NEW SERIES. VOL. LXVI. CCCLXI.

BOOK NO.
935

JOURNAL

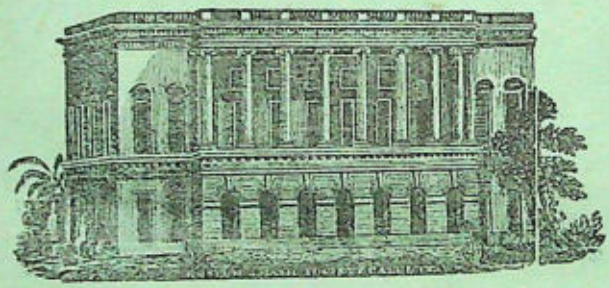
OF THE

ASIATIC SOCIETY OF BENGAL,

Vol. LXVI. Part II, No. 1.—1897.

EDITED BY

THE NATURAL HISTORY SECRETARY.



"The bounds of its investigation will be the geographical limits of Asia: and within these limits its inquiries will be extended to whatever is performed by man or produced by nature."—SIR WILLIAM JONES.

*** *Communications should be sent under cover to the Secretaries, Asiat. Soc., to whom all orders for the work are to be addressed in India; or care of Messrs. Luzac & Co., 46, Great Russell Street, London, W. C., or Mr. Otto Harrassowitz, Leipzig, Germany.*

CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS,

AND PUBLISHED BY THE

ASIATIC SOCIETY, 57, PARK STREET.

1897.

30 (exclusive of postage) to Subscribers, Re. 1-8.—To Non-Subscribers, Rs. 2.
Price in England, 3 Shillings.

Issued June 8th, 1897.

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SUS PHI

JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.

Vol. LXVI. Part II.—NATURAL SCIENCE.

No. I.—1897.

terials for a Flora of the Malayan Peninsula.—By GEORGE KING, LL.D., F.R.S., C.I.E., *Superintendent of the Royal Botanic Garden, Calcutta.*

No. 9.

With the last part of these *Materials* the account of the *Discifloræ* the Malayan Peninsula was concluded; and in the present part that f the *Calycifloræ* is begun. My progress has (owing to the press of icial and of other work) been even slower than I anticipated when I gan the publication of these *Materials* now more than seven years o. I therefore invoked the aid of my excellent friend and colleague . D. Prain, and he, in response to my appeal, generously undertook e elaboration of the important family of *Leguminosæ* which forms so rge a portion of the present paper. It is hoped that one more con- ibution similar in size to the present one will suffice to complete the ccount of the *Calycifloræ*, and so to bring the whole series about half way towards completion.

Order XXXVII. CONNARACEÆ.

Erect or climbing shrubs or trees. *Leaves* alternate, exstipulate, -3-foliolate or unequally-pinnate; leaflets quite entire. *Flowers* in cemes panicles or cymes, regular or subregular, usually bisexual. *alyx* 5-lobed or -partite, usually persistent, imbricate or valvate. *Petals*

5, usually narrow, free or slightly cohering, very rarely valvate. *Stamens* perigynous or hypogynous, sometimes declinate, 5 or 10, those opposite the petals often shorter and imperfect; filaments often connate at the base. *Disc* 0 or small, annular or incomplete. *Pistils* 5, rarely 1–3 or 6–7, ovoid, hirsute, 1-celled; styles subulate or filiform, stigmas capitellate, simple or 2-lobed; ovules 2, collateral, ascending, orthotropous. *Fruit* usually of 1, rarely 2–3, sessile or stalked, 1- rarely 2-seeded follicles. *Seed* erect, usually arillate, testa thick, usually more or less covered by an arillus which is often very thin; cotyledons fleshy in the exalbuminous, leafy in the albuminous seeds; radicle superior, rarely ventral.—Distrib. 14 genera, all tropical.

Seeds exalbuminous, arillate.	
Pistils solitary.	
Leaves pinnate, leaflets 3 to 11; trees or scandent shrubs	1. Connarus.
Leaflet solitary, small trees or shrubs, never scandent	2. Ellipanthus.
Pistils 5 but usually only 1 perfect: leaves pinnate, (leaflet solitary in one species of *Rourea*).	
Flower-pedicels ebracteolate: follicle curved; lobes of calyx persistent, slightly accrescent, imbricate and forming a cup at the base	3. Rourea.
Flower-pedicels with persistent bracteoles at their bases, follicle not curved; calyx-lobes persistent, but neither accrescent nor imbricate	4. Roureopsis.
Pistils 2 to 5, perfect.	
Calyx imbricate; follicles rugose, laminate or tubercled	5. Agelæa.
Calyx valvate; follicles neither rugose laminate nor tubercled	6. Tæniochlæna.
Seeds albuminous, pistils 5 to 7, follicles 1 to 3, arillus thin	7. Cnestis.

1. Connarus, Linn.

Trees or (usually scandent) shrubs. *Leaves* unequally pinnat leaflets 5, rarely 3 or more, quite entire. *Panicles* axillary and termin branched. *Flowers* small. *Sepals* 5, deciduous or persistent and cla ing the pedicel of the capsule but not accrescent, imbricate. *Petal* linear or slightly dilated upwards. *Stamens* 10, 5 shorter and sometim without anthers. *Ovary* 1, densely pubescent, style slender, stig capitellate. *Capsule* oblique, stipitate, inflated, broader upwards; valv glabrous or pubescent within. *Seeds* arillate, testa shining, albumen 0 cotyledons amygdaloid.—Distrib. Species about 80, all tropical.

Petals minute, much shorter than the sepals	1. *C. Maingayi*.
Petals longer than the sepals.	
Under surfaces of the leaflets and the follicles externally densely rusty-pubescent, upper surfaces of leaflets sparsely pubescent	2. *C. ferrugineus*.

Under surfaces of leaflets pubescent, upper surfaces and adult follicles externally glabrous ... ... 3. *C. semidecandrus.*
Both surfaces of the leaflets quite glabrous.
Leaflets ovate-lanceolate or elliptic-lanceolate, acuminate, 2 to 4 in. long.
Follicles sub-cylindric, tapering at the ends, not compressed, minutely sericeous inside ... ... 4. *C. oligophyllus.*
Follicles compressed, sparsely stellate-hairy inside .. 5. *C. hebephyllus.*
Leaflets broadly ovate with very rounded bases; petals pubescent; follicles 1·5 in. long, pubescent inside ... 6. *C. nicobaricus.*
Leaflets elliptic-oblong or elliptic, 3 to 12 in. long; petals glabrous.
Main nerves of leaves 6 or 7 pairs; follicles 1·25 to 1·4 in. long, sericeous inside .. .. 7. *C. gibbosus.*
Main nerves of leaves 9 or 10 pairs; follicles 1·5 to 1·75 in. long, sericeous inside ... ... 8. *C. grandis.*
Main nerves of leaves 5 pairs; follicles 2·5 in. long, pubescent inside ... ... 9. *C. ellipticus.*

1. Connarus Maingayi, Hook. fil. Fl. Br. Ind. II, 53. A small tree; young branches minutely rusty-tomentose. *Leaves* 6 to 8 in. long, their rachises densely and minutely tomentose; leaflets 7 to 9, coriaceous, elliptic-oblong, obtusely and shortly acuminate, the base rounded or sub-cuneate, both surfaces distinctly reticulate when dry, the upper glabrous, the lower paler and sparsely adpressed-pubescent, the midrib tomentose; main nerves 7 to 11 pairs, spreading, faint; length 2·25 to 3·25 in., breadth 1 to 1·35 in., petiolules ·1 to ·15 in. *Panicles* axillary and terminal, longer than the leaves, densely and minutely rusty-tomentose; the branches short, spicate, with the flowers clustered near the apices. *Flowers* about ·15 in. long, and the same in diameter, on pedicels shorter than themselves. *Sepals* oblong, laterally inflexed at the apex, hoary-pubescent outside, glabrous inside, connivent. *Petals* minute, much shorter than the sepals and shorter than the stamens, pale-pubescent in front. *Stamens* 10; the anthers almost sessile, broadly ovate, glabrous. *Pistil* solitary, the ovary sericeous like the disc, the style short and stout. *Fruit* not seen.

Perak; King's Collector, No. 3106.

This is readily distinguished from every *Connarus* described here by its very minute petals. In leaves it approaches *C. oligophyllus*, but is distinguished from that by its pinnate nervation.

2. Connarus ferrugineus, Jack in Mal. Misc. 2, VII, 37. A sarmentose shrub or powerful woody climber as much as 80 feet long; young branches, petioles, rachises, under-surfaces of leaves and inflorescence densely rusty-tomentose. *Leaves* 8 to 16 in. long; leaflets 5 to 11, coriaceous, oblong-lanceolate or oblong-oblanceolate, shortly acumi-

nate, narrowed in the lower fourth to the rounded or sub-cordate base; upper surface rugose and, even when adult, clothed with sparse thin hairs; when old glabrous, the midrib and nerves depressed and tomentose; under-surface rusty-tomentose; main nerves 6 or 7 pairs, oblique, curved, prominent beneath; length 3 to 6 in., breadth 1·25 to 2 in., petiolules ·1 to ·15 in. *Panicles* terminal, shorter or longer than the leaves; the branches rather short, stout. *Flowers* crowded, ·3 in. long, on pedicels much shorter than themselves. *Sepals* oblong-ovate, tomentose outside, glabrous inside. *Petals* linear-oblong, glabrous. *Stamens* 10, alternately long and short, the filaments glabrous. *Ovary* oblong, tomentose, style short. *Follicle* obovoid-oblong, shortly apiculate, tapering to the base, red when ripe, densely rusty-tomentose, 1·75 to 2·25 in. long and ·8 to 1·25 in. broad; pericarp woody, densely sericeous inside. *Seed* narrowly oblong, 1 in. long and ·6 in. broad, black, shining, with a basal incomplete arillus ·5 in. long. Planchon in Linnæa, Vol. XXIII, 429; Hook. fil. Fl. Br. Ind. II, 51. *Tricholobus ferrugineus*, Blume Mus. Bot. Lugd. Bat. I. 237. *Connaracea*, Wall. Cat. 8530.

In all the provinces except the Andaman and Nicobar Islands.—DISTRIB. Sumatra.

I see no character to separate Blume's genus *Tricholobus* from *Connarus*, and I therefore follow Sir Joseph Hooker in adhering to Jack's name for this plant.

3. CONNARUS SEMIDECANDRUS, Jack in Mal. Misc. 2, VII, 39. A sarmentose or often scandent shrub; young branches deciduously puberulous. *Leaves* 6 to 9 in. long, their rachises and the under-surfaces of the leaflets with their petiolules pubescent or puberulous; leaflets 5 to 7, thinly coriaceous, oblong to elliptic-lanceolate, shortly caudate-acuminate, the base cuneate or rounded; upper surface quite glabrous; the lower reticulate, the pubescence often deciduous with age; main nerves 6 or 7 pairs, prominent on the lower surface, spreading but curving upwards, the lower pair very oblique; length 2·5 to 4·5 in., breadth ·9 to 2·5 in., petiolules ·15 in. *Panicles* axillary and terminal, longer than the leaves, much branched, densely and minutely rusty-tomentose. *Flowers* rather crowded, ·2 in. long, on pedicels shorter than themselves. *Sepals* oblong, obtuse, concave, pubescent outside, shorter than the glabrous linear-oblong petals. *Stamens* 10, in two rows, one row very short, the other with its filaments dilated at their bases and as long as the petals. *Pistil* single, shorter than the stamens, the ovary hairy; the style short, stout, pubescent; stigma sub-capitate. *Follicles* falcate, obovoid, compressed, with a short abrupt apical point, narrowed to a stalk at the base, at first rusty-pubescent, afterwards glabrous, obliquely striate, about ·75 to ·9 in. long and ·5 in. broad; pericarp thin, sparsely

sericeous internally. *Seed* with a short basal arillus. Hook. fil. Fl. Br. Ind. II, 52; Kurz For. Flora Burma, II, 326. *Connarus floribundus*, Wall. Cat. 8543 (in part), 8541, B.

In all the provinces except the Nicobars and Andamans.—DISTRIB. Sumatra.

This species is easily distinguished when in fruit by the small size of its follicles. But, while in flower, it is not easy to separate it from *C. gibbosus*, Wall.; the only distinctions that I can find being that, in the latter, the follicles are larger than in this, and that the leaflets are quite glabrous on both surfaces.

4. CONNARUS OLIGOPHYLLUS, Wall. ex Planch. in Linnæa, XXIII, 427. Scandent, glabrous except the inflorescence. *Leaves* 6 to 8 in. long; leaflets 3 to 5, coriaceous, elliptic-lanceolate to elliptic-oblong, sub-acute or shortly and bluntly acuminate, the base cuneate or rounded; upper surface shining; the lower paler, dull; main nerves 4 or 5 pairs, ascending (especially the lower 2 pairs), curved, slightly prominent on the lower surface, very faint on the upper; length 2·25 to 4 in., breadth 1 to 2 in., petiolules ·25 to ·3 in. *Panicles* terminal and longer than the leaves or lateral and shorter, sub-pyramidal, much branched, minutely rusty-pubescent, many-flowered. *Flowers* ·35 in. long, sub-sessile or on short pedicels. *Sepals* ovate-lanceolate, acute, much shorter than the oblong obtuse puberulous petals; perfect ovary 1, flask-shaped, puberulous. *Follicle* nearly straight, not compressed, cylindric, tapering to each end, glabrous and vertically striate (when dry) outside, the pericarp coriaceous, minutely sericeous internally, 1·5 to 2 in. long and ·75 in. in diam. at the middle. *Seed* shining, black. Hook. fil. Fl. Br. Ind. II, 53. *Connaracea*, Wall. Cat. 8542 (*in part*) and 8539 D. (*in part*).

Penang; Porter. Perak; Wray, No. 1942. King's Collector, Nos. 5232, 5613, 7804, 8335, 8432. Scortechini, No. 1057. Singapore; Ridley, No. 5904. Malacca; Maingay, Nos. 506, 508/2, 513.

5. CONNARUS HEREPHYLLUS, n. spec. King. A powerful climber; young branches deciduously rusty-pubescent; the bark pale, sparsely lenticellate. *Leaves* 6 to 12 in. long, their rachises glabrous; leaflets coriaceous, ovate-lanceolate, acuminate, the base rounded or slightly cuneate; both surfaces glabrous, dull, the lower pale and faintly reticulate; main nerves 6 or 7 pairs, spreading, curving upwards; length 2 to 4 in., breadth ·75 to 1·35 in.; petiolules about ·2 in., rugulose, glabrous, pale. *Panicles* terminal and axillary, shorter than the leaves in flower, as long as or longer than them in fruit; the branches short, densely rusty-tomentose. *Flower-buds* obovate, on short pedicels. *Calyx* densely rusty-tomentose outside. *Petals* glabrous. *Stamens* 5 long and 5 minute. *Follicles* when young rusty-tomentose, when ripe

glabrous externally except along the suture, broadly oblong, blunt at both ends, somewhat compressed, obliquely striate, attenuated to a very short grooved pseudo-stalk, rosy-red when ripe, sparsely stellate-hairy inside; length 1·25 in., breadth ·85 in.; the pericarp thin, coriaceous, glabrous inside. *Seed* narrowly oblong, blunt, with a short arillus at its base.

Perak; Wray, No. 1858. King's Collector, Nos. 5586, 6517, 7519.

6. CONNARUS NICOBARICUS, King n. spec. Scandent, woody, all parts except the inflorescence glabrous; young branches with pale smooth bark. *Leaves* 8 to 10 in. long; leaflets thinly coriaceous, 3 to 5, broadly ovate with a very short blunt apical point, the base broad and rounded; upper surface slightly shining, the lower duller and paler; main nerves 6 or 7 pairs, faint, curving upwards; length of lateral leaflets 2·75 to 4·5 in., breadth 1·5 to 2·75 in.; petiolules about ·25 in., the terminal leaflet larger. *Panicles* terminal (probably also axillary), nearly as long as the leaves, rusty-pubescent, the branches sub-erect. *Flowers* crowded near the ends of the branchlets, ·35 in. long, on pedicels much shorter than themselves. *Calyx-segments* ovate, tomentose outside, glabrous inside, about one-fourth as long as the corolla. *Petals* linear, pubescent on both surfaces. *Stamens* 10, in two rows, the longer row much shorter than the style and petals; filaments sparsely pubescent, swollen near the base. *Pistil* as long as the petals; the ovary broadly ovoid, tomentose; style sparsely pubescent. *Stigma* sub-capitate. *Follicle* broad, sub-compressed, obtuse, glabrous, faintly striate longitudinally, 1·5 in. long, and nearly 1 in. broad, pubescent inside.

Nicobar Islands; King's Collectors.

Allied to *C. gibbosus*, Wall., but with pubescent petals and larger follicles which are pubescent inside.

7. CONNARUS GIBBOSUS, Wall. Cat. 8541 (*in part*). A large semi-scandent shrub; young branches deciduously rusty-puberulous. *Leaves* 6 to 9 in. long, quite glabrous; leaflets 3 to 5, thinly coriaceous, elliptic or elliptic-oblong, very shortly and obtusely acuminate, the base rounded; both surfaces shining, the lower reticulate; main nerves 6 or 7 pairs, spreading but curving upwards, the lower pairs very oblique, slightly prominent on the lower surface; length 3 to 5 in., breadth 1·25 to 2·5 in., petiolules ·2 to ·3 in. *Panicles* axillary and terminal, shorter than or as long as the leaves, many-branched, rusty-pubescent. *Flowers* rather crowded on the short ultimate branchlets, ·25 in. long, on pedicels shorter than themselves. *Sepals* and *petals* as in *C. semidecandrus*. *Stamens* 10, the one row only slightly shorter than the other. *Pistil* longer than the stamens and petals; the ovary ovate-rotund, rusty-tomentose, the style pubescent; stigma sub-capitate. *Follicles*

sub-rhomboidal, compressed, with a short stout apical point, glabrous, obliquely striate; pericarp leathery inside, sericeous, 1·25 to 1·4 in. long, and about 1 in. broad, the stalk ·4 in. long. *Seed* nearly 1 in. long, oblong, blunt at both ends, black, with an arillus obliquely covering its lower half. Hook. fil. Fl. Br. Ind. II, 52; Kurz For. Flora Burma, II, 326.

