cymes about 1 in. long; rachis glabrous, somewhat angular; bracts and bracteoles small, ovate, acute. *Calyx* .05 in. long, tube short; lobes 4, ovate, obtuse. *Corolla-tube* scarcely any; lobes in 2 pairs, oblong, .1 in. long. *Stamens*: filaments broad; anthers oblong, cells extrorsely dehiscent; connective apiculate. *Ovary* glabrous, conical; style very short; stigma bifid. *Drupe* (immature) obovoid, .3 to .4 in. long, seed apparently albuminous.

PERAK: *King's Collector* 3212, 6857, in dense jungle on high mountains at 3,500 to 4,000 feet.

This species is rather near *L. monticola*, Bl., but the leaves are narrower and the inflorescence longer.

#### 4. OLEA, Linn.

Trees or shrubs. *Leaves* opposite, entire or toothed. *Flowers* small; hermaphrodite, diœcious or polygamous; in axillary, rarely terminal trichotomous panicles; bracts small. *Calyx* short, 4-toothed or -lobed. *Corolla-tube* short; lobes 4, induplicate-valvate, sometimes 0. *Stamens* 2, on the corolla-tube or sub-hypogynous; filaments short; anthers ovate or oblong, cells dehiscent on the margin or slightly extrorse, in ♂ flowers sometimes introrse. *Ovary* 2-celled; ovules 2 in each cell, attached laterally to the septum or sub-pendulous; style short; stigma obtuse, capitate or bifid. *Drupe* ellipsoid or sub-globose; exocarp fleshy; endocarp bony or crustaceous, usually 1-seeded. *Seed* pendulous; testa thin; albumen fleshy, sometimes slightly ruminant; cotyledons flat, radicle superior.—DISTRIB. South Europe and Asia, tropical and South Africa, New Zealand; about 35 species.

Inflorescence more than 3 in. long; leaves oblong lanceolate,

acute, usually over 4 in. in length .. .. . 1. *O. dentata*.

Inflorescence under 3 in. long; leaves elliptic-lanceolate, acuminate,

under 4 in. in length .. .. . 2. *O. maritima*.

#### SPECIES IMPERFECTLY KNOWN.

Leaves 8 to 14 in. long; inflorescence extra-axillary on old wood;

drupes flattened .. .. . 3. *O. platycarpa*.

Leaves 2 to 3 in. long; inflorescence axillary or extra-axillary on

young wood; corolla-lobes linear, .1 in. long; drupes not known.. 4. *O. ardisioides*.

1. OLEA DENTATA, Wall. Cat. 2840 (1829). A tree, 40 to 60 feet high; branchlets light brown, smooth, innovations minutely pubescent. *Leaves* coriaceous; oblong-lanceolate, bluntly acute at apex, cuneate or rounded at base; glabrous on both surfaces, but when young pubescent on the nerves beneath; margins entire or distantly dentate, slightly recurved; 3.5 to 5.5 in. long, 1 to 2 in. broad; midrib slender, im-

pressed above, raised beneath; main-nerves obscure, 8 to 10 pairs, arching upwards to join in a looped nerve near the margin, impressed above; petiole  $\cdot 4$  in. long. *Flowers* in axillary or extra-axillary, leafy, tri-pinnate, minutely pubescent, paniculate cymes, 3 to 6 in. long, branches trichotomous, ultimate cymes umbellate; bracts leafy, oblong or lanceolate,  $\cdot 5$  to  $1\cdot 5$  in. long; pedicels slender,  $\cdot 05$  to  $\cdot 1$  in. long; bracteoles minute, ovate-acute. *Calyx* minutely pubescent,  $\cdot 05$  in. long; lobes 4, ovate, obtuse. *Corolla* tubular-campanulate,  $\cdot 15$  in. long; lobes 4, rounded,  $\cdot 05$  in. long. *Stamens* very small, inserted at the base of the corolla-tube; filaments very short; anthers ovoid, sub-extrorsely dehiscent. *Ovary* ovoid; style none; stigma capitate; cells 2, ovules 2 in each cell. *Drupe* not seen. A.DC. Prod. VIII. 286; Kurz in Journ. As. Soc. Beng. XLVI. ii. 245, and For. Fl. II. 157; Clarke in Hook. f. Fl. Br. Ind. III. 613.

PENANG: *Curtis* 222, 950, 2267.—DISTRIB. Burma.

2. *OLEA MARITIMA*, Wall. Cat. 2813 (1829). A large shrub or small tree; branchlets terete, pale brown; innovations minutely pubescent. *Leaves* coriaceous; elliptic-lanceolate, acuminate at apex, cuneate or somewhat rounded at base; glabrous on both surfaces; margins entire or distantly serrate on their upper half; 3 to 4 in. long, 1 to 2 in. broad; midrib slender, impressed above, raised beneath; main-nerves obscure, 7 to 10 pairs, meeting near the margin in a looped intramarginal nerve; reticulations scanty; petiole  $\cdot 2$  to  $\cdot 3$  in. long, minutely pubescent when young, finally glabrous. *Flowers* dull white, polygamous, in slender, minutely pubescent, trichotomous paniculate cymes with few branches; ultimate cymes umbellate, usually  $\cdot 75$  to 1 in. long in flower, up to  $1\cdot 5$  in. long in fruit, rarely axillary, usually extra-axillary; each pair of peduncles supported by a pair of ovate lanceolate leafy bracts  $\cdot 3$  to  $\cdot 5$  in. long; common peduncles  $\cdot 7$  in. long; pedicels  $\cdot 05$  to  $\cdot 1$  in. long, bracteoles none. *Calyx*  $\cdot 05$  in. long, minutely rusty-pubescent; tube short; lobes 4, ovate-acute, as long as tube. *Corolla* campanulate,  $\cdot 1$  to  $\cdot 15$  in. long; lobes 4, obtuse, as long as tube, induplicate-valvate, apparently absent in ♀. *Stamens*  $\cdot 07$  in. long, inserted near the base of the corolla-tube; filaments slender; anthers as long as filaments, reniform, cells sub-extrorsely dehiscent. *Ovary* conical; style none; stigma capitate; cells 2, ovules in each cell pendulous. *Drupe* globose,  $\cdot 2$  in. in diam., black when ripe, wrinkled when dry; exocarp thin, fleshy, endocarp crustaceous. *Seed* 1, testa very thin, albumen copious; cotyledons elliptic, nearly  $\cdot 1$  in. long; radicle somewhat thick. G. Don Gen. Syst. IV. 49; A.DC. Prod. VIII. 288; 288; Clarke in Hook. f. Fl. Br. Ind. III. 612; Miq. Fl. Ind. Bat. II. 547.

MALACCA: *Griffith* (K.D.) 3679; *Maingay* (K.D.) 1022; *Cuming* 2318; *Ridley* 3284, 10731. PAHANG: a common bush on the sandy heaths, *Ridley* in *Trans. Linn. Soc. Ser. 2. III. 319*. SINGAPORE: *Wallich* 2813; *Walker* 183; *Ridley* 3616A, 8420; *King's Collector* 1138; *Murton* 62.—DISTRIB. Malay Islands.

## SPECIES IMPERFECTLY KNOWN.

3. *OLEA PLATYCARPA*, King & Gamble, n. sp. A small tree with spreading branches, reaching 25 to 30 feet in height; branchlets stout, pale brown, smooth, marked by the prominent horse-shoe-shaped scars of fallen leaves. *Leaves* coriaceous; obovate-oblong or oblong-lanceolate, abruptly acuminate at apex, cuneate at base; glabrous on both surfaces and with scattered glands; margins entire, slightly recurved; 8 to 14 in. long, 3 to 5 in. broad; midrib very stout and prominent; main-nerves 14 to 16 pairs, curving upwards to join in a looped intramarginal nerve close to the margin; secondary nerves few; reticulations irregular, obscure; petiole 1 in. long, base enlarged, wrinkled. *Flowers* dioecious, in extra-axillary, sessile, paniculate, trichotomous cymes, usually on old wood, 1 to 1.5 in. long, supported by a cluster of sheathing scarious bracts; bracts of panicle branches and bracteoles ovate-acute; pedicels very short, stout, somewhat angular. *Calyx* short, .05 in. long; teeth (in ♀ flowers) ovate, obtuse, ciliate. *Corolla* none in ♀, ♂ not seen. *Ovary* conical, rugose; style 0; stigma 2-lobed, mitriform. *Drupe* ovate-oblong, flattened, .7 in. long, .5 in. broad; exocarp thick, wrinkled when dry; endocarp thick, granular; cells 2. *Seed* 1, pendulous from the summit of the thin central persistent septum; testa membranous; albumen thick, fleshy; cotyledons ovoid, .15 in. long, radicle rather stout.

PERAK: at low levels on the hills, *King's Collector* 5541, 7649; *Hervey*.

The absence of male flowers renders the identification of the genus of this plant somewhat uncertain, but we consider it belongs rightly to *Olea*.