The Andaman Islands.—DISTRIB. Burma.

This may be distinguished from *C. semidecandrus* by its larger follicles, and larger seeds much more extensively covered by arillus. The inner surface of the pericarp in this is glabrous; in *C. semidecandrus* it is sparsely sericeous.

8. CONNARUS GRANDIS, Jack in Mal. Misc. 2, VII, 40. Scandent, all parts except the inflorescence quite glabrous. *Leaves* 9 to 12 in. long, their rachises stout; leaflets 3 to 5, very coriaceous, elliptic-oblong, acute or obtusely acuminate, the base rounded or sub-cuneate; both surfaces, but especially the upper, shining, the lower reticulate when dry; main nerves 9 or 10 pairs, oblique, faint; length 4 to 12 in., breadth 1·5 to 4 in.; petiolules of the lateral leaflets about ·5 in., of the terminal ·75 in. *Panicles* often as long as the leaves, terminal or axillary, spreading, with a few spike-like branches, rusty-tomentose. *Flowers* sessile, ·25 in. long *Sepals* tomentose outside, linear-oblong, obtuse. *Petals* twice as long, linear, dilated upwards, glabrescent. *Filaments* puberulous. *Follicles* obliquely ovoid, sub-rhomboidal, compressed, glabrous, slightly and obliquely rugulose when dry, tapering to a short pseudo-stalk, 1·5 to 1·75 in. long, and about 1 in. broad; pericarp woody, sericeous inside. Planchon in Linnæa, XXIII, 429; Hook. fil. Fl. Br. Ind. II, 53. *C. Wallichii*, Planch. l. c. 426; Kurz For. Flora Burma, I, 328. *Connaracea*, Wall. Cat., 8538 A. B. (*in part*).

In all the provinces except the Nicobars and Andamans.

9. CONNARUS ELLIPTICUS, King n. spec. Scandent; young branches deciduously rusty-pubescent, the bark dark and polished. *Leaves* 8 to 15 in. long, everywhere glabrous; leaflets coriaceous, 3 to 5, elliptic-oblong to elliptic, acute or shortly acuminate, the base rounded or sub-cuneate, upper surface very shining when dry; the lower paler, reticulate and less shining; main nerves 5 pairs, oblique, rather prominent beneath; length 4·5 to 7 in., breadth 2 to 3 in.; petiolules ·2 to ·3 in., rugulose, pale. *Panicles* axillary and shorter, or terminal and longer than the leaves, minutely rusty-pubescent, the branches obliquely spreading, the ultimate branchlets short. *Flowers* ·25 in. long, on pedicels slightly shorter than themselves. Segments of the *calyx* ovate-lanceolate, acute, rusty-tomentose outside, glabrescent inside, about as long as the pistil and half as long as the linear acute glabrous petals. *Stamens* 5 perfect nearly as long as the petals, and 5 abortive (without

anthers) shorter than the pistil; filaments glabrescent or glabrous, those of the perfect stamens dilated at the base. *Ovary* pubescent, *style* glabrous, *stigma* discoid-capitate. *Follicles* broad, obliquely subrhomboid, tapered to the base, the dorsal suture straight and ending in a conical point, the ventral compressed and widely curved, glabrous, red when ripe, 2·5 in. long and 1·5 in. broad; pericarp woody, adpressed-pubescent on its inner surface. *Seed* oblong, flat; the testa black, half covered by a thin basal arillus. *Erythrostigma ellipticum*, Zoll. in Tijdsch. Ned. Ind. XIV, 174.

Singapore; Ridley, No. 1380. Perak; King's Collectors, Nos. 4090, 4943, 5958, 7480, 8435. Wray; Nos. 1831, 2870, 2873; Scortechini, No. 1689. Penang; Curtis.

There is a specimen in the Calcutta Herbarium collected by Kurz in the Buitenzorg garden what exactly agrees with this. That specimen is named *Erythrostigma ellipticum* Zoll.; and it is on the strength of this identification of Kurz's that I have included this synonym here. For Zollinger (who refers the genus *Erythrostigma* to *Anacardiaceæ*) defines his three species (l. c.) *E. ellipticum*, *E. obliquum* and *E. villosum* so briefly and imperfectly, that it is quite impossible, from his descriptions alone, to identify any of them.

2. Ellipanthus, Hook. f.

Trees or erect shrubs. *Leaves* with 1 leaflet, quite entire. *Racemes* or *cymes* axillary, short. *Flowers* hermaphrodite or polygamous. *Sepals* 5, not enlarged in fruit, sub-erect, valvate. *Petals* 5, longer than the sepals, oblong-lanceolate, densely pubescent. *Stamens* 10, 5 shorter without anthers; filaments short, subulate, connate at the base. *Ovary* 1, pubescent; style short. *Follicle* stalked, oblique, velvetty; valves glabrous within. *Seed* arillate, albumen 0; cotyledons plano-convex.—Distrib. 12 species; Malayan Peninsula and Islands.

Both surfaces of leaves quite glabrous.	
Leaflet narrowly elliptic-oblong, tapering to each end; follicles ·5 in. long	1. *E. Scortechinii.*
Leaflet elliptic-ovate to elliptic; follicle 1 in. long ...	2. *E. calophyllus.*
Under surfaces of leaves hairy.	
Leaflet oblong-lanceolate, 2·5 to 3·5 in. long; flowers in short panicles	3. *E. Curtisii.*
Leaflets ovate- or oblong-elliptic to elliptic, 4 to 6 in long.	
Flowers in racemes, follicle with a pseudo-stalk only ·2 in. long	4. *E. Griffithii.*
Flowers in dense capituloid cymes; follicle gibbous at the base on one side, its pseudo-stalk about 1 in. long ..	5. *E. gibbosus.*

1. Ellipanthus Scortechini, King n. spec. A small tree; young branches with pale cinereous bark, pubescent. *Leaflet* thinly coriaceous, narrowly elliptic-oblong, tapering from the middle to either end, the

apex caudate-acuminate; both surfaces glabrous, the upper shining; the lower dull, minutely reticulate; main nerves 4 pairs, curved, ascending, prominent on the lower surface; length 4·5 to 7 in., breadth 1·25 to 2 in., petiole ·1 to ·15 in. *Cymes* axillary, very short, tawny-tomentose. *Calyx* thick; the lobes deep, ovate, obtuse, cinereous-tomentose. *Petals* slightly longer than the calyx, membranous. *Follicles* cinereous-tomentose, obliquely elliptic, sub-compressed, grooved along the suture, almost straight, the apex rather blunt with an abrupt small apiculus, the base slightly and suddenly contracted into a short stout pseudo-stalk covered by the persistent calyx; length ·5 in., breadth ·3 in.; pericarp thick, glabrous inside. *Seed* oblong with a large hilum and thin arillus.

Perak; Scortechini No. 607.

Gathered only by the late Father Scortechini whose specimens are in fruit, and from whose field notes the foregoing description of the flower has been taken.

2. Ellipanthus calophyllus, Kurz Andam. Report, Append. B. 6. A small tree; young branches slender, glabrous. *Leaflet* coriaceous, elliptic to elliptic-ovate, sometimes oblong-lanceolate, shortly caudate-acuminate, the base rounded or slightly and abruptly cuneate; both surfaces glabrous; the upper shining when dry; the lower dull, minutely reticulate; main nerves 4 or 5 pairs, spreading, curving upwards, inter-arching freely; length 4·5 to 6·5 in., breadth 2 to 2·25 in.; petiole ·75 to 1 in., the joint near the apex. *Cymes* axillary, shorter than the petioles, minutely tawny-tomentose. *Flowers* ·3 in. long, on pedicels shorter than themselves. *Calyx lobes* broadly ovate, sub-acute, tawny-tomentose outside, less than half as long as the linear-oblong densely velvetty obtuse petals. *Stamens* the 5 perfect shorter than the petals and with very pubescent filaments; the 5 abortive much shorter and more slender, anantherous. *Ovary* narrowly ovoid, sericeous. *Style* rather short, stigma sub-capitate. *Follicles* obovoid or ellipsoid, slightly compressed, blunt, rusty-tomentose, 1 in. long; pericarp thick, woody, glabrous within: Kurz Journ As. Soc. Beng. 1872, Pt. II, 305; For. Flora Burma I, 329; Hook. fil. Fl. Br. Ind. II, 55.

Andaman Islands; Kurz, King's Collectors.

3. Ellipanthus Curtisii, King n. spec. A tree; young branches rusty-puberulous, the bark dark. *Leaflet* thinly coriaceous, oblong-lanceolate, tapering to each end, the apex caudate-acuminate; upper surface glabrous, shining; the lower reticulate, sparsely pubescent, the midrib tomentose; main nerves 7 or 8 pairs, curving obliquely upwards, prominent beneath; length 2·5 to 3·5 in., breadth ·8 to 1·5 in., petiole ·3 in., tomentose. *Panicles* axillary, branching from the base, ·5 to ·7 in. long, sericeous. *Flowers* ·2 in. long, on pedicels shorter than themselves. Segments of the *calyx* ovate-lanceolate, thick, tomentose on the outer,

glabrescent on the inner surface, less than half as long as the petals and pistil. *Petals* narrowly oblong, sub-acute, pubescent on the outer, glabrescent on the inner surface. The 5 fertile *stamens* as long as the ovary, glabrous, the anthers broadly ovate, the filaments much dilated at the base, the 5 alternate much smaller and without anthers. *Ovary* oblong, sericeous-tomentose, longer than the stout pubescent style; stigma capitate-discoid. Fruit unknown.

Penang; Curtis Nos. 1014, 1097.

The nearest ally of this appears to be the imperfectly known *E. Helferi*, Hook. fil. from Tenasserim, of which the type is Helfer's No. 1253; but the leaves of this are much more pubescent on the lower and more shining on the upper surface. The flowers of this are moreover larger.

4. Ellipanthus Griffithii, Hook. fil. Fl. Br. Ind. II, 56. A small tree? Young branches slender, rusty-pubescent. *Leaflet* thinly coriaceous, ovate-elliptic, caudate-acuminate, the base abruptly sub-cuneate; upper surface glabrous, shining, the lower sparsely rusty-pubescent, the midrib and nerves almost tomentose; main nerves 9 or 10 pairs, spreading, interarching, prominent beneath; length 4 to 5 in., breadth 1·5 to 2 in., petiole ·2 to ·25 in. *Racemes* ·25 in. long, few-flowered; calyx deeply divided into 5 ovate-lanceolate teeth, adpressed-pubescent. Follicles compressed, much curved, the apex beaked, narrowed at the base to a pseudo-stalk ·2 in. long which is embraced by the persistent calyx, rufous tomentose outside, ·75 in. long; the pericarp coriaceous, glabrous inside.

Mallacca; Griffith No. 1253.—Distrib. Borneo.

5. Ellipanthus gibbosus, King n. spec. A small tree; young branches slender, rusty-tomentose. *Leaflet* elliptic or oblong-elliptic, sometimes slightly obovate, shortly and rather abruptly caudate-acuminate, the base cuneate; upper surface quite glabrous; the lower sparsely adpressed-pubescent, the midrib densely so; main nerves 7 or 8 pairs, spreading but curved upwards, prominent on the lower surface when dry; length 4·5 to 6·5 in., breadth 1·75 to 2·75 in., petiole ·5 or ·6 in. long, tomentose, stout, the joint near the apex. *Flowers* ·15 in. long, in dense many-flowered capituloid axillary cymes, sub-sessile. *Calyx-teeth* lanceolate, tawny-tomentose externally, glabrous internally. *Petals* broader than the sepals and sometimes also longer, imbricate, tomentose outside, glabrous inside. *Stamens* 5 or 6 fertile with broadly ovate anthers, and 5 alternate smaller and abortive; the filaments of all united by their expanded bases. *Ovary* villous, style about as long as the stamens, stigma discoid. *Follicle* narrowly oblong, compressed, the apex produced into a long conical beak; the base gibbous at one side, contracted below the gibbosity into a curved pseudo-stalk about an inch

long, everywhere pale rusty-tomentose; length of follicle and beak equal to that of the pseudo-stalk; pericarp leathery, glabrous inside. *Seed* arillate at the base, testa black.

Perak; very common, Scortechini, Wray, Curtis, King's Collectors.

3. Rourea, Aubl.

Scandent or sarmentose shrubs. *Leaves* unequally pinnate, sometimes with only one leaflet; leaflets subopposite or alternate. *Racemes or panicles* axillary. *Flowers* small; pedicels usually slender. *Sepals* 5, orbicular, imbricate, enlarged and clasping the base of the ripe capsule. *Petals* 5, usually linear-oblong. *Stamens* 10; filaments connate at the base. *Ovaries* 5, 4 usually imperfect; style slender. *Follicle* sessile, curved. *Seed* erect, arillate, exalbuminous.—Distrib. Tropics; species about 52.

Leaflets not more than 7, petiolulate, glabrous.
- Leaves with usually a single leaflet ... ... 1. *R. anomala.*
- Leaves with 3 to 9, rarely 11, leaflets; inflorescence ebracteolate, or the bracteoles (if any) fugacious.
  - Leaflets glaucous on the lower surface ... ... 2. *R. acuminata.*
  - Leaflets not glaucous on the lower surface.
    - Leaves 8 to 12 in. long; leaflets elliptic-lanceolate to elliptic, their main nerves 2 to 5 pairs, curving abruptly upwards; flowers ·35 in. in diam., in racemes or panicles, flower buds ovoid ... ... 3. *R. commutata.*
    - Leaves 3 to 7 in. long; leaflets ovate-lanceolate, their main nerves 4 or 5 pairs, faint, spreading; flowers ·25 in. in diam.; flower buds ovoid ... ... 4. *R. pulchella.*
    - Leaves 3·5 to 6 in. long; leaflets 3 rarely 5, broadly ovate or ovate-orbicular with broad rounded bases; their main nerves about 4 pairs, spreading, faint; flower-buds globose ... ... 5. *R. humilis.*

Leaflets very numerous (17 to 40), small, sessile, oblong.
- Leaflets shortly and bluntly acuminate, pubescent beneath... 6. *R. rugosa.*
- Leaflets bifid at the apex, minutely dotted and sparsely pubescent beneath ... ... 7. *R. parallela.*
- Leaflets with obtuse rounded apices.
  - Lower surface of leaflets rusty-sericeous ... ... 8. *R. fulgens.*
  - Lower surface of leaflets minutely dotted, reticulate, glabrous ... ... 9. *R. concolor.*

1. Rourea anomala, King n. spec. A powerful woody perfectly glabrous creeper. *Leaves* either simple or ternate; leaflets coriaceous, ovate-elliptic to broadly ovate, shortly and bluntly caudate-acuminate, the base rounded and usually broad; both surfaces shining and minutely reticulate when dry; main nerves about 6 pairs, curving upwards,

faint; length of the simple leaves and of the terminal leaflet of the ternate leaves 3·25 to 4·5 in., breadth 1·6 to 2·2 in.; petiolules about ·2 in., those of the lateral leaflets shorter. *Racemes* slender, shorter than the leaves, in fascicles in the leaf-axils, laxly-flowered. *Flowers* ·35 in. long, on slender pedicels of about the same length. *Segments of calyx* ovate-orbicular, sub-oblique, puberulous outside, their edges ciliate, only about one-third of the length of the linear-oblong glabrous petals. *Stamens* much shorter than the petals and than the glabrous pistils. *Follicles* obliquely ovoid, sub-compressed, blunt, yellowish with a red tinge when ripe, 1 in. long. *Seed* with a soft red arillus.

Penang; Curtis No. 504. Perak; King's Collector Nos. 804, 953, 3066, 3866, 4527, 4622, 6755, 8312, 10542, 10863. Wray, No. 3799; Scortechini.

This resembles *R. simplicifolia* Bl. in having both simple and compound leaves; but that is a smaller plant with puberulous inflorescence, and different follicles.

2. Rourea acuminata, Hook. fil. Fl. Br. Ind. II, 48. A powerful woody perfectly glabrous creeper often over 100 feet long; young branches glabrous, often minutely lenticellate. *Leaves* 3 to 9 in. long, the rachis slender; leaflets 5 to 11, thinly coriaceous, oblong, lanceolate or elliptic-oblong, sometimes somewhat obovate, abruptly shortly and bluntly caudate-acuminate, slightly narrowed to the rounded base or with broad minutely cordate base; upper surface shining, the lower dull and glaucous, both minutely reticulate when dry; main nerves about 5 pairs, very faint, spreading; length 1·5 to 2·25 in., breadth ·65 to ·9 in.; petiolules under ·1 in., the terminal one slightly larger. *Racemes* very slender, lax, several from an axil. *Flowers* ·3 in. long, on slender pedicels of about the same length. *Sepals* ovate-rotund, about half as long as the narrowly oblong glabrous sepals, glabrous, the edges minutely ciliolate. *Stamens* shorter than the petals and glabrous pistils. *Follicle* narrowly ovate, curved, pointed, ·75 in. long, when ripe red tipped with yellow. *Cuestis acuminata*, Wall. Cat. 8533.

Singapore; Wallich. Perak; King's Collector Nos. 866, 4271, 6987, 7781, 10599, 10871.

3. Rourea commutata, Planch. in Linnaea, XXIII, 420. Shrubby, scandent; young branches puberulous becoming glabrous, sometimes minutely lenticellate. *Leaves* 8 to 12 in. long, glabrous; leaflets 3 to 7, thinly coriaceous, sub-opposite, elliptic-lanceolate to elliptic, sub-obtusely caudate-acuminate, the base rounded, both surfaces shining; main nerves 2 to 5 pairs, curved, rather abruptly ascending; length 2·5 to 6 in., breadth 1·35 to 2·25 in.; petiolules ·15 to ·2 in., the terminal one larger. *Flowers* ·35 in. in diam., in glabrous racemes or racemoid panicles much shorter than the leaves and clustered in their axils, pedicels

shorter than the flowers. *Sepals* broadly ovate, blunt, pubescent. *Petals* linear-oblong, broadly ovate. *Stamens* 10, alternately shorter than the filaments, expanded towards the base and united by their edges; ovaries slightly hairy on the inner side, styles glabrous. *Follicles* obliquely ovate-oblong, pointed, coriaceous, glabrous, ·75 to 1 in. long. *Seed* ovate, covered by an orange-coloured arillus. Hook. fil. Fl. Br. Ind. II, 47; Kurz For. Flora Burma I, 324. *Cnestis monadelpha*, Roxb. Fl. Ind. II, 454. *Connaracea*, Wall. Cat., 8547, 8548.