4. *OLEA ARDISIODES*, King & Gamble, n. sp. A small tree; branches slender, terete, with yellowish bark; branchlets minutely pubescent. *Leaves* coriaceous; lanceolate, long acuminate at apex, cuneate at base; glabrous on both surfaces; margins entire, recurved; 2 to 3 in. long, .6 to .1 in. broad; midrib slender, impressed above, raised beneath; main-nerves 5 pairs, curving upwards to meet in a looped intramarginal nerve, obscure; secondary nerves and reticulations very obscure; petiole slender, .1 to .2 in. long. *Flowers* in axillary or extra-axillary

slender paniculate cymes, 1 to 2 in. long; rachis somewhat angular, minutely pubescent; bracts leafy, lanceolate, .5 to 1 in. long; bracteoles similar or sometimes subulate-spathulate; pedicels slender, .1 in. long, reflexed. *Calyx-tube* very short; lobes 4, ovate-acute, .025 in. long, ciliate. *Corolla-tube* .03 to .05 in. long; lobes 4, induplicate-valvate, linear, .1 in. long. *Stamens* 2, inserted at the base of the corolla-tube, .05 in. long; filaments slender; anthers elliptic, cells dehiscing laterally, connective mucronate. *Ovary* conical; style 0; stigma minute, bifid; cells 2. *Fruit* not seen.

PERAK: on Gunung Bubu, 5,000 feet, *Wray* 3871. PAHANG: *Barnes* 10896.

We have hesitated whether to describe this species as *Olea* or *Linociera*, for the corolla-tube is not very long, and the lobes are like those of the latter genus, but the character of the leaves is distinctly that of *Olea*.

### 5. MYXOPYRUM, Blume.

Large scandent shrubs with quadrangular branches. *Leaves* opposite, large, triplinerved, entire or denticulate. *Flowers* small, yellow, very numerous, in axillary and terminal trichotomous panicles. *Calyx-tube* short, lobes 4. *Corolla* fleshy; tube urceolate; lobes 4, concave, induplicate-valvate in bud. *Stamens* 2, inserted on the base of the corolla-tube; filaments very short; anthers rather large, ovate, cells dehiscing laterally. *Ovary* 2-celled; style very short or 0, stigma 2-lobed; ovules 1 to 2 in each cell, attached near the base at the inner angle. *Fruit* a 1-2-seeded sub-globose berry; pericarp crustaceous. *Seeds* 1 to 4, erect, testa membranous, albumen thick; cotyledons flat, ovate, radicle inferior.—DISTRIB. India and Malaya, 3 species.

MYXOPYRUM NERVOSUM, Blume Bijdr. 683 (1826). A large climbing shrub; branches with fibrous pale brown bark; branchlets prominently quadrangular. *Leaves* coriaceous; elliptic or elliptic-oblong or elliptic-lanceolate, acuminate at apex, cuneate or rounded at base; glabrous on both surfaces; margins entire or denticulate in the upper half, prominently recurved; 4 to 7 in. long, 1.5 to 3.5 in. broad; midrib thick, prominent beneath, impressed above; main-nerves 4 to 6 pairs, the lowest pair opposite, very prominent, starting a little above the base and forming an intramarginal nerve looped only after where it meets the rest at about two-thirds of the way up, the next pair not opposite and only starting from about half the length of the leaf; secondary nerves few, reticulations irregular, prominent in dry specimens; petiole .3 to .5 in. long, often twisted, channelled above, articulate at the base. *Flowers* sessile, in terminal or axillary or extra-axillary, trichotomous, minutely

pubescent panicles, 1·5 to 3 in. long; rachis angular, swollen at the nodes; bracts subulate, recurved, ·1 in. long; bracteoles triangular, minute. *Calyx-tube* very short; lobes 4, triangular, acuminate. *Corolla* yellowish- or greenish-white, fleshy; tube urceolate, ·05 to ·1 in. long; lobes oblong, incurved, ·05 in. long, induplicate-valvate in bud. *Stamens* 2, inserted on the tube of the corolla; filaments very short, broad; anthers ovate, rather large. *Ovary* ovoid; style 0; stigma 2-lobed; cells 2, ovules 2 in each cell, erect from a minute basal central placenta. *Berry* ovoid or globose, ·5 to ·7 in. in diam., rough, surmounted by the persistent stigma, blueish-black when ripe; cells 2. *Seeds* 2 to 4, erect on an enlarged placenta at the base of the central dissepiment; albumen fleshy, testa membranous. Mus. Bot. Lugd. Bat. I. 320, t. 51; A.D.C. Prod. VIII. 290; Miq. Fl. Ind. Bat. II. 549; Clarke in Hook. f. Fl. Br. Ind. III. 618.