Andaman and Nicobar Islands.—DISTRIB. Burma, Chittagong, Sylhet and Assam.

The present species (published in 1850), *R. pulchella*, Blume (1850), and *L. humilis*, Planch. (1850), differ from each other so little that I am not sure that they should not be reduced to one, in which case the species might be named *Rourea monadelpha*, the earliest published name of any of them being *Cnestis monadelpha*, Roxb. (1832).

4. ROUREA PULCHELLA, Planch. in Linnaea XXIII, 419. Scandent, woody, quite glabrous. *Leaves* 3 to 7 in. long; leaflets 3 to 7, thinly coriaceous, ovate-lanceolate, obtusely caudate-acuminate, the upper surface very shining, the lower less so, both reticulate; main nerves 4 or 5 pairs, spreading, faint; length 1·5 to 3 in., breadth ·75 to 1·6 in.; petiolules ·15 in., slender. *Racemes* crowded in the axils, shorter than the leaves. *Flowers* ·25 in. in diam., the pedicels of the same length, slender. *Sepals* broadly ovate, acute, ciliolate, half as long as the petals, linear-oblong. *Pistils* 5, ovaries pilose, styles slender. *Follicle* stout, curved, pointed, glabrous, ·6 in. long, red when ripe. Hook. fil. Fl. Br. Ind. II. 48.

Malacca; Griffith, No. 1265. Maingay, No. 501 (Kew Distrib.); Ridley, No. 1449. Singapore, Ridley, Nos. 2028, 3981. Perak; Wray, Nos. 1167, 3774.

5. ROUREA HUMILIS, Blume Mus. Bot. Lugd. Bat. I, 262. Scandent, woody, glabrous. *Leaves* 3·5 to 6 in. long, the rachises slender; leaflets 3 rarely 5, coriaceous, broadly ovate or ovate-orbicular, abruptly and obtusely caudate-acuminate, the base rounded, rarely sub-cuneate, upper surface very shining, the lower less so and more distinctly reticulate; main nerves about 4 pairs, spreading, faint; length 1·5 to 3 in., breadth 1 to 2·25 in. petiolules about ·2 in., the terminal leaflet the largest. *Racemes* axillary, clustered, slender, few-flowered; the buds sub-globose, on pedicels of about their own length. *Calyx-lobes* sub-orbicular, glabrous. *Stamens* shorter than the calyx, much shorter than the styles. *Follicles* cylindric, pointed, coriaceous, glabrous, ·75 in. long.

Nicobar Islands; Jelinek, No. 140. Kurz. Penang; Curtis, No. 2285. Pahang, Ridley, Nos. 2645, 5121; Singapore. Perak; King's Collector, No. 4677, Scortechini.—DISTRIB. Sumatra, Borneo.

Distinguished chiefly by its broadly ovate coriaceous leaves, very shining on the upper surface and with broad bases.

6. ROUREA RUGOSA, Planch. in Linnaea XXIII, 422. A stout woody climber; young branches densely cinereous-tomentose. *Leaves* thinly coriaceous, 12 to 15 in. long, the rachises tomentose; leaflets 8 to 15 pairs, sub-sessile, sub-opposite, narrowly oblong or oblong-lanceolate, shortly and bluntly acuminate, rarely acute, the bases rounded or minutely cordate; upper surface glabrous, smoooth; the lower reticulate, sparsely pubescent, the midrib tomentose; main nerves 8 or 9 pairs, spreading, interarching very freely, prominent; length 2 to 3·25 in., breadth ·6 to 1·25 in. *Panicles* shorter than the leaves, crowded in the leaf-axils, pubescent, many-flowered. *Flowers* about ·2 in. long, their pedicels shorter. *Sepals* rotund, pubescent, half as long as the petals. *Follicle* about ·75 in. long, pointed, glabrous, striate. *Seed* ovoid, apiculate, about ·5 in. long. Hook. fil. Fl. Br. Ind. II, 46. *Connarus-rugosus*, Wall. Cat. 8527.

Singapore; Wallich. Malacca; Griffith, Maingay. Penang; Porter, Curtis. Perak; King's Collector, Wray.

7. ROUREA PARALLELA, Planch. in Linnaea XXIII, 421. A powerful woody climber often 150 feet long; young branches cinereous-pubescent. *Leaves* 2 to 6 in. long, their rachises with crisped pubescence; *leaflets* coriaceous, sessile, 10 to 22 pairs, opposite or sub-opposite, oblong, the apex broad, shortly bifid; the base minutely cordate, slightly oblique; upper surface glabrous, shining; the lower with very minute pale dots, sparsely pubescent especially on the midrib; main nerves about 6 pairs, faint; length ·5 to ·75 in., breadth ·25 to ·3 in. *Racemes* in axillary clusters, shorter than the leaves; the rachises slender, tomentose. *Flowers* not crowded, ·3 in. in diam. and ·2 in. long, the pedicels slightly shorter. *Sepals* puberulous, half as long as the petals, broadly oblanceolate, sub-glabrous. *Follicles* when ripe bright red with yellow tips, glabrous, ·6 to ·7 in. long, pointed. *Seed* elliptic, keeled on one side, ·3 in. long. *Under C. similis*, Bl. in Hook. fil. Fl. Br. Ind. II, 50 *Connarus mimusoides*, Vahl.? Wall. Cat. 8526 C.

Penang; Porter; Curtis, No. 473. Malacca; Maingay, No. 4 Perak; King's Collector, Nos. 2580, 4202, 8405, 10119, 105 10896; Scortechini. Singapore; Anderson, Ridley. Kedah, Cur No. 2629.

Blume's species *R. similis* (Mus. Lugd. Bat. I, 264 (September, 1850), is stat by its author to be very near to this, and indeed Sir Joseph Hooker (Fl. Br. Ind. II, 50) has taken Blume's name in preference to Planchon's. *R. sororia*, Planch. from Borneo must, from the description, be also very near this.

VAR. *major*. Flowers ·3 in. long and ·35 in. in diam. in lax panicles; leaflets nearly 1 in. long.

Perak; King's Collector, No. 5516.

8. Rourea fulgens, Planch. in Linnaea, XXIII, 423. A woody climber; young branches minutely and deciduously rusty-tomentose. *Leaves* 3 to 5 in. long, the rachis tomentose; leaflets 12 to 24 pairs, thinly coriaceous, oblong, slightly oblique, entire, obtuse, the base rounded or sub-cordate, usually oblique; upper surface glabrous, reticulate, minutely rugulose when dry, the lower rather densely covered with rusty silky pubescence; length ·4 to ·65 in., breadth ·15 to ·25 in. *Racemes* axillary, solitary, shorter than the leaves, pubescent, pedicels short. *Flowers* unknown. *Follicles* ·75 in. long, much curved. Hook. fil. Fl. Br. Ind. II, 46. *Connarus fulgens*, Wall. Cat. 8524.

Singapore; Wallich; Ridley, Nos. 2027, 4568. Malacca; Maingay, No. 499.

9. Rourea concolor, Blume Mus. Bot. Lugd. Bat. I, 264. A woody climber; young branches rusty-pubescent. *Leaves* 1 to 4 in. long, the rachises tomentose; leaflets 4 to 16 pairs, thinly coriaceous, sub-sessile, broadly oblong, with very obtuse or truncate apex and broad oblique minutely cordate base; both surfaces glabrous, the upper shining, the lower minutely dotted and boldly reticulate; main nerves about 3 pairs, spreading; length 3·5 to 5 in., breadth 1·5 to 3 in. *Racemes* about as long as the leaves, axillary, slender, rusty-tomentose; pedicels slender, ·25 in. long, as long as the flowers. *Sepals* orbicular, only half as long as the oblong petals, stamens as long as the petals. *Follicles* ·5 to ·75 in. long, pointed. Hook. fil. Fl. Br. Ind. II, 49. *R. parvifolia*, Planch. in Linnaea, Vol. XXIII, 420. *Connarus mimusoides*, Wall. (not Vahl.) Cat. 8526 B. *Cnestis mimusoides*, Jack in Mal. Misc. Vol. II, VII, 44.

Singapore; Prince, Ridley, No. 2026, Hullett. Malacca; Griffith, No. 1262 (Kew Distrib.) Perak; King's Collector, No. 4373.—Distrib. Sumatra; Forbes, No. 3169. Borneo.

4 Roureopsis, Planch.

Sarmentose or scandent shrubs. *Leaves* unequally-pinnate, leaflets few. *Flowers* in axillary racemes; pedicels slender, bracteolate at the base. *Sepals* oblong, slightly imbricate, somewhat enlarged and spreading, but not clasping the base of the capsule. *Petals* linear-oblong. *Stamens* 10, the alternate longer. *Ovaries* 5, styles slender. *Capsule* linear-oblong, straight. *Seed* ovoid; testa thin, black, arilliform at the base; cotyledons amygdaloid.—Distrib. Species 3, all Malayan.

This genus differs from *Rourea* in having straight (not curved) follicles, at the base of which the persistent sepals are free, and also in having bracteoles at the base of the pedicels.

Leaflets puberulous beneath	...	...	...	1.	*R. pubinervis.*
„ quite glabrous	...	...	...	2.	*R. Scortechinii.*

1. Roureopsis pubinervis. Planch. in Linnaea, XXIII, 424. A woody climber, sometimes as long as 50 feet; young branches with pale striate puberulous bark. *Leaves* 2·5 to 5 in. long, the rachises pubescent; leaflets membranous, 5 to 9, (the terminal one larger than the others), narrowly ovate-elliptic, tapering to each end, the apex abrupt and notched, the base cuneate; upper surface glabrous; the lower paler, puberulous on the midrib and sometimes on the nerves; main nerves 4 or 5, inter-arching, not much more prominent than the intermediate nerves; length of lateral leaflets ·7 to 1·7 in., breadth ·5 to ·75 in. *Racemes* slender, shorter than the leaves, solitary or in fascicles of 2 or 3 in the leaf axils, laxly few-flowered. *Flowers* ·35 in. long; their pedicels of about the same length, each with a minute pubescent persistent bracteole at its base. *Sepals* broadly oblong, obtuse, pilose near the apex, about half as long as the linear-oblong sub-acute glabrous petals. *Stamens* shorter than the sepals and pistils; ovaries pubescent. *Follicles* ovate, ·5 or ·6 in. long, not curved; the persistent calyx-lobes free, erect, about one-third as long as the fruit. Hook. fil. Fl. Br. Ind., II, 50. *Indeterminata*, Wall. Cat. 9050.

Penang; Porter; Curtis, 2332 and 2749. Malacca; Griffith, Maingay No. 500. Perak; very common, Scortechini, King's Collector.—Distrib. Java.

2 Roureopsis Scortechinii, King n. sp. A slender sarmentose woody shrub, all parts except the inflorescence glabrous, young branches minutely lenticellate *Leaves* 6 to 10 in. long, the rachis rather slender; leaflets 7 to 9, sub-opposite, very thinly coriaceous, ovate-lanceolate, tapering from below the middle to the long rather blunt acuminate point, the base cuneate; upper surface shining, the lower rather dull, paler and conspicuously reticulate; main nerves about 4 pairs, faint, the lower very oblique; length 2·25 to 3 in., breadth 1 to 1·25 in., petiolules about ·1 in., stout; the lowest leaflets the smallest. *Racemes* slender, axillary, 1 to 2 in. long, laxly-flowered, minutely and sparsely rusty-pubescent. *Flowers* about ·25 in. long, on slender pedicels about ·2 in. long, each pedicel with a minute rusty-tomentose bracteole at its base. *Calyx-lobes* ovate, obtuse, ciliolate, hairy inside, glabrous outside. *Petals* longer than the calyx, lanceolate, plicate in bud, yellowish. *Filaments* slightly coherent at the base, glabrous. *Pistils* 5, only 1 or 2 fertile. *Fruit* narrowly ovoid, not curved, pointed, coriaceous, glabrous, 1 in. long.

Perak; Scortechini, No. 613. Curtis (elevation 5,000 feet), No. 1998.

Scortechini's specimens have flowers in bud only, and none of them is in fruit. The foregoing description, as respects the flower, is copied from his field note. The fruit is described from what I take to be the same plant collected by Curtis in Perak at an elevation of 5,000 feet and described by him as a small tree.

5. Agelæa, Soland.

Erect or scandent shrubs. *Leaves* 3-rarely 5-foliolate. *Panicles* or *racemes* axillary. *Calyx* 5-partite, not accrescent nor embracing the fruit, imbricate or subvalvate. *Petals* lanceolate or ligulate, obtuse, free or connate at the middle. *Stamens* 5 or 10. *Disc* ½-annular or 0. *Pistils* 2–5. *Follicles* 1–3, sessile or shortly stalked, coriaceous, rugose or lamellate. *Seed* erect, exalbuminous; testa arilliform below the middle. —Distrib. 12 species, African and Asiatic.

Main nerves of leaflets 2 or 3 pairs, sub-erect, curving.
- All parts more or less pubescent, stamens 5 ... ... 1. *A. vestita.*
- All parts, except the inflorescence, glabrous; stamens 10 ... 2. *A. Wallichii.*

Main nerves of leaflets 7 to 10 pairs, spreading.
- Leaflets 3 to 5, all parts more or less pubescent; stamens 5 .. 3. *A. pinnata.*
- Leaflets never more than 3, adult leaves quite glabrous; stamens 10 ... ... 4. *A. Hullettii.*

1. Agelæa vestita, Hook. fil. Fl. Br. Ind. II, 46. A rather slender woody creeper 20 to 80 feet long; young branches at first rusty-tomentose but soon becoming sub-glabrous or glabrous. *Leaflets* membranous, unequal, more or less ovate or elliptic, with rounded base and caudate-acuminate apex; the terminal one the larger, sometimes ovate-rotund to sub-rhomboidal; its petiolule ·5 or more in length, swollen at the apex; the lateral leaflets inequilateral, the petiolule only ·1 or ·2 in. long; upper surface of all sparsely adpressed-pubescent, the midrib and nerves tomentose; lower surface pubescent; main nerves about 3 pairs (one pair sub-marginal), much curved, prominent as are the intermediate nerves and reticulations; length of the lateral leaflets 2·5 to 3 in., breadth 1·25 to 1·75 in., the terminal one larger. *Panicles* extra-axillary, less than 1 in. long, tomentose, with many short branches. *Flowers* under ·2 in. long, on slender pedicels. *Calyx* cleft to the very base; the segments unequal, linear, tomentose, shorter than the glabrous yellowish oblanceolate or linear petals. *Stamens* 5, unequal. *Styles* 2 to 5, slender, with a few white hairs. *Follicles* solitary, bright red, rarely in pairs, ovoid, boldly tuberculate or lamellate externally and tomentose, about ·6 to ·8 in. long, usually with a short curved stout apical beak. *Seed* narrowly sub-obovoid, black, ·4 in. long, pale and arilliform near the base. *Cuestis vestita*, Wall. in Herb. Linn. Soc. *Connaracea*, Wall. Cat. 8535. *Hemiandrina borneensis*, Hook. f. in. Trans. Linn. Soc. xxxiii. 171, t. 28. *Troostwyckia singularis*, Miq. Fl. Ind. Bat. Suppl. 531.

Singapore; Jack, Ridley. Penang; Porter, Curtis. Malacca; Griffith, Maingay. Perak; King's Collector, Scortechini, Johore, Ridley.—Distrib. Sumatra, Borneo.

A very common species in Perak. The arillus of the seed is very inconspicuous

in dried specimens. The number of the pistils varies from 2 to 5. There are in the Kew Herbarium fruiting specimens of a plant collected by Griffith which exactly resembles this except that its fruits (which are immature) are non-tuberculate and are covered with a dense coating of long silky tawny hairs. The same plant was collected by the Calcutta Garden Collector (No. 6878), but also without flowers. I believe the dense hairiness of the fruit of both gatherings to be due to the irritation caused by the deposit of the eggs of some insect in the young fruit.

2. AGELEA WALLICHII, Hook. fil. Fl. Br. Ind. II, 47. A slender woody creeper 20 to 50 feet long, all parts except the inflorescence glabrous. *Leaflets* coriaceous, slightly unequal, ovate-elliptic, with rounded or cuneate bases and short caudate-acuminate apices; the petiolule of the terminal leaflet about 1 in. long, thickened near the apex; the petiolules of the lateral leaflets about ·25 in. long; both surfaces shining, the lower reticulate; length 3 to 4·5 in.; breadth 1·5 to 2·25 in.; main nerves 2 or 3 pairs, ascending, much curved, one pair submarginal. *Panicles* under 1 in. long, extra-axillary, pubescent. *Flowers* ·25 in. in diam., on pedicels longer than themselves. *Calyx* divided for three-fourths of its length into 5 ovate-lanceolate imbricate segments, sparsely pubescent externally, glabrous internally, their edges densely sericeous. *Petals* longer and narrower than the segments of the calyx, glabrous, linear, sub-acute. *Stamens* 10, sub-equal, longer than the styles, much shorter than the petals. *Pistils* 5, very short, stout. *Follicle* usually solitary, bright red when ripe, ovoid, curved, shortly beaked, covered outside with short obtuse tubercles and minutely rusty-tomentose, inside glabrous, ·6 in. long. *Seed* oblong, black, its lower half pale and arilliform. *Connaracea*, Wall. Cat., 8544.

Singapore; Wallich. Malacca; Griffith (Kew Distrib.) No. 1275, Maingay, No. 511, Derry, No. 69. Penang; Curtis, Nos. 1633 and 3032. Perak; Wray, No. 48, Scortechini, No. 1730, King's Collector, No. 3735. —DISTRIB. Sumatra, Forbes, No. 2589.

3. AGELEA PINNATA, King n. spec. A woody climber 30 to 40 feet long; young branches rusty-puberulous, striate. *Leaflets* 3 to 5, thinly coriaceous, unequal, (the middle the largest), elliptic, broadly and shortly caudate-acuminate, the base rounded or sub-cuneate; upper surface glabrous except the minutely pubescent midrib; lower surface minutely sub-adpressed pubescent, the transverse veins distinct; the midrib tomentose; main nerves 7 to 10 pairs, spreading and curving upwards, prominent on the lower surface, slightly impressed on the upper; length of the terminal leaflet 6 to 8 in., breadth 3 to 3·5 in.; its petiolule jointed to the rachis and not longer than those of the lateral slightly smaller leaflets. *Panicles* about 1 in. long, densely crowded in the axils of the leaves, many-flowered, minutely tomentose. *Flowers* ·3 in. long, their pedicels half as long. *Calyx* divided to the very base

into 5 linear acuminate reflexed segments, half as long as the petals, tomentose externally. *Petals* linear, much acuminate, glabrous, white inside and purple outside. *Stamens* 5, shorter than the pistils, the anthers sub-globular. *Pistils* 5, the ovaries softly tomentose; the styles spreading, recurved; the stigma bifid. *Fruit* unknown.

Perak; King's Collector, No. 5425.

This differs notably from both the other species of this genus in its leaflets having often 5 instead of 3 leaflets. In the structure of its flowers, however, it agrees perfectly with the diagnosis of the genus. It is more nearly allied to *A. vestita* than to *A. Wallichii*, but it differs from both in the larger number of main nerves in its leaves. Its flowers are moreover larger than those of *A. vestita*, and the petals are differently coloured.

4. Agelæa Hullettii, King n. spec. A woody creeper 15 to 20 feet long; young branches minutely tomentose. *Leaflets* 3, coriaceous; the terminal slightly the largest, narrowly elliptic-oblong; the lateral pair slightly oblique, all with acute apices and cuneate bases; the petiolule of the terminal one from ·5 to ·75 in. long, jointed; those of the lateral pair ·25 in. long; upper surface glabrous and minutely pitted, the lower finely reticulate, when young sub-lepidote and puberulous, when adult glabrous; main nerves 7 or 8 pairs, spreading and curving upwards, prominent on the lower and obsolete on the upper surface; some of the intermediate nearly as distinct; length of the terminal leaflet 6 to 9 in., breadth 2 to 2·5 in., the lateral pair rather smaller. *Panicles* less than 1 in. long, minutely tomentose, crowded in the leaf-axils or from the axils of fallen leaves, many-flowered. *Flowers* ·2 in. long and about the same across; their pedicels about ·25 in. long. *Calyx* divided for two-thirds of its length into 5 lanceolate segments, tomentose outside, glabrescent inside. *Petals* longer than the sepals, spreading, linear-oblong, glabrous, with a mesial rib, recurved from about the middle. *Stamens* 10, the alternate ones shorter, none of them so long as the pistils. *Ovaries* narrowly oblong, tomentose. *Styles* sub-glabrous, slightly diverging. *Follicles* 1 to 3, bright red when ripe, woody, ovoid, shortly beaked, externally tubercled and minutely rusty-tomentose, inside glabrous, length ·5 to ·65 in. *Seed* sub-cylindric, compressed, the upper half black, the lower pale and arilliform, ·5 in. long.

Singapore; Hullett, No. 841; Ridley, No. 4589. Perak; King's Collector, No. 5729.

This is distinguished from *A. pinnata* by the leaflets being invariably 3 and the stamens being only 5 while, in that species, there are often 5 leaflets and always 10 stamens. This resembles *A. Wallichii* in some respects, but it differs from that species in having larger leaflets more cuneate at the base with acute, not caudate acuminate, apices and with more than twice as many main nerves. The leaflets of the former are moreover quite glabrous at all stages, while in this the lower surface of the young leaflets is puberulous and lepidote.

NOTE.

Connarus Diepenhorstii, Miq. Fl. Ind. Bat. Suppl. 529, (of which a type specimen is in the Calcutta Herbarium) is unmistakeably a species of *Agelæa* and should be named *Agelæa Diepenhorstii*. It is allied to *A. Wallichii*, Hook. fil., but has larger leaflets and much longer racemes. To this belong Teysmann's Sumatra specimens from Prianam (Herb. Hort. Bogor., No. 2197), and Forbes's from the Lampongs in Sumatra, Nos. 1313 and 1386.

6. TÆNIOCHLÆNA, Hook. f.

A rambling shrub. *Leaves* unequally pinnate, glabrous; leaflets 3, quite entire. *Panicles* axillary, short. *Flowers* hermaphrodite. *Calyx-tube* short, hemispheric; segments 5, enlarged and revolute in fruit, valvate. *Petals* 5, much exceeding the calyx. *Stamens* 10, alternately shorter, nearly free at the base. *Ovaries* 5, sessile; styles short, stigmas discoid. *Follicles* 1–3, ovoid, pubescent; valves glabrous within. *Seed* oblong, arillate; albumen 0, cotyledons plano-convex.

TÆNIOCHLÆNA GRIFFITHII, Hook. fil. in Benth. and Hook. Gen. Pl. I, 434; Fl. Br. Ind. II, 55. Young branches puberulous, and with pale brown lenticels; all parts except the inflorescence quite glabrous. *Leaflets* coriaceous, the terminal largest, elliptic to ovate-elliptic, with sub-acute slightly bifid apices, slightly narrowed to the rounded base, the edges slightly sub-revolute when dry; both surfaces shining, the lower reticulate; main nerves 4 or 5 pairs, the lower pair sub-marginal, all curved upwards, prominent on the lower and depressed on the upper surface; the petiolules of all jointed, ·15 in. long; length of the terminal leaflets 5 to 6·5 in., the laterals smaller. *Panicles* (fide Sir J. D. Hooker) "2 to 3 in. long, fascicled, densely pubescent, slender. *Flowers* rotate, ·33 in. in diam. *Segments of the calyx* oblong, pubescent, recurved in flower. *Petals* twice as long, linear, dilated upwards, glabrous; filaments short, subulate. *Follicles* 2 or 3, ·5 to 1 in. long, obtuse, densely pubescent, valves coriaceous. *Seed* short, slightly compressed, testa black, arillus small."

Malacca; Griffith, Maingay, No. 497.

7. CNESTIS, Juss.

Scandent shrubs or trees. *Leaves* unequally pinnate; leaflets many, quite entire. *Flowers* in racemes, tomentose, rarely panicled, polygamous or dioecious, rotate. *Sepals* 5, valvate or imbricate at the tip, spreading in fruit. *Petals* 5, shorter or longer than the calyx. *Stamens* 10, free. *Ovaries* 5–7, sessile; styles short, stigmas capitellate. *Capsules* 1–3, kidney-shaped, cylindric, curved or waved, pubescent, often villous or clothed with rigid hairs within. *Seed* with a thin arillus, albumen

fleshy, cotyledons thin.—Distrib. Tropical Asia and Africa; species about 17.

Cnestis ramiflora, Griff. Notul. IV, 432. A small tree or a climber, young branches, rachises of leaves, under surfaces of leaflets and inflorescence more or less softly rusty-tomentose. *Leaves* 8 to 15 in. long; leaflets 19 to 31, sub-sessile, narrowly oblong, rarely slightly obovate, obtuse or sub-acute; the base broad, rounded or minutely cordate; upper surface sparsely adpressed-pubescent or glabrescent, the nerves pubescent; main nerves 4 or 5 pairs, spreading, faint; length 1·25 to 3 in., breadth ·4 to 1·5 in. *Racemes* much shorter than the leaves, in axillary fascicles. *Female flowers* about ·35 in. in diam., the males smaller. *Sepals* narrowly oblong, obtuse, pubescent on both surfaces. *Petals* similar in shape to the sepals but sometimes longer, glabrous. *Stamens* much shorter than the sepals, the filaments glabrous. *Disc* and *Ovaries* 5, tomentose, styles short. *Follicles* 1 to 3 from one flower, sessile, compressed, falcate, widest about the middle, much curved, rugose, rusty-pubescent; the pericarp very thick, woody, lined inside with a dense layer of sericeous tomentum, 1·5 to 1·75 in. long and ·8 in. broad. *Seed* broad, compressed, the testa and arillus thin. Kurz Journ. As. Soc. Beng. Vol. XLV, pt. 2, p. 216; For. Flora Burma, I, 329; Hook. fil. Fl. Br. Ind. II, 54. *C. flaminea*, Griff. Notul. VI, 433. *C. platantha*, Griff. l. c. 434; Kurz l. c. *Cnestis foliosus* and *C. igneus*, Planch. MSS. in Herb. Kew. *Connarus foliosus*, Jack in Wall. Cat. 8529. *C. igneus*, Wall. Cat. 8528. *Rourea dasyphylla*, Miq. Fl. Ind. Bat. Suppl. 528.

In all the provinces, a common plant.—Distrib. Burma, Sumatra, Philippine Islands.

A widely distributed plant and therefore presenting various forms, some of which (as the synonymy shows) have been regarded as species. The form which is most distinct is that which assumes the habit of a small tree; but its flowers and leaves are in no way different from those of the scandent forms. This was, however, kept separate by Kurz under the specific name *C. ramiflora* Griff.; while, for the scandent forms, he kept the name *C. platantha*, Griff.

Order XXXVIII. LEGUMINOSÆ.

(By D. Prain.)

Herbs, shrubs or trees. *Leaves* stipulate and usually alternate, pinnate or digitate or simple, often stipellate, sometimes with the rachis ending in a bristle or tendril. *Inflorescence* axillary or leaf-opposed or terminal; usually simply racemose or panicled; bracts and bracteoles usually both present. *Flowers* usually irregular, hermaphrodite, rarely regular or polygamous. *Sepals* 5, combined or free, often unequal, sometimes arranged in two lips. *Petals* 5, rarely fewer by arrest, very

rarely 0, usually free and unequal. *Stamens* normally 10, perigynous or almost hypogynous, rarely fewer by arrest, or indefinite; filaments free or variously combined; anthers 2-celled, dehiscence almost always longitudinal. *Ovary* free, style simple, cylindric, usually declinate; stigma capitate, terminal or oblique; ovules 1—∞ on the ventral suture. *Fruit* usually dry, a pod splitting open along both sutures, sometimes opening only along the ventral suture, sometimes continuous and indehiscent, sometimes separating into one-seeded indehiscent segments. *Seeds* usually exalbuminous; cotyledons foliaceous or amygdaloid, with a straight or an inflexed accumbent radicle.

A very large order with three very natural suborders, including altogether about 8,000 species. Of these suborders the *Papilionaceæ* are cosmopolitan in distribution, the *Cæsæpinieæ* and the *Mimoseæ* are confined to the tropics and to warm temperate regions.

Petals imbricate:—
Calyx segments united above the level of the disc; the upper petal (standard) exterior (PAPILIONACEÆ):—
Stamens mon- or diadelphous:—
Pods dehiscent along both sutures:—
Leaves even-pinnate the rachis continued as a tendril or bristle .. .. I. VICIEÆ.
Leaves simple, digitate or odd-pinnate:—
Leaves simple *sessile*, or digitately 3–7-foliolate; stamens monadelphous, anthers dimorphous ... ... II. GENISTEÆ.
Leaves pinnately 3-foliolate, rarely (*Clitoria*) 5–7-foliolate or (*Flemingia*) *petioled* 1-foliolate or digitately 3-foliolate and then with 2-adelphous stamens; when stamens 1-adelphous, the upper filament attached to the others at its base ... ... III. PHASEOLEÆ.
Leaves 5–∞-foliolate, or if 1–3-foliolate (*Tephrosia*) with partially monadelphous stamens and uniform anthers, or (*Indigofera*) with 2-adelphous stamens, apiculate anthers and basifixed hairs; when stamens monadelphous the upper stamen free at its base ... IV. GALEGEÆ.
Pods indehiscent or opening only along lower suture; (leaves, except *Arachis*, odd-pinnate):—
Pods not segmented, always quite indehiscent; leaves all odd-pinnate ... ... V. DALBERGIEÆ.
Pods breaking into 1-seeded indehiscent segments, or if dehiscent (*Desmodium* in part) only opening along lower suture; if not segmented (*Arachis*) with leaves even-pinnate; (segment solitary in *Phylacium*) ... ... VI. HEDYSAREÆ.
Stamens free ... ... VII. SOPHOREÆ.

Calyx segments free to the level of the disc (except *Bauhinieæ*); the upper petal interior (CÆSALPINIEÆ):—
Leaves simple or simply pinnate :—
Anthers basifixed ... ... VIII. CASSIEÆ.
Anthers versatile :—
Petals 5 :—
Calyx gamosepalous or valvately partite ... IX. BAUHINIEÆ.
Calyx lobes free imbricate ... ... X. CYNOMETREÆ.
Petals fewer than 5 (3 or 1 or 0) ... ... XI. AMHERSTIEÆ.
Leaves 2-pinnate ... ... XII. CÆSALPINIEÆ.
Petals valvate (MIMOSEÆ) :—
Calyx teeth imbricated ... ... XIII. PARKIEÆ.
Calyx valvate :—
Stamens 5 or 10 :—
Anthers glandular ... ... XIV. ADENANTHEREÆ.
Anthers not glandular ... ... XV. EUMIMOSEÆ.
Stamens ∞ :—
Filaments free ... ... XVI. ACACIEÆ.
Filaments united ... ... XVII. INGEÆ.

A. *SUBORDER I. PAPILIONACEÆ. Calyx segments united beyond the disc. Petals imbricated, the upper external. Radicle inflexed accumbent or, rarely, very short and straight.*

TRIBE I. VICIEÆ. Dwarf herbs or climbers. *Leaves* usually even-pinnate, the petiole produced in a spine or tendril, leaflets entire ex-stipellate; stipules often foliaceous. *Flowers* solitary or racemose. *Stamens* diadelphous (9+1). *Pod* dehiscent.

1. Abrus.

TRIBE II. GENISTEÆ. Shrubs, sometimes tree-like, or non-climbing herbs. *Leaves* simple or digitately 3–∞-foliolate, rarely 1-foliolate; stipules small, free. *Flowers* in racemes or spikes. *Stamens* monadelphous: anthers almost always 2-morphous. *Pod* dehiscent.

2. Crotalaria.

TRIBE III. PHASEOLEÆ. Climbing or creeping herbs, rarely erect and shrubby, very rarely trees. *Leaves* pinnately 3-foliolate, rarely 1- or 5–7-foliolate, leaflets entire or lobed, almost always stipellate. Bracts 2 opposite persistent stipular or caducous. *Stamens* monadelphous, but if so the upper filament always free at the base; or diadelphous (9+1) by more or less complete detachment of the upper; anthers uniform very rarely (*Mucuna*) 2-morphous. *Pod* dehiscent.

Leaves gland-dotted beneath ... ... *A. Cajaneæ.*
Leaves not gland-dotted beneath :—
Style bearded and bracts very small or deciduous ... *B. Euphaseoleæ.*
Style beardless, or if bearded (*Clitoria*) with bracts persistent :—
Rachis of inflorescence not swollen at nodes (style bearded in *Clitoria*) ... ... *C. Glycineæ.*

Rachis of inflorescence nodose :—

Upper stamen subconnate with the others and petals subequal ... ... *D. Dioclex.*

Upper stamen free or if subconnate, then petals very unequal :—

Petals very unequal ... ... *E. Erythrinex.*

Petals of same length ... ... *F. Galactiex.*

Sub-tribe A. Cajanex. Inflorescence racemose, rachis not swollen, or flowers subumbellate or solitary, bracts usually membranous caducous, bracteoles 0; petals of subequal length; upper stamen free; style bearded, stigma terminal; leaves gland-dotted at least beneath; stipels small, sometimes 0.

3. Flemingia. *Ovules* 2; *pod turgid, leaves subdigitate or* 1-*foliolate.*
4. Eriosema. *Ovules* 2; *pod compressed, leaves pinnately* 3-*foliolate; funicle terminal on hilum.*
5. Dunbaria. *Ovules* 4–∞ ; *pod compressed, not deep-lineate between the seeds.*
6. Atylosia. *Ovules* 4–∞ ; *pod compressed, deep-lineate between the strophiolate seeds.*
7. Cajanus. *Ovules* 4–∞ ; *pod compressed, deep-lineate between the seeds; strophiole* 0.

Sub-tribe B. Euphaseolex. Inflorescence racemose, rachis nodose, bracts small or caducous; petals equal in length or the keel long-beaked, or spirally twisted; upper stamen free; style longitudinally bearded along the inner face or less often simply pilose round the stigma.

8. Phaseolus. *Keel spiral.*
9. Vigna. *Keel not spiral; stigma oblique, style not flattened upwards; pods not lineate between seeds.*
10. Pachyrhizus. *Keel not spiral; stigma oblique globose on inner face of style flattened upwards; pod lineate.*
11. Dolichos. *Keel not spiral; stigma terminal; pod not winged.*
12. Psophocarpus. *Keel not spiral; stigma terminal; pod square, winged at the* 4 *corners.*

Sub-tribe C. Glycinex. Inflorescence of axillary fascicles or racemes of solitary or geminate flowers on an unswollen rachis; standard not appendiculate or (in small flowered genera) minutely appendiculate at the base; upper stamen free or united at the base with the rest; style naked (bearded in *Clitoria*).

13. Clitoria. *Bracts persistent; standard large not spurred; calyx-tube long; style bearded; stamens* 10 *fertile.*
14. Centrosema. *Bracts persistent; standard large spurred on the back; calyx-tube short; style naked; stamens* 10 *fertile.*
15. Teramnus. *Bracts small decidous; standard small; stamens alternate,* 5 *fertile,* 5 *sterile.*

Sub-tribe D. Dioclex. Inflorescence racemose with rachis swollen at the nodes, bracts small or caducous; calyx usually 4-lobed from union of the two upper teeth, rarely very unequally 2-lipped; petals subequal in length; upper stamen free at the base, connate with the remainder above; style not bearded.