PENANG: *Curtis* 2849. PERAK: *Wray* 2139, 2834, 4179; *Scortechini* 532, 598b; *King's Collector* 3584, 4544, 7392, 8845. MALACCA: *Main-gay* (K.D.) 996/3—DISTRIB. Sumatra (*Forbes* 1585, in the Lampongs); Java.

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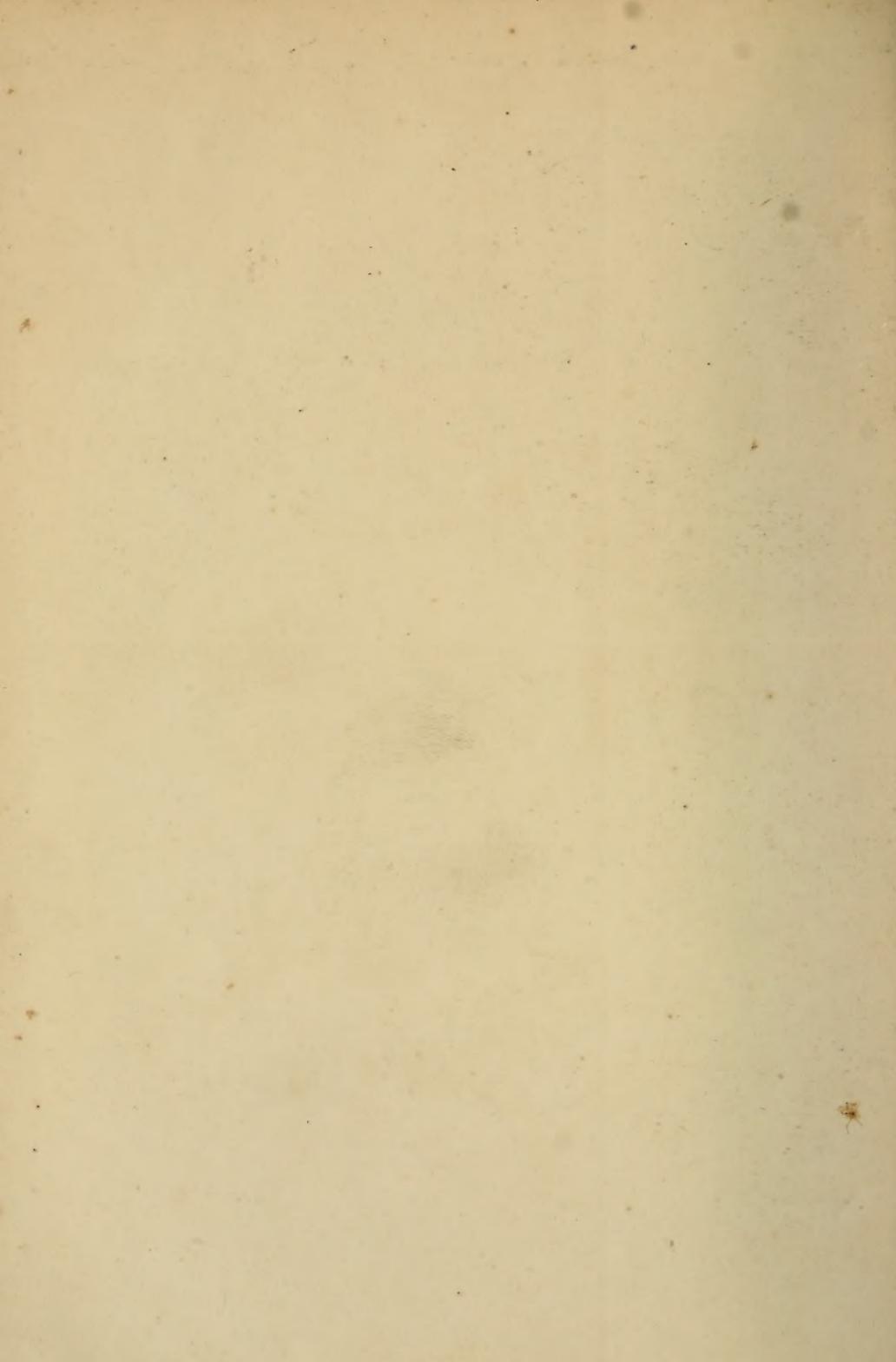












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