16. Dioclea. *Calyx campanulate; pod broad much thickened along upper suture.*
17. Pueraria. *Calyx campanulate; pod linear, flat or narrow.*
18. Canavalia. *Calyx 2-lipped; with a large upper and small lower lip.*

Sub-tribe E. Erythrinex. Inflorescence usually racemose with rachis nodose, flowers showy with unequal petals—in some genera with very large standard longer than the wings and sometimes than the keel also, in others with standard much exceeded by the large cochleate keel; upper stamen free or united at the base with the remainder; style naked; bracts usually small, deciduous.

19. Mucuna. *Keel longest, standard shorter than wings; anthers 2-morphous; climbers.*
20. Strongylodon. *Standard and keel equal and longer than wings; anthers uniform; climbers.*
21. Erythrina. *Standard longer than keel and wings; anthers uniform; armed trees.* Pod sometimes dehiscent only at apex, sterile and indehiscent below.

Sub-tribe F. Galactiex. Inflorescence racemose with nodose rachis, more rarely amply paniculate; bracts small very deciduous; calyx usually 4-lobed, the two upper teeth connate; petals sub-equal in length; upper stamen free; style not bearded.

22. Spatholobus. Pod 1-seeded at the apex only and there partially dehiscent, sterile and indehiscent below.

Tribe IV. Galegeæ. Herbs never twining, erect shrubs, or less often trees or large woody climbers. *Leaves* odd-, very rarely even-pinnate without the rachis prolonged, leaflets ∞, or rarely 3–1, usually entire. *Stamens* 10, the lower 9 united as far as their middle or further in a sheath split along the upper side or less often closed in the middle, the upper sometimes free from the base, at others connate *by its middle* with the sheath, very rarely wanting; filaments filiform at the tips, anthers versatile uniform, or rarely somewhat dimorphous. *Pod* not segmented, 2-valved or if indehiscent usually small, 1–2-seeded or membranous inflated. *Seeds* rarely strophiolate.

Anthers with connective apiculate or gland-tipped ... ... *A. Indigofereæ.*
Anthers muticous:—
Racemes all axillary or from old nodes ... ... *B. Robiniex.*

Racemes terminal, or leaf-opposed, or paniculate at the ends of branches	*C. Tephrosieæ.*

Sub-tribe A. Indigofereæ. Herbs or shrubs, glandular punctate or not, usually hoary canescent, the hairs always fixed in the middle; racemes or spikes axillary; connective of anther produced in a gland or mucro; ovules usually ∞; pod 2-valved.

23. Indigofera.

Sub-tribe B. Robinieæ. Herbs, erect or rarely climbing shrubs, or trees; racemes all axillary or fasciculate on old nodes; upper stamen usually free; anthers muticous; ovules ∞; style usually rigid; pod usually 2-valved, flat or only turgid opposite the seeds.

24. Sesbania.

Sub-tribe C. Tephrosieæ. Herbs, erect or large climbing shrubs, or trees; racemes terminal or leaf-opposed or panicled at the ends of branches, rarely arising from upper axils, or with the lower or all the pedicels geminate or fasciculate in the axils of leaves; anthers muticous; ovules usually ∞; style usually rigid; pod 2-valved.

25. Tephrosia. *Leaves striate-veined; pod thin, early dehiscent.*

26. Millettia. *Leaves reticulate-veined; pod firm, tardily dehiscent.*

Tribe V. Dalbergieæ. Trees or erect or lofty climbing shrubs. *Leaves* pinnately 5–∞-foliolate, very rarely 3- or 1-foliolate, usually exstipellate. *Inflorescence* various, paniculate, fascicled racemose, or cymose. *Stamens* all united in one sheath, entire or split along the upper side, or in two lateral half-sheaths from simultaneous fission along both upper and lower sides, or the upper stamen free the rest connate; anthers usually uniform. *Pod* longer than the calyx, membranous, coriaceous, woody or drupaceous, indehiscent and not segmented.

Leaflets opposite	*A. Lonchocarpeæ.*
Leaflets alternate	*B. Pterocarpeæ.*

Sub-tribe A. Lonchocarpeæ. Leaflets opposite; pod not drupaceous; seeds usually transverse or attached by a lateral hilum, not pendulous.

27. Pongamia. *Pod coriaceous, not winged; calyx subtruncate.*

28. Derris. *Pod coriaceous or membranous, winged; calyx subtruncate.*

29. Kunstleria. *Pod membranous not winged; calyx toothed.*

Sub-tribe B. Pterocarpeæ. Leaflets alternate; pod not drupaceous; seeds usually transverse or attached by a lateral hilum, not pendulous.

30. Dalbergia. *Anthers small, terminal; pod oblong or linear.*

31. Pterocarpus. *Anthers versatile; pod suborbicular.*

Tribe VI. Hedysareæ. Herbs, undershrubs or shrubs sometimes twining or climbing, rarely trees. *Leaves* odd- or rarely even-pinnate, petiole if produced not cirrhate, leaflets 3–∞, rarely digitately 3–4-foliolate, 1-foliolate or simple. *Stamens* diadelphous, 9 connate in a sheath as high as their middle or higher and split along the upper side, the upper being free, or monadelphous in a sheath split along the upper side, or diadelphous in two equal lateral half-sheaths (split simultaneously along upper and lower sides) or rarely all free; filaments free at their tips, filiform or dilated upwards; anthers uniform versatile, or rarely 2-morphous, the alternate larger subbasifixed. *Pod* indehiscent separating into 1-seeded segments, rarely unsegmented (*Arachis*), or by abortion or organically (*Phylacium*) 1-seeded. *Seeds* rarely strophiolate.

Stamens monadelphous, anthers 2-morphous; leaflets even-pinnate or digitate, exstipellate ... ... *A. Stylosantheæ.*
Stamens diadelphous, anthers uniform; leaflets odd-pinnate or simple.
Leaflets exstipellate, staminal phalanges 5+5 ... ... *B. Aeschynomeneæ.*
Leaflets stipellate, staminal phalanges 9+1 ... ... *C. Desmodieæ.*

Sub-tribe A. Stylosantheæ. Herbaceous approaching undershrubs, often viscid; leaves exstipellate, leaflets few; flowers spicate, capitate or rarely subracemose, in terminal spikes, or axillary by suppression of floral branches; bracts 1-foliolate and 2-stipulate, or stipuloid from suppression of the leaf-element; stamens monadelphous; anthers 5 oblong basifixed, 5 alternate shorter versatile.

32. Arachis. *Calyx-tube long filiform; leaves even-pinnate;* pod not segmented ripening underground.

33. Zornia. *Calyx-tube not elongated; leaves digitately* 2–4-*foliolate*

Sub-tribe B. Aeschynomeneæ. Herbs, undershrubs or shrubs; leaves pinnate, leaflets ∞, or rarely 1–3, exstipellate; flowers usually in few-fld. axillary racemes, rarely in axillary fascicles or subcymose; keel obtuse or beaked, incurved; wings usually transversely folded; stamens (*in Malayan genera*) connate in two lateral phalanges; style filiform.

34. Smithia. *Pod folded within calyx.*

35. Ormocarpum. *Pod straight exserted, joints oblong; ovary sessile.*

36. Aeschynomene. *Pod straight exserted, joints quadrate or suborbicular; ovary stipitate.*

Sub-tribe C. Desmodieæ. Herbs, rarely twining, or undershrubs, less often shrubs, very rarely trees; leaves pinnately 3-foliolate or 1-foliolate the distal leaflets 2-stipellate the lateral leaflets opposite, each 1-stipellate, rarely 5–7-foliolate; stipules often striate; flowers in pairs

along the rachis of a raceme, rarely fasciculate or solitary, the racemes terminal or casually at the same time also axillary; standard usually cuneate at the base, wings as long as or longer than keel and usually adherent to its base; upper stamen free or coherent with the rest from the base upwards; pod sometimes (*Phylacium*) 1-jointed, sometimes (*Desmodium* § *Nicholsonia*) opening along the lower suture.

37. Phylacium. *Ovary* 1-*ovuled*; *pod* 1-*seeded.*
38. Uraria. *Ovary* 2- *or more-ovuled*; *pod folded inside calyx*; *calyx-tube short, teeth long, not accrescent.*
39. Lourea. *Ovary* 2- *or more-ovuled*; *pod folded inside calyx*; *calyx-tube large, teeth small, accrescent in fruit.*
40. Alysicarpus. *Ovary* 2- *or more-ovuled*; *pod straight exserted*; *joints of pod coriaceous as thick as they are long and broad.*
41. Desmodium. *Ovary* 2- *or more-ovuled*; *pod straight exserted*; *joints of pod membranous or, if coriaceous* (§ Dendrolobium), *broader than their thickness, and, if as thick as they are broad,* (§ Scorpiurus) *then much longer than broad.*

Tribe VII. Sophoreæ. Trees or tall shrubs, very rarely subherbaceous or large climbers. *Leaves* pinnately 5–∞-foliolate or 1-foliolate. *Corolla* papilionaceous or almost regular the upper petal outer in bud, the lower ones occasionally absent. *Stamens* 10, free or very slightly connate at the base. *Pod* indehiscent unsegmented, or 2-valved. *Radicle* straight, incurved or inflexed.

42. Sophora. *Pod moniliform elongated, indehiscent.*
43. Ormosia. *Pod short thickly coriaceous, 2-valved.*

B. *Suborder II. Cæsalpinieæ. Calyx-segments partite to the disc, very rarely* (*some* Bauhinias) *gamosepalous. Petals imbricated the uppermost internal. Radicle straight or, rarely, slightly oblique. Stamens almost always free.*

Tribe VIII. Cassieæ. Trees, rarely shrubs or undershrubs. *Leaves* odd- or even-pinnate. *Calyx* segments or sepals 5, rarely 4–3, divided to the disc, imbricate or rarely subvalvate. *Petals* 5 or fewer or 0. *Anthers* erect, thick, basifixed, dehiscence longitudinal or 2-porose; or rarely dorsifixed and 2-porose. *Ovary* or stipe free inside calyx-tube. *Ovules* 2—∞, rarely 1. *Seeds* albuminous.

44. Cassia. *Sepals* 5, *petals* 5; *stamens* 10 *or* 5, *leaves even-pinnate.*
45. Koompassia. *Sepals* 5, *petals* 5; *stamens* 5; *leaves odd-pinnate.*
46. Dialium. *Sepals* 5, *petals* 2 *or* 1 *or* 0, *stamens* 2; *leaves odd-pinnate.*

Tribe IX. Bauhinieæ. Woody tendril-bearing climbers, rarely trees. *Leaves* simple, entire or 2-lobed; rarely 2-foliolate. *Calyx* gamo-

sepalous above the disc or valvately partite, the tip 5-toothed or less often 5-lobed with teeth or lobes imbricated. *Petals* 5. *Anthers* versatile. *Ovary* with stalk free or adnate to calyx-tube. *Ovules* 2–∞. *Seeds* albuminous.

47. Bauhinia.

Tribe X. Cynometreæ. Trees. *Leaves* even-pinnate, 2–∞-foliolate. *Calyx* lobes divided to the disc, imbricate or valvate. *Petals* 5 or fewer or 0. *Anthers* versatile. *Ovary* 1–2-ovuled. *Flowers* usually small.

48. Cynometra.

Tribe XI. Amherstieæ. Trees. *Leaves* even-, very rarely odd-pinnate, 2–∞-, rarely 1-foliolate. *Calyx* lobes divided to the disc, imbricate, very rarely valvate. Petals 5 or fewer or 0. *Anthers* versatile. *Ovary* 3–∞-ovuled, stalk adnate to the disc-bearing tube of calyx.

49. Tamarindus. *Petals* 3 *perfect; stamens* 3 *perfect.*
50. Sindora. *Petal* 1; *leaves very coriaceous; calyx-segments subvalvate.*
51. Afzelia. *Petal* 1; *leaves papery; calyx-segments much imbricated.*
52. Saraca. *Petals* 0; *leaflets even-pinnate.*
53. Crudia, *Petals* 0; *leaflets alternate odd-pinnate.*

Tribe XII. Eucæsalpinieæ. Trees, shrubs or large climbers. *Leaves* all 2-pinnate or, rarely, some leaves simply pinnate others 2-pinnate. *Calyx* lobes divided to the disc. *Petals* usually 5 slightly unequal. *Anthers* versatile. *Ovary* 2–∞-, rarely 1-ovuled, the stalk free in the calyx tube.

54. Peltophorum. *Calyx-lobes subequal; pod winged along both sutures;* stigma large peltate.
55. Cæsalpinia. *Calyx-lobes unequal, the lowest large hooded; pod wingless.*
56. Mezoneuron. *Calyx-lobes unequal, the lowest large hooded; pod winged along upper suture.*
57. Pterolobium. *Calyx-lobes unequal, the lowest large hooded; pod samaroid, winged at the apex only.*

C. *Suborder III. Mimoseæ. Flowers regular small. Calyx gamosepalous or valvately partite. Petals valvate, usually connate below the middle. Stamens free or monadelphous.*

Tribe XIII. Parkieæ. Trees. *Leaves* 2-pinnate. *Calyx* teeth short, imbricate. *Stamens* as many or twice as many as petals.

58. Parkia.

Tribe XIV. Adenantheræ. Herbs, climbing shrubs or trees. *Leaves* 2-pinnate. *Calyx* valvate. *Stamens* twice as many, rarely only as many, as the petals. *Anthers* tipped by a stipitate gland.

59. Entada. *Inflorescence a long spike; woody climbers* with very large pods and seeds.
60. Adenanthera. *Inflorescence a long narrow raceme; trees.*
61. Neptunia. *Inflorescence capitate; aquatic floating or creeping herbs.*
62. Xylia. *Inflorescence capitate; tall trees.*

Tribe XV. Eumimoseæ. Herbs, erect or climbing shrubs, or trees. *Leaves* 2-pinnate. *Flowers* 4–5-merous, rarely 3- or 6-merous. *Calyx* valvate or pappus-like, or 0. *Stamens* twice as many, or only as many, as the petals, free. *Anthers* not gland-tipped; pollen-granules many, distinct.

63. Leucaena. *Pod opening through the sutures, valves continuous; shrubs or small trees.*
64. Mimosa. *Pod with persistent sutures; valves segmented; shrubs or undershrubs.*

Tribe XVI. Acacieæ. Trees, shrubs or woody climbers. *Leaves* 2-pinnate. *Flowers* 4–5-merous, rarely 3-merous or 6-merous. *Calyx* valvate, very rarely 0. *Stamens* indefinite, often very numerous, free, or with the inner rows slightly subconnate at the base into a shallow ring; pollen-masses 2–6.

65. Acacia.

Tribe XVII. Ingeæ. Trees. *Leaves* 2-pinnate sometimes 2–3-geminate, rarely simply pinnate. *Flowers* usually 5-merous. *Calyx* valvate. *Stamens* indefinite often numerous, rarely 10–15, united in a tube at the base or sometimes higher up; anthers small; pollen-masses 2–6.

66. Serianthes. *Pod septate between the seeds, thick, woody, indehiscent; flowers large; trees.*
67. Enterolobium. *Pod septate between the seeds, spongy or fleshy, indehiscent; flowers small; trees.*
68. Calliandra. *Pod thin, straight with thickened sutures, dehiscing elastically; flowers small; trees or shrubs.*
69. Albizzia. *Pod thin, straight, dehiscent or indehiscent; flowers small; trees or shrubs.*
70. Pithecolobium. *Pod coriaceous, curved, indehiscent or dehiscing through lower suture, or fleshy and dehiscing by both sutures; flowers small; trees.*

Sub-order I. Papilionaceæ.

Herbs or shrubs (often climbing), rarely trees. Leaves simple or digitately or pinnately compound; usually stipellate rarely even-pinnate. *Inflorescence* various, often racemose. *Flowers* irregular, usually hermaphrodite, rarely regular. *Sepals* 5, united beyond the disc in a campanulate or tubular calyx with a truncate, 5-toothed or 5-lobed limb, or with limb 4-toothed by union of the two upper segments or 2-lipped by similar union of three lower. *Petals* 5 imbricate or rarely spreading, the upper (*standard*) outer, two lateral (*wings*) usually overlying and free from or attached about the middle to the two lower inner rarely free usually connate below in a curved sheath (*keel*); petals rarely subsimilar and subequal. *Stamens* inserted with the petals on a disc lining the base of the calyx, usually 10 diadelphous in a sheath of 9 connate next keel with 1 free next standand, rarely in 2 lateral sheaths of 5 each; sometimes 9 by abortion of upper filament, or 5 by abortion of alternate stamens; occasionally 10, monadelphous, very rarely 10, free; anthers usually dehiscing longitudinally. *Embryo* with radicle usually inflexed, accumbent. *Albumen* 0 or very scanty.

Stamens mon- or di-adelphous:—
  Pods dehiscent by both sutures:—
    Leaves even-pinnate the petiole ending in a bristle; stamens 9, the tenth abortive ... ... 1. Abrus.
    Leaves odd-pinnate or simple, or digitately 3- or more-foliolate:—
      Leaves simple or digitately compound; (pods turgid):—
        Leaves simple, sessile, or digitately 3–7-foliolate; stamens monadelphous; seeds many ... ... 2. Crotalaria.
        Leaves digitately 3-foliolate or, if 1-foliolate, petioled; stamens diadelphous; seeds 2 ... ... 3. Flemingia.
      Leaves pinnately compound:—
        Leaves 3-foliolate (5–7-foliolate in one species of *Clitoria*) (Phaseoleæ except *Flemingia*):—
          Pods dehiscent from end to end:—
            Leaves glandular beneath; (pod compressed; stamens 9+1) (*Cajaneæ* except *Flemingia*):—
              Ovules 2; the 2 upper calyx-lobes almost free; (stigma small terminal; seed not strophiolate,) funicle attached to end of hilum ... ... 4. Eriosema.
              Ovules 4 or more; the 2 upper calyx-lobes much connate; funicle centric:—
                Climbers; stigma small terminal; seeds strophiolate or sub-strophiolate:—
                  Pod linear acuminate, hardly depressed between the seeds; funicle expanded but seeds not distinctly strophiolate ... 5. Dunbaria.

Pod oblong obtuse, deeply transversely lineate between the seeds; strophiole large ... ... 6. ATYLOSIA.

Woody undershrubs; stigma dilated, oblique; seeds not strophiolate; (pod acute deeply transversely lineate between the seeds) ... 7. CAJANUS.

Leaves not glandular beneath, (leaflets stipellate; climbing species except *Erythrina*):—

Style bearded below the stigma; (stamens 9+1) (*Euphaseoleæ* + *Clitoria*):—

Stigma oblique:—

Keel spirally twisted .. ... 8. PHASEOLUS.

Keel not spiral:—

Style filiform ... ... 9. VIGNA.

Style flattened upwards ... ... 10. PACHYRHIZUS.

Stigma terminal:—

Petals equal in length:—

Pod flattish, not winged ... ... 11. DOLICHOS.

Pod square, 4-winged ... .. 12. PSOPHOCARPUS.

Petals very unequal, standard large; *leaflets sometimes* 5–7 ... ... 13. CLITORIA.

Style not bearded below the stigma:—

Nodes of racemes not swollen (*Glycineæ* except *Clitoria*):—

Petals very unequal, standard large; stamens 9+1, all fertile ... ... 14. CENTROSEMA.

Petals subequal, all small; stamens monadelphous, 5 fertile, 5 alternate sterile ... 15. TERAMNUS.

Nodes of racemes swollen:—

Stamens monadelphous; petals equal (*Dioclеæ*):—

Upper lip of calyx not projecting:—

Pod oblong, turgid, 1–2-seeded ... 16. DIOCLEA.

Pod linear, flat, many-seeded ... 17. PUERARIA.

Upper lip of calyx projecting ... 18. CANAVALIA.

Stamens diadelphous (9+1); petals very unequal (*Erythrineæ*):—

Anthers dimorphous; keel exceeding wings and standard ... ... 19. MUCUNA.

Anthers uniform:—

Keel and standard equal, wings very short ... ... 20. STRONGYLODON.

Keel and wings [illegible] shorter than standard; *armed* [illegible] ... 21. ERYTHRINA.

[illegible] the seed-bear[illegible] only, else- [illegible] indehiscent

[illegible] and wings [illegible] standard 21. ERYTHRINA § HYPAPHORUS.

[illegible]; petals [illegible] ... 22. SPATHOLOBUS.

Leaves pinnately 5–∞-foliolate; (1-foliolate in some species of *Tephrosia*):—
Anthers apiculate; hairs centrally fixed; (stamens diadelphous, 9+1) ... ... 23. INDIGOFERA.*
Anthers obtuse; hairs basifixed:—
Pods transversely septate between the seeds; (stamens diadelphous, 9+1) ... ... 24. SESBANIA.
Pods not septate; (stamens 9+1, the upper often united in the middle to the staminal sheath):—
Leaflets closely parallel-veined; pod thin early dehiscent; *leaves sometimes* 1–3-*foliolate* ... 25. TEPHROSIA.
Leaflets reticulate-veined; pod thick, tardily dehiscent ... ... 26. MILLETTIA.

Pods indehiscent or, rarely, opening (some *Desmodia*) along the lower suture:—
Pod not segmented; (always indehiscent):—
Leaves odd-pinnate; trees or strong woody climbers:—
Leaflets opposite:—
Stamens monadelphous, the vexillary filament united in the middle to the staminal sheath; pod thickly coriaceous or woody; (calyx truncate):—
Pod wingless ... ... 27. PONGAMIA.
Pod winged ... ... 28. DERRIS.
Stamens quite diadelphous, 9+1:—
Pod winged; calyx truncate ... ... 28. DERRIS § AGANOPE.
Pod wingless; calyx toothed ... ... 29. KUNSTLERIA.
Leaflets distinctly alternate:—
Flowers small, pods narrow ... ... 30. DALBERGIA.
Flowers large, pods suborbicular ... ... 31. PTEROCARPUS.
Leaves even-pinnate, the rachis ending in a bristle, *herbs with hypogæal fruits* ... ... 32. ARACHIS.
Pod of several (rarely 1) indehiscent 1-seeded segments (in *Desmodium* § *Nicholsonia* dehiscing along the lower suture) (HEDYSAREÆ except *Arachis*):—
Leaves exstipellate:—
Stamens monadelphous, anthers dimorphous; leaves digitately 2–4-foliolate; (joints of pod muricated) ... 33. ZORNIA.
Stamens diadelphous in 2 bundles of 5 each; anthers uniform; leaves pinnate (*Aeschynomeneæ*); (joints of pod papillose or weakly muricated, rarely smooth):—
Leaves even-pinnate, end-leaflet replaced by a bristle; pod folded together within the calyx ... 34. SMITHIA.
Leaves odd-pinnate; pod straight exserted:—
Calyx 5-toothed; ovary sessile, ovules few, joints of pod oblong ... ... 35. ORMOCARPUM.

* None of the simple-leaved or subdigitately-leaved species of *Indigofera* are reported from the Malay Peninsula.

Calyx deeply 2-lipped; ovary stalked, ovules many; joints of pod suborbicular or quadrate ... 36. AESCHYNOMENE.
Leaves stipellate; (stamens 9+1, anthers uniform):—
Ovary 1-ovuled; (leaves pinnately 3-foliolate) ... 37. PHYLACIUM.
Ovary 2- or more-ovuled:—
Pod folded together within the calyx:—
Calyx-teeth setaceous, not accrescent ... 38. URARIA.
Calyx-teeth lanceolate, accrescent ... ... 39. LOUREA.
Pod straight exserted:—
Joints of pod coriaceous about as thick as they are broad and long ... ... 40. ALYSICARPUS.
Joints of pod thin, or if coriaceous (§ *Dendrolobium*) much broader than thick, and if as thick as broad (§ *Scorpiurus*) much longer than broad; opening along lower suture in § *Nicholsonia* and in § *Pleurolobium* ... ... 41. DESMODIUM.
Stamens free:—
Stigma terminal, pod long moniliform ... ... 42. SOPHORA.
Stigma oblique, pod short turgid ... ... 43. ORMOSIA.

1. ABRUS Linn.

Climbing shrubs. *Leaves* with numerous deciduous leaflets. *Flowers* small, in dense racemes on axillary peduncles or short branches. *Calyx* campanulate, equal; teeth very short. *Corolla* much exserted; standard ovate, acute, adhering below to the staminal tube; wings narrow; keel arcuate. *Stamens* 9, united in a tube slit above, the tenth absent; anthers uniform. *Ovary* subsessile, many-ovuled; style short, incurved, beardless, stigma capitate. *Pod* oblong or linear-oblong, flat or turgid, moderately firm, thinly septate. Species 5; cosmopolitan in the tropics.

Pod oblong turgid 3–5-seeded ... ... 1. *A. precatorius.*
Pod linear flat incurved 8–12-seeded ... ... 2. *A. pulchellus.*

1. ABRUS PRECATORIUS Linn. Syst. Veg. ed. XII, 472. A copiously branched climber with thin stems and slender glabrous or thinly silky branches. *Leaves* 2–3 in. long; leaflets equally pinnate in 10–20 opposite pairs membranous glabrous above thinly silky beneath, green deciduous, ligulate-oblong ·35–·65 in. long, ·15–·2 in. wide. *Racemes* many-flowered, crowded, usually shorter than the leaves, rachis usually distinctly thickened in fruit. *Calyx* ·1 in. thinly silky. *Corolla* ·5 in. pink, or white with pink tinge. *Pod* oblong, turgid, 1–1·5 in. long, ·4–·5 in. wide, valves rugose thickened, 3–5-seeded. *Seeds* various, usually bright scarlet with black hilum in wild specimens; sometimes white with black hilum, uniformly white, or uniformly black in cultivated forms. DC. Prodr. II, 381; Roxb. Flor. Ind. III, 258; Wall. Cat., 5818; Miq. Flor. Ind. Bat. I, 158; Bak. in Flor. Brit. Ind. II, 175. *A. minor* Desv. Ann. Sc. Nat. IX, 418. *A. pauciflorus* Desv. Ann. Sc. Nat. IX, 418.

Andamans; very common from the Coco Group to Little Andaman; Barren Island. Nicobars; common. Penang; *Wallich! Curtis!* Pangkore; *Scortechini!* Pahang; *Ridley!* Distrib. Cosmopolitan in the tropics.

2. Abrus pulchellus Wall. Cat. 5819. A copiously branched climber with thin stems and slender glabrous or thinly silky branches. *Leaves* 3–4 in. long; leaflets equally pinnate in 12–16 opposite pairs, membranous glabrous above thinly silky beneath, green deciduous, ligulate oblong ·75–1·25 in. long, ·25–·35 in. wide. *Racemes* many-flowered, usually lax always long-peduncled, equalling or exceeding the leaves; rachis little thickened in fruit. *Calyx* ·1 in. thinly silky. *Corolla* ·5 in. pink, or pale blue. *Pod* linear flat incurved 2–2·5 in. long, ·5 in. wide, valves smooth thin, 8–12 seeded. Thwaites, Enum. Pl. Zeyl. 91; Bak. in Flor. Brit. Ind. II, 175. *A. lævigatus* E. Mey. Comm. I, 126; Harv. Fl. Cap. II, 263. *A. melanospermus* Hassk. Cat. Bog. 282; Miq. Flor. Ind. Bat. I, 159. *A. acutifolius* Blume MSS. ex Miq. Flor. Ind. Bat. I, 160.

Andamans; Coco Group, *Prain!* Port Blair, common. Perak; *Kunstler* 1023! *Scortechini* 630! Distrib. S. Africa and S.-E. Asia.

2. Crotalaria Linn.

Herbs or shrubs with simple or digitately 3-foliolate rarely 5–7-foliolate leaves. *Flowers* often large and showy in terminal or leaf-opposed racemes. *Calyx* with short tube, and with lanceolate or linear teeth free or somewhat connate in two lips. *Corolla* equalling or exceeding the calyx; standard rounded or ovate short-clawed; wings obovate or oblong shorter than standard; keel as long as wings, its petals united, much incurved and beaked. *Stamens* monadelphous in a sheath split dorsally, anthers dimorphous, alternately on short filaments versatile and on longer basifixed. *Ovary* sessile or, rarely, stipitate linear usually many-ovuled; style long, abruptly incurved at the base, bearded above, stigma oblique small. *Pod* sessile or, rarely, supported on a gynophore oblong or linear, straight, turgid or inflated, continuous within, 2–∞-seeded. Species about 250, widespread in tropical and sub-tropical regions.

Leaves simple:—
- Stipules decurrent as a persistent wing to the stem ... 1. *C. alata.*
- Stipules, if present, not decurrent:—
  - Pods not longer than the calyx:—
    - Flowers in elongated racemes, petals blue; stipules minute ... ... 2. *C. sessiliflora*
    - Flowers in short few-fld. heads, petals pale yellow; stipules 0 ... ... 3. *C. chinensis.*

Pods much longer than the calyx :—
Pods glabrous, flowers yellow :—
Stems diffuse, racemes lateral ... ... 4. *C. ferruginea.*
Stems erect, racemes terminal :—
Branches stout striated, glabrous or nearly so ; leaves stipellate :—
Leaves obtuse or retuse, bracts and stipules small subulate ... ... 5. *C. retusa.*
Leaves acute, bracts and stipules large acute and leafy ... ... 6. *C. sericea.*
Branches slender terete, densely silky ; leaves exstipellate ... ... 7. *C. albida.*
Pods hirsute, flowers usually blue, racemes lateral as well as terminal ... ... 8. *C. verrucosa.*
Leaves compound :—
Leaves 3-foliolate :—
Pods small, obliquely subglobose, very few-seeded (hirsute) ... ... 9. *C. uncinella.*
Pods large, cylindric, many-seeded :—
Pods hirsute (narrowly cylindric almost sessile) ... 10. *C. incana.*
Pods glabrous :—
Pods narrowly cylindric, almost sessile .. 11. *C. Saltiana.*
Pods oblong, supported on a long gynophore ... 12. *C. laburnifolia.*
Leaves usually 5-foliolate (at times 3-, 4-, or even 6-7-foliolate ... ... 13. *C. quinquefolia.*

1. Crotalaria alata Ham. in Roxb. Hort. Beng. 98. A suberect undershrub 1–2 feet high ; stem and leaves below clothed with short silky pubescence. *Leaves* 1–3 in. long, simple, oblong-ovate or obovate subacute or obtuse, membranous, the stipules with lanceolate-dentate points forming decurrent wings on the stem for nearly the whole length of the nodes. *Racemes* 2–3-fld., on elongated often leafy lateral peduncles ; bracts small, persistent, ovate, acuminate. *Calyx* densely silky, ·35 in. long, tube campanulate, bracteolate. *Corolla* pale-yellow hardly exserted. *Pod* distinctly stalked 1·25–1·75 in. long, linear-oblong, glabrous, 30–40-seeded. Don, Prodr. 241 ; Roxb. Flor. Ind. III, 274 ; DC. Prodr. II 124 ; Wall. Cat. 5356 ; Benth. in Hook. Lond. Journ. II, 478 ; Miq. Flor. Ind. Bat. I, 329 ; Bak. in Flor. Brit. Ind. II, 69. *C. sagitticaulis* Wall. Cat. 5357. *C. bialata* Roxb. Flor. Ind. III, 274.

Singapore ; Changi, *Hullett ! Ridley !* Distrib. Himalaya ; Indo-China ; Malay Islands.

2. Crotalaria sessiliflora Linn. Sp. Pl. ed. 2, 1004. A rigid erect annual 1–2 feet high, simple or sparingly fastigiately branched, stem and leaves below shortly silky. *Leaves* 2–6 in. long, simple linear or lanceolate narrowed to both ends thickly herbaceous, quite glabrous above, the stipules setaceous very small. *Racemes* 1–8 in. long, 5–20-

fld., terminal; flowers deflexed close-set (occasionally solitary flowers occur also in the axils of the uppermost stem-leaves); bracts long, setaceous, persistent. *Calyx* densely silky with very long hairs, ·35–·5 in. long, tube shortly campanulate, teeth all long acute, the upper lanceolate, narrow. *Corolla* blue and white, rarely yellow, glabrous, not exserted. *Pod* sessile ·5 in. long, not exserted, oblong, glabrous, 10–15-seeded. DC. Prodr. II, 129; Benth. in Hook. Lond. Journ. II, 565; Miq. Flor. Ind. Bat. I, 338; Bak. in Flor. Brit. Ind. II. 73. *C. anthylloides* Lamk. Encyc. Meth. II, 195; Don, Prodr. 241; Wall. Cat. 5366 A (partly), B, C. *C. salicifolia* Ham. in Don, Prodr. 241 not of Heyne. *C. nepalensis* Link, Enum. II, 228. *C. venusta* Wall. Cat 5365. *C. brevipes* Champ. in Hook. Kew Journ. IV, 44. *C. eriantha* Sieb. & Zucc. Fl. Jap. 13. *C. Oldhami* Miq. Ann. Mus. Lugd. Bat. III, 42. *C. calycina* Kurz, Journ. As. Soc. Beng. XLV, pt. 2, 147 not of Schrank.

Malaya Peninsula; Pahang, *Ridley!* Nicobars; Kamorta, *Kurz!* Distrib. Japan, China, Indo-China, Philippines, Java; Himalayas from Assam westward; Panjab, Central India and Behar.

The specimens collected by Mr. Kurz in Kamorta having yellow flowers were referred by him to *C. calycina*. An examination however shows that they are not *calycina* but *sessiliflora*. A gathering from Java has been issued from Mus. Leyden, also under the name *C. calycina*; this probably indicates that in Java as in the Nicobars, *C. sessiliflora* may have yellow flowers.

3. Crotalaria chinensis Linn. Sp. Pl. ed. 2, 1003. An annual 1–2 feet high, usually breaking into several stoutish ascending branches from near the base, laxly silky with reddish brown hairs. *Leaves* 1–2 in. long, simple, linear to oblanceolate with rounded base and obtuse or subacute apex, thickly herbaceous laxly silky on both surfaces; stipules 0. *Racemes* densely capitate 3–6-fld., all terminal, bracts and bracteoles linear, persistent. *Calyx* laxly silky, ·35–·5 in. long, tube very short, teeth all long acute, the upper lanceolate, lower linear. *Corolla* pale-yellow, glabrous, not exserted. *Pod* sessile ·5 in. long, not exserted, oblong, glabrous, 15–20-seeded. DC. Prodr. II, 130; Benth. in Hook. Lond. Journ. II, 566; Miq. Flor. Ind. Bat. I, 339; Bak. in Flor. Brit. Ind. II, 73.

Perak; Larut river; on rocks in the stream, *Wray!* Distrib. China, Indo-China, Philippines; India; Malay Islands.

4. Crotalaria ferruginea Grah. in Wall. Cat. 5398. A diffuse copiously branching herb with a perennial rootstock, finely silky or shaggy, branches 1·5–2 feet long. *Leaves* very short petioled, herbaceous 1·5–2 in. long, ·5–·75 in. across, simple, ovate-oblong obtuse paler beneath; stipules persistent foliaceous deflexed or spreading, ·25 in. long; petioles ·15 in. long. *Racemes* laxly 2–8-fld. leaf-opposed, 2–4 in. long, bracts linear ·2 in. long often deflexed, pedicels very short. *Calyx*

laxly silky with rusty hairs, ·5 in. long, tube very short, upper teeth lanceolate lower linear. *Corolla* yellow not exserted. *Pod* shortly stalked 1–1·25 in. long glabrous 20–30-seeded. Benth. in Hook. Lond. Journ. II, 476; Bak. in Flor. Brit. Ind. II, 68. *C. canescens* Wall. Cat. 5415. *C. crassifolia* Ham. in Wall. Cat. 5416. *C. leioloba* Bartl. Ind. Sem. Hort. Goett. 1837; Linnæa XII, Litt. 80. *C. pilosissima* Miq. Flor. Ind. Bat. I, 327.

Pahang; Katepong Pekan, *Ridley!* Distrib. India, Indo-China, China; Malay Archipelago.

Mr. Ridley has kindly sent the writer for inspection, from the Singapore Herbarium, the only specimen of this species hitherto collected in the Malay Peninsula. The plant is, however, quite common in Sumatra and Java and may yet be found elsewhere in the Peninsula.

5. Crotalaria retusa Linn. Sp. Pl. 715. An erect robust undershrub 3–4 feet high, with stout striated glabrous branches. *Leaves* 1·5–3 in. long, simple, short-petioled, thickly herbaceous, glabrous above puberulous beneath, oblong-oblanceolate, obtuse or oftener retuse, rarely subacute at apex, cuneate at base, stipules subulate very small. *Racemes* terminal elongated 6–8 in. long laxly 12–20-fld., bracts and bracteoles subulate, pedicels shorter than calyx. *Calyx* almost glabrous, ·35–·5 in., tube short campanulate, half the length of the lanceolate teeth. *Corolla* ·8 in. long, much exserted, yellow with purple tinge. *Pod* glabrous linear-oblong, 1–1·5 in., distinctly stalked, 15–20-seeded. DC. Prodr. II, 125; Roxb. Flor. Ind. III, 272; Bot. Reg. t. 253; Bot. Mag. t. 2561; Wall. Cat. 5405; W. & A. Prodr. 187; Miq. Flor. Ind. Bat. I, 330; Bak. in Flor. Brit. Ind. II, 75. *Lupinus cochinchinensis* Lour. Flor. Cochinch. 429; DC. Prodr. II, 410. *Tandale-cotti* Rheede, Hort. Malab. IX, t. 25.

Malay Peninsula; Malacca, *Maingay! Hervey!* Pahang, *Ridley!* Andamans; Port Blair, very common; having been introduced as a plant of native gardens, it has now run wild throughout the settlement. —Distrib. General in the tropics.

6. Crotalaria sericea Retz, Obs. V, 26. A robust undershrub 3–4 feet high with stout striated almost glabrous branches. *Leaves* 2–6 in. long, simple, short petioled, thickly herbaceous, glabrous above, finely silky beneath, oblong-oblanceolate acute or subacute at apex, cuneate at base; stipules large leafy persistent. *Racemes* terminal elongated 10–12 in. long, laxly 20–50-fld., bracts ovate leafy persistent, pedicels longer than calyx. *Calyx* almost glabrous ·5 in. long, tube short campanulate half the length of the lanceolate teeth. *Corolla* ·8 in. long, much exserted, yellow with purple tinge. *Pod* glabrous linear-oblong 1–2 in. long, distinctly stalked 20–30-seeded. DC. Prodr. II,

126; Roxb. Fl. Ind. III, 273; Wall. Cat. 5406; W. & A. Prodr. 186; Miq. Flor. Ind. Bat. I, 330; Bak. in Flor. Brit. Ind. II, 75. *C. spectabilis* Roth, Nov. Sp. 341; DC. Prodr. II, 125. *C. macrophylla* Wenm. Syll. II, 26. *C. cuneifolia* Schrank, Syll. II, 78.

Malay Peninsula; Malacca, *Griffith.* Andamans; Table Island, *Prain!* Distrib. India and Indo-China.

Very like the preceding, but easily distinguished, even in those cases where the foliage is similar, by the large stipules and bracts.

7. Crotalaria albida Heyne ex Roth, Nov. Sp. Pl. 333. An undershrub 1–2 feet high with numerous firm slender terete obscurely silky branches. *Leaves* simple linear or oblanceolate obtuse firm shining gland-dotted glabrescent above, thinly silky beneath, 1–2 in. long ·2–·25 in. wide, petiole ·1 in., stipules 0. *Flowers* in terminal, or rarely lateral, laxly 6–20-fld. racemes, 2–4 in. long; bracts linear ·05–·1 in. long; pedicels ·15–·2 in. long slender adpressed-puberulous. *Calyx* turbinate ·25 in. long, in fruit ·35 in. long, thinly silky; teeth long the 3 lower linear acuminate, the 2 upper broader often subobtuse. *Corolla* pale yellow glabrous ·3 in. long. *Pod* glabrous sessile, oblong-cylindric ·5–·6 in. long, half as long again to twice as long as calyx; seeds 6–12. W. & A. Prodr. 189; Bak. in Flor. Brit. Ind. II. 71. *C. montana* Roxb. Hort. Beng. 54; Flor. Ind. III, 265; W. & A. Prodr. 182. *C. scoparia* Wall. Cat. 5418. *C. parva* Grah. in Wall. Cat. 5402. *C. punctata* Grah. in Wall. Cat. 5401 A, 5401 C. *C. tennis* Wall. Cat. 5403.

Selangor; roadsides at Kwala, *Ridley* 7293! Distrib. Throughout South Eastern Asia.

A species perhaps only recently introduced to the Malay Peninsula from India; in India and Indo-China the plant is very common in grassy places.

8. Crotalaria verrucosa Linn. Sp. Pl. 715. A woody herb 2–3 feet high with many angular branches puberulous at first but soon glabrescent. *Leaves* 2–6 in. long, simple short petioled, thin, obscurely downy beneath, ovate, obtuse or occasionally acute at apex, deltoid at base; stipules moderately large leafy semilunate. *Racemes* terminal and lateral, about 6 in. long, rather closely 12-20-fld., bracts linear minute, pedicels about as long as calyx. *Calyx* ·3 in. long, obscurely downy, tube short campanulate, half the length of lanceolate teeth. *Corolla* ·75 in. long, exserted, usually white and blue, often white, occasionally yellow. *Pods* faintly hirsute, oblong, 1–1·5 in. long, distinctly stalked, 10–15-seeded. DC. Prodr. II, 125; Bot. Mag. t. 3034; Wall. Cat. 5392; W. & A. Prodr. 187; Wight Ic. t. 200; Miq. Flor. Ind. Bat. I, 331 Bak. in Flor. Brit. Ind. II, 77. *C. angulosa* Lamk. Encyc. Meth. II, 197; Roxb. Flor. Ind. III, 273. *C. cærulea* Jacq. Ic. t. 144. *C. acuminata* G. Don., Dict. II, 134.—Rheede, Hort. Malab. IX, t. 29.

Malay Peninsula; Perak, *Scortechini!* Malacca, *Griffith.* Pahang, *Ridley!*

9. Crotalaria uncinella Lamk. Encyc. Meth. II, 200. An almost stemless undershrub with several subprocumbent slender flexuous spreading branches 1–2 feet long, slightly puberulous. *Leaves* compound 3-foliolate, petioles 1 in. long, leaflets subequal or the terminal slightly the larger, 1–1·5 in. long, ·5–·75 in. wide, glabrous above slightly hirsute beneath, elliptic obtuse entire; stipules small, acute, rigid, recurved, glabrous above hirsute beneath. *Racemes* lateral and terminal 2 in. long, 20–25-fld.; flowers close-set, bracts small recurved ovate acuminate. *Calyx* hirsute ·15 in. long, teeth lanceolate. *Corolla* ·25 in. long, exserted, yellow, glabrous. *Pod* obliquely subglobose, closely adpressed-pubescent, 2-seeded; style sharply hooked. Lamk. Ill. t. 617, f. 2. *C. elliptica* Roxb. Hort. Beng. 54; Flor. Ind. III, 279; Miq. Flor. Ind. Bat. I, 344; Benth. in Hook. Lond. Journ. II, 580; Flor. Hongk. 75; Forbes & Hemsl. Ind. Sinens., I, 151. *C. Vachellii* H. & A. Bot. Beech. Voy. 180; Walp. Rep. I, 588. *Rhynchosia aurea* Ridl. Trans. Linn. Soc., Ser. II, III, 293 not of DC.

Malay Peninsula; Pahang, *Ridley!* Malacca, *Derry! Goodenough!* Distrib. China.

First described by Lamarck from specimens received by him from Mauritius; probably the plant had been there introduced; at all events Mr. Baker does not cite it, even as a stranger, in his *Flora of Mauritius.* Afterwards described, independently, by Roxburgh, from specimens reared in the Calcutta garden, and therefore, though issued by Wallich, deliberately excluded from the Indian Flora by Wight and Arnott, who have been in this followed by Baker in the *Flora of British India.* Its discovery in Pahang by Mr. Ridley, in whose list it stands as *Rhynchosia aurea*, and in Malacca where it is apparently quite common, shows that after all it deserves to be included in the Indian Flora.

10. Crotalaria incana Linn. Sp. Pl. 716. An erect undershrub 2–4 feet high with robust terete loosely downy branches. *Leaves* compound 3-foliolate petioles 2–3 in. long, leaflets membranous, quickly glabrescent above sparsely hirsute beneath terminal 1·5–2 in. long, larger than lateral all ovate, obtuse at apex and rounded or widely cuneate at base; stipules minute setaceous. *Racemes* terminal and lateral 6–10 in. long, rather closely 12–20-fld., bracts minute. *Calyx* ·25 in. long, loosely downy, teeth lanceolate twice as long as the tube. *Corolla* ·6 in. long, exserted, yellow, glabrous. *Pod* subsessile slightly deflexed and slightly recurved, cylindric 1–1·25 in. long, permanently pubescent with spreading brown silky hairs; 20–30-seeded. DC. Prodr. II, 132; Bot. Reg. t. 377; Miq. Flor. Ind. Bat. I, 347; Bak. in Flor. Brit. Ind. II, 83. *C. Schimperi* A. Rich. Fl. Abyss. I, 151. *C. herbacea* Schweig. in Schrank, Syllog. Ratisb. II, 77.

Penang; *Curtis!* Distrib. Cosmopolitan in the tropics, originally American.

There is one specimen of this in Mr. Curtis' own Herbarium. No other collector has sent it from Malaya.

11. Crotalaria Saltiana Andr. Bot. Rep. t. 648. An erect shrub 2–4 feet high with robust smooth or slightly sulcate thinly silky branches. *Leaves* compound, 3-foliolate, petioles 2–3 in. long, leaflets membranous, glabrous above very sparingly silky below, terminal 1·5–2·5 in. long, larger than lateral, all obtuse cuneate at base; stipules minute, deciduous. *Racemes* terminal and occasionally also lateral, usually 1–1·25 feet long, laxly 20–50-fld.; bracts minute. *Calyx* ·25 in. long, thinly silky; teeth lanceolate as long as campanulate tube. *Corolla* ·6 in. long, exserted, yellow with purple stripes or pure yellow, glabrous. *Pod* subsessile deflexed, subrecurved puberulous when young, ultimately glabrous, cylindric, 1·5 in. long, 20–30-seeded. *C. striata* DC. Prodr. II, 131; Miq. Flor. Ind. Bat. I. 346; Bak. in Flor. Brit. Ind. II, 84 (excluding the synonyms *C. Brownei* Bertero and *C. latifolia* Roxb.)

Malay Peninsula; Perak, *Wray! Scortechini!* Penang, *King!* Malacca, *Maingay!* Singapore, *Kunstler!* Pahang, *Ridley.*

Nearly related to, and at times mistaken for *C. Brownei* Bertero ex DC. in Prodr. II, 130 (*C. lanceolata* Roxb. Hort. Beng. 54 [nomen prius] nec Meyer; *C. latifolia* Roxb. ex Wall. MSS. in Hort. Calcutta) a native of the West Indies, but now occasionally met with as a spontaneous species in India. From *C. Saltiana*, *C. Brownei* differs in having more numerous lateral racemes, with flowers always close-set and racemes never exceeding 6 in., and in having much larger leaflets acute at apex as well as base and more densely silky underneath. The leaves of *C. Saltiana* are like those of the next species; of *C. Brownei* like those of *C. bracteata* and of *Priotropis cytisoides* for both of which species it has, at times, been mistaken.

12. Crotalaria laburnifolia Linn. Sp. Pl. 715. An erect shrub 2–4 feet high with long slender rounded glabrous branches. *Leaves* compound, 3-foliolate, petioles 2–3 in. long, leaflets membranous, glabrous on both surfaces, terminal 1–2 in. long, hardly larger than lateral, all subacute or obtuse, cuneate at the base; stipules 0. *Racemes* terminal and lateral 6–12 in. long, few- and very lax-fld.; bracts minute deciduous, pedicels ·5 in. long. *Calyx* ·3–·4 in. long, glabrous turbinate, teeth lanceolate as long as tube. *Corolla* 1 in. long, much exserted, pure yellow, glabrous, keel much incurved. *Pod* pendulous from a filiform gynophore ·75–1 in. long, glabrous, cylindric 1·5–2 in. long, 20–30-seeded. DC. Prodr. II, 130; Roxb. Fl. Ind. III, 275; Wall. Cat. 5424, mostly; W. & A. Prodr. I, 193; Miq. Flor. Ind. Bat. I, 345; Bak. in Flor. Brit. Ind. II, 84. *C. pendula* Bert. in DC. Prodr. II, 130. *C. pedunculosa* Desv. Journ. Bot. III, 76; DC. Prodr. II, 132. *Clavulium pedunculosum* Desv. Ann. Sc. Nat. IX, 407. *Nellia-tandalecotti* Rheede, Hort. Malabar. IX, t. 27.

Malay Peninsula; Malacca, *Griffith! Maingay! Hervey!* Distrib. India; Malay Archipelago; Philippines.

13. Crotalaria quinquefolia Linn. Sp. Pl. 716. An erect annual 2–4 feet high with straight robust sulcate fastigiate sparingly silky branches. *Leaves* digitate normally 5-foliolate, at times 3-, 4-, or even 6–7-foliolate, petioles 1–3 in. long, leaflets herbaceous, glabrous above, thinly silky beneath, central largest 2–4 in. long, all linear or occasionally narrowly oblanceolate obtuse; stipules linear. *Racemes* terminal, 6–8 in. long, laxly 8–20-fld.; bracts linear as long as pedicels, thinly silky, persistent; lower pedicels as long as calyx, upper short. *Calyx* subglabrous ·5 in. long; teeth lanceolate as long as campanulate tube. *Corolla* 1 in. long, glabrous, yellow, white or rarely purplish. *Pod* distinctly stalked subinflated, glabrous, 1·5–2 in. long, ·75 in. wide, 30–40-seeded. DC. Prodr. II, 135; Roxb. Flor. Ind. III, 279; Wall. Cat. 5429; W. & A. Prodr. I, 194; Wight Ill, t. 16; Miq. Flor. Ind. Bat. I, 347; Bak. in Flor. Brit. Ind. II, 84. *C. heterophylla* Linn. f. Suppl. 323; DC. Prodr. II, 131.

Malay Peninsula; Kedah, *Kunstler!* Singapore, *Hullett!* Distrib. India; Indo-China; Malay Archipelago; Philippines.

3. Flemingia Roxb.

Shrubs, rarely herbs, with leaves digitately 3-foliolate or simple, gland-dotted below. *Inflorescence* various; pedicels very short, no bracteolate. *Calyx-tube* short; teeth narrow, acuminate, the lowe often the longest. *Corolla* little or not at all exserted; petals equ in length; keel obtuse or slightly rostrate. *Stamens* diadelphous anthers uniform. *Ovary* subsessile, 2-ovuled; style filiform, beardless, stigma capitate. *Pod* oblong, turgid, small, usually two-seeded; seeds not strophiolate, the funicle centrical. Species about 25; 3 Tropical African, the remainder Asiatic.

Leaves 1-foliolate; flowers in small cymes hidden by large folded persistent bracts and arranged in racemes longer than the leaves	1. *F. strobilifera.*
Leaves 3-foliolate; flowers in simple solitary or fascicled axillary racemes shorter than the petioles, bracts small deciduous	2. *F. congesta.*

§ Ostreodium Desv. Shrubs. *Leaves* simple. *Flowers* in small cymes, each hidden by a large folded persistent bract, closely distichously arranged in copious simple or slightly branched racemes, both in the axils of the leaves and above them.

1. Flemingia strobilifera R. Br. in Ait. Hort. Kew. ed. II, IV, 350. An erect shrub 5–10 feet high with slender terete branches velvety towards their tips. *Leaves* 4 in. long, petioles ·5 in. long, adpressed

puberulous; leaflets 1, subcoriaceous green glabrescent above thinly silky on the nerves beneath, ovate-acute, base widely rounded or truncate 3·5 in. long, 2 in. wide, lateral nerves 10–12 pairs; stipels obsolete, stipules scarious lanceolate ·3 in. long. *Inflorescence* in terminal racemes or thyrses 3–6 in. long, the slender zigzag rachis rusty-pubescent; bracts erecto-patent, short-petioled, deeply cordate 1 in. long, 1·25 in. wide, membranous, apex shortly cuspidate in all except the very uppermost. *Calyx* ·25 in. finely pilose; teeth lanceolate, exceeding the tube. *Corolla* yellowish or greenish-white ·35 in. long. *Pod* oblong turgid ·35 in. long, finely downy; 2-seeded. DC. Prodr. II, 351; Wall. Cat. 5753; W. & A. Prodr. 243; Wight Ic. t. 267; Miq. Flor. Ind. Bat. I, 161; Bak. in Flor. Brit. Ind. II, 227 (excluding both varieties). *F. abrupta* Wall. Cat. 5755. *Hedysarum strobiliferum* Linn. Sp. Pl. 746; Roxb. Flor. Ind. III, 350. *Zornia strobilifera* Per. Synops. II, 319.

In all the provinces, common. Distrib. Throughout S.-E. Asia.

§ 2. Flemingiastrum DC. Erect shrubs. *Leaves* digitately 3-foliolate. *Flowers* in dense subspicate axillary racemes; bracts linear or lanceolate, caducous.

2. Flemingia congesta Roxb. Hort. Beng. 56. An erect woody shrub 4–6 feet high with slender triangular sulcate branches silky towards their tips. *Leaves* 6–9 in. long, petioles 2·5–3·5 in. long, adpressed puberulous margins angled but hardly winged; leaflets 3, subcoriaceous, ovate-acute, terminal cuneate lateral obliquely round at base, green, puberulous above thinly rusty silky especially on the nerves beneath, 3–5 in. long, 1·5–3 in. wide, lateral nerves 5–7 pairs, the lowest pair long, very oblique, arising at junction of midrib and petiolule, stipels obsolete, petiolules ·25 in. long, stipules scarious externally velvety, early caducous ·4 in. long. *Inflorescence* in dense axillary racemes sometimes solitary in the higher, usually fasciculate in the lower axils, 2 in. long, always shorter than petioles; bracts lanceolate ·25 in. long or less, silky externally less rigid than the stipules and like them deciduous. *Calyx* ·35 in. long, densely silky externally, teeth linear-lanceolate the lowest exceeding the others. *Corolla* wings purple standard white striped with pink ·4 in. long. *Pod* oblong ·5 in. long, ·25 in. wide, closely shortly tomentose; seeds 2. Roxb. Fl. Ind. III, 340; DC. Prodr. II, 351; W. & A. Prodr. 241; Wight. Ic. t. 390; Wall. Cat. 5747; Miq. Flor. Ind. Bat. I, 164; Bak. in Flor. Brit. Ind. II, 288, excluding all the varieties. *Crotalaria macrophylla* Willd. Sp. Pl. III, 982. *Rhynchosia crotalarioides* DC. Prodr. II, 387.

Penang; *Wallich* 5747 F! Pulo Bœting, *Curtis* 1926! Malacca; *Griffith!* Pangkore, *Goodenough!* Perak; Larut, *Scortechini* 134! Kampong Kota, *Wray* 3316! Distrib. India, Indo-China, Java.

All the specimens quoted belong to Roxburgh's true *Flemingia congesta*.

4. Eriosema DC.

Shrubs or herbs, mostly suberect, with 1–3-foliolate leaves. *Flowers* racemed or axillary. *Calyx* campanulate; teeth 5, as long as the tube. *Corolla* distinctly exserted; limb of standard roundish, auricled at the base; wings and slightly beaked keel shorter. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, 2-ovuled; style filiform, glabrous, stigma capitate. *Pod* oblong, turgid, 1–2-seeded; seeds ob[illegible] the funiculus attached to the extremity of a linear hilum. Sp[illegible] 50, mostly Trop. African and American.

Eriosema chinense Vogel. Pl. Meyen. 31. An erect [illegible] 1–1·5 feet high, stems slender branching virgately usually [illegible] densely pubescent one or more from a small tuberous woody [illegible] 1·5 in. long, ·75 in. across. *Leaves* 1–2 in. long, ·3–·4 in. acro[illegible] late very short petioled, linear-oblong to linear-lanceolate, sub[illegible] greenish with a few adpressed hairs above densely grey [illegible]se beneath, the veins rusty brown tomentose; stipules linea[illegible] 2-nerved persistent ·2 in. long, stipels minute. *Flowers* in axils of upper leaves, solitary or geminate subsessile or on a common pedicel, sometimes ·5 in. long jointed below flower, bracteoles obsolete. *Calyx* campanulate densely pilose ·2 in. long. *Corolla* yellow, drying black, ·4 in. long, standard orbicular hairy externally. *Pod* oblong ·4 in. long, pubescent with long spreading rufous hairs. Bak. in Flor. Brit. Ind. II. 219. *Crotalaria tuberosa* Ham. in Don. Prodr. 241. *Rhynchosia virgata* Grah. in Wall. Cat. 5503. *R. Grahami* Wall. Cat. 5504. *Pyrrotricha tuberosa* W. & A. Prodr. 238.

Perak; *Wray* n. 3804! Malacca; *Griffith.* Distrib. S.-E. Asia, N. Australia.

5. Dunbaria W. & A.

Woody or herbaceous climbers. *Leaves* 3-foliolate, distinctly gland-dotted beneath; stipellæ rarely present. *Flowers* racemose or axillary. *Calyx* teeth narrow the lowest distinctly exceeding the others. *Corolla* exserted, marcescent or caducous; keel usually not beaked. *Stamens* diadelphous anthers uniform. *Ovary* sessile or stalked, many-ovuled; style inflexed filiform beardless, stigma capitate. *Pod* linear, flat not marked with depressed lines between the substrophiolate seeds. Species about 12, Eastern Asiatic, Japanese and North Australian; only one from our area.

§ Rhyncolobium. Corolla caducous.

Dunbaria Scortechinii Prain. A slender creeper 10–20 feet long with rigid subsulcate grey canescent stem and branches. *Leaves* 4–6 in. long, 3-foliolate; leaflets subtrapezoid, cuspidate acuminate at apex narrowed from below the middle to a rounded base, the lateral pair

obliquely; blueish-green faintly puberulous above, densely grey-canescent beneath 2–2·5 in. long, 1·75–2 in. wide; petiole 1·5–4 in. long, puberulous; petiolules ·15 in. long, puberulous; stipels very minute caducous, stipules lanceolate ·1 in. long caducous. *Racemes* 2–3 in. long on peduncles 4–6 in. long, overtopping the leaves; pedicels geminate ·2 in. long. *Calyx* grey-pubescent with reddish streaks, ·3 in. long, tube wide campanulate, lower tooth lanceolate as long as tube and twice as long as lateral deltoid and connate upper pair. *Corolla* ·5 in. long, externally dark brown, within pale yellow; keel beaked, standard ·6 in. wide, orbicular entire. *Pod* 2·5 in. long, ·25 in. wide, linear, pedicel abruptly recurved, closely grey-canescent; 6–8 seeded.

Perak; in open grassy or bamboo jungles, at Dijong, *Scortechini*, 1841! *Kunstler*, 908! Ulu Bubong, *Kunstler*, 10852!

A species with somewhat the appearance of *Rhynchosia bracteata* but with much more slender stems. It also resembles, but to a less degree, *Atylosia mollis* Its pods, however, have no depressions between the seeds and this renders it necessary to refer the plant to *Dunbaria*.

6. Atylosia W. & A.

Herbs or shrubs, erect or twining. *Leaves* 3-foliolate, sometimes subdigitate often exstipellate, gland-dotted beneath. *Flowers* axillary or racemed. *Calyx* teeth distinct, longer or shorter than the tube the lowest the longest. *Corolla* more or less exserted, marcescent or caducous; keel not beaked. *Stamens* diadelphous; anthers uniform. *Ovary* sessile; ovules 3 or more; style filiform incurved glabrous, stigma capitate. *Pod* linear or oblong, turgid, marked with horizontal or oblique transverse lines between the seeds which have a conspicuous divided strophiole. Species about 25; from India to Australia and Mauritius.

Petals marcescent, leaflets large pinnately trifoliolate ... 1. *A. crassa.*
Petals deciduous, leaflets small subdigitate ... ... 2. *A. scarabæoides.*

§ Atylia. Petals marcescent, remaining till the pod develops.

1. Atylosia crassa Prain. A twining species with firm slender striate shortly-tomentose stems and branches. *Leaves* 3–6 in. long, pinnately 3-foliolate; leaflets subtrapezoid cuspidate-acuminate at apex narrow from beyond the middle to a rounded base, the lateral pair obliquely, dark green and rather densely puberulous especially on the nerves above, densely greenish-brown pubescent and reticulately veined beneath, 2–3 in. long, 1·75–2·25 in. wide; petiole 1·5–2·5 in. long, pubescent; petiolules ·15 in. stipels subulate ·1 in. long, pubescent, subpersistent, stipules minute caducous. *Racemes* 2–3 in. long, lax short-peduncled, pedicels geminate ·3–·5 in. long; bracteoles large roundish acute reddish ·6 in. long, forming a conspicuous tuft before the racemes expand. *Calyx* ·4 in. finely grey-downy lowest tooth lanceolate as long

as the narrowly campanulate tube. *Corolla* yellow, ·75 in. long. *Pod* 1–1·25 in. long, ·6 in. wide, straight, rounded at both ends closely greenish-brown viscidly puberulous, 3–5-seeded, obliquely transversely depressed between the smallish seeds of which the longer diameter is parallel to the direction of the pod. *Dolichos reticulatus* Ham. in Wall. Cat. 5552 not of Ait. *D. crassus* Grah. in Wall. Cat. 5553. *Dunbaria Horsfieldii* Miq. in Flor. Ind. Bat. I, 179. *Atylosia mollis* Benth. in Pl. Jungh. 243 (excluding syn. *Collæa mollis* Grah.); Bak. in Flor. Brit. Ind. II, 213 (excl. syn. *Collæa mollis* Grah., *Atylosia glandulosa* Dalz., and *Cajanus glandulosus* Dalz. & Gibs.)

Andamans; very common. Distrib. India, Indo-China, Malay Archipelago.

The prior name for this species is *Dolichos reticulatus* Ham. but the name *Atylosia reticulata* may not be employed for it owing to there being another *A. reticulata* from Australia based on the *Dolichos reticulatus* Ait. of the *Hortus Kewensis* which was known before our plant. The nearest ally of this species is the purely Himalayan and quite distinct *A. mollis* Bth. (*Collæa mollis* Grah.)

§ Cantharospermum. Petals falling before the pod developes.

2. Atylosia scarabæoides Benth. Pl. Jungh. 243. A slender biennial herbaceous twiner with densely grey-downy stems and branches. *Leaves* 1·5–2 in. long, subdigitately 3-foliolate; leaflets obovate-oblong subcoriaceous flexible 1–1·5 in. long, ·5–·75 in. wide, obtuse or subacute thinly grey-canescent above, densely pubescent, 3-nerved in lower two-thirds and faintly reticulate-veined beneath; petiole ·5 in. long, brownish pubescent; stipels 0, stipules minute caducous. *Racemes* 2–6-fd., on densely pubescent axillary peduncles ·3—·4 in. long; pedicels ·25 in. long also pubescent. *Calyx* ·25 in., densely brownish-grey silky, teeth linear, the lowest twice as long as tube. *Corolla* ·4 in. long, keel abruptly incurved at tip. *Pod* straight ·75–1 in. long, ·25 in. wide, clothed with fine spreading brown silky hairs, with slightly oblique transverse depressed lines between the 4–5-seeds. Miq. Flor. Ind. Bat. I, 173; Bak. in Flor. Brit. Ind. II, 215. *Dolichos scarabæoides* Linn. Sp. Pl. 726. *Cajanus scarabæoides* Thouars ex Grah. in Wall. Cat. 5580. *Rhynchosia scarabæoides* DC. Prodr. II, 387. *R. biflora* DC. Prodr. II. 387. *Cantharospermum pauciflorum* W. & A. Prodr. 255.

Malacca; *Griffith!* Distrib. India, Indo-China, Malaya, China, Mascarene Islands.

7. Cajanus DC.

An erect shrub. *Leaves* 3-foliolate. *Flowers* racemed. *Calyx*-tube campanulate; teeth short. *Corolla* much exserted, its petals equal in length; keel truncate. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, few-ovuled; style long, filiform, much upcurved, stigma capi-

tate. *Pod* linear, straight, narrowed at both ends, 3–5-seeded, torulose with oblique linear depressions between the non-strophiolate seeds. The only species.

Cajanus indicus Spreng. Syst. III, 248 An erect shrub 6–8 feet high with slender grooved grey-silky branchlets. *Leaves* 2–5 in. long; petiole ·5–1·5 in. finely fluted densely adpressed hoary; leaflets 3 oblong-lanceolate entire subcoriaceous, terminal 1·75–3 in. long, ·5–1·25 in. wide lateral similar but smaller 1·25–1·75 in. long, ·35–·75 in. wide, thinly silky above densely shortly silky and indistinctly gland-dotted beneath, nerves 6–9 pairs oblique prominent; stipels minute; stipules lanceolate hoary-canescent externally, ·15 in. long. *Inflorescence* in sparse corymbose axillary racemes with peduncles 2 in. long and in a terminal panicle; pedicels downy the lowest ·5 in. long, bracteoles obsolete. *Calyx* campanulate ·25 in. long, teeth triangular shorter than tube. *Corolla* ·6–·75 in., standard yellow, or yellow with red veins, or rarely red. *Pod* 2–3 in. long, ·25–·45 in. wide, finely downy, with oblique cross depressions between the 2–6 seeds; armed at tip with thickened base and lower half of style; testa firm from pale to dark brown. W. & A. Prodr. 256; Miq. Flor. Ind. Bat. I, 174; Bak. in Flor. Brit. Ind. II, 217. *C. flavus* DC. Prodr. II, 406. *C. bicolor* DC. Prodr. II, 406; Wall. Cat. 5577. *Cytisus Cajan* Linn. Sp. Pl. 739; Roxb. Flor. Ind. III, 325. *C. pseudo-Cajan* Jacq. Hort. Vindob. t. 119.

Andamans; Perak; Penang; Malacca. Distrib. Cultivated everywhere in the tropics; probably a native of S.-E. Asia.

8. Phaseolus Linn.

Twiners, usually herbaceous, with 3-foliolate stipellate leaves. *Flowers* in copious axillary racemes; bracteoles usually conspicuous and persistent. *Calyx* campanulate, the lowest tooth usually longer than the rest and the two uppermost subconnate. *Corolla* much exserted, the keel prolonged into a very long beak which forms a complete spiral. *Stamens* diadelphous; anthers uniform. *Ovary* sessile, many-ovuled; style filiform, twisted round with the keel, conspicuously bearded down the side below the very oblique stigma. *Pod* linear, rarely oblong, subterete or subcompressed, more or less distinctly septate between the seeds. Species about 60, mostly tropical, many widely cultivated, especially in America.

Stipules small basifixed:—

Petals yellow puberulous externally, pods broad subcompressed ... ... 1. *P. lunatus.*

Petals red glabrous, pods narrow subtorulose between seeds 2. *P. adenanthus.*

Stipules produced below point of insertion (petals yellow, glabrous) :—
Pods subcylindric glabrous :—
Stems slender diffuse, racemes subcapitate, leaflets less than half as long as petioles, seeds rounded at ends ... 3. *P. trilobus.*
Stems twining, racemes subspicate, leaflets as long as petioles, seeds subtruncate ... ... 4. *P. calcaratus.*
Pods slightly compressed, pubescent ; (racemes subcapitate, seeds rounded at ends) ... ... 5. *P. Mungo.*

§ Euphaseolus. Stipules small, basifixed. Pods broad subcompressed.

1. Phaseolus lunatus Linn. Sp. Pl. 724. A tall twining biennial with stems at first finely downy but soon glabrescent. *Leaves* 6–8 in. long, leaflets 3, pale-green membranous entire rather wide triangular acute, base wide cuneate—of lateral leaflets obliquely, glabrous above minutely sparsely puberulous beneath, 3–4 in. long, 2–2·5 in. wide; petiole 4–6 in. long, and petiolules ·2 in. long puberulous; stipels ·15 in. long ovate-acute; stipules hardly larger and similar. *Racemes* axillary lax 2–6 in. long peduncles short the lower nodes distant; flowers in fascicles of 2–4, pedicels ·35 in. long, bracts minute. *Calyx* ·1 in. long minutely 2-bracteolate at the base, puberulous externally teeth wide triangular very short. *Corolla* greenish-yellow ·35 in. long puberulous externally. *Pod* decidedly compressed 2–3 in. long, ·6–·75 in. wide, ·25 in. thick; upper suture recurved, lower widely rounded. DC. Prodr. II, 393; Roxb. Flor. Ind III, 287; W. & A. Prodr. 244; Miq. Flor. Ind. Bat. I, 194; Bak. in Flor. Brit. Ind. II, 200. *P. vulgaris* Wall. Cat. 5595 not of Linn.

In all the provinces, cultivated.

An American species now widely spread in the old world.

§ Leptospron Bth. & Hk. f. Stipules medium, basifixed. Pods narrow subcompressed.

2. Phaseolus adenanthus G. W. F. Mey. Prim. Flor. Esseq. 239. A spreading glabrescent perennial, with slender rigid stems. *Leaves* 4–6 in. long; leaflets 3 medium to pale green, chartaceous, ovate-acute base cuneate—of lateral leaflets obliquely, nerves on both surfaces at first sparsely puberulous, otherwise glabrous, 2·5–4 in. long, 1·25–2 in. wide; petiole 2·5 in. long channelled above very sparsely hirsute or glabrous, petiolules ·2 in. long puberulous; stipels ·1 in. ovate adpressed, stipules often reflexed ovate-acute ·2 in. long. *Racemes* axillary rather crowded, peduncles 1–4 in. long nodes rather close together; flowers 1–3 from each node, pedicels under ·1 in. long, bracts minute. *Calyx* ·25 in. long campanulate, teeth deltoid to lanceolate half as long as tube, with 2 ovate bracteoles ·1 in. long at its base. *Corolla* pink to purple, showy, 1 in.

long glabrous. *Pod* decidedly compressed 4–6 in. long, ·4 in. wide, ·2 in. thick upper suture much recurved, subtorulose between the 10–16 brown or red seeds ·3 in. long, ·25 in. wide, with a small hilum. Bak. in Flor. Brit. Ind. II, 200. *P. alatus* Roxb. Hort. Beng. 54; Flor. Ind. III, 288 not of Linn. *P. amarus* Roxb. ex W. & A. Prodr. 244. *P. rostratus* Wall. Pl. As. Rar. I, 50, t. 63; Cat. 5610; W. & A. Prodr. 244; Wight, Ic. t. 34. *P. truxillensis* H. B. K. Nov. Gen. & Sp. VI, 451; DC. Prodr. II, 392. *P. senegalensis* Guill. & Perr. Fl. Seneg. 217.

Andamans; N. Andaman, *Helfer!* S. Andaman, *King's Collector!* Narcondam, growing on the boulders of the higher beach, *Prain!* Distrib. Cosmopolitan in the tropics.

A very beautiful species not yet reported from the Malay Peninsula proper and not recorded by Prof. Miquel from the Malay Archipelago. It may, however, be found if looked for in the sea-fences of screw-pines along the coasts, this being the habitat chiefly affected by it in the Andaman group.

§ Strophostyles Bth. & Hk. f. Stipules produced below their point of insertion.

3. Phaseolus trilobus Ait. Hort. Kew., ed. I, III, 30. A slender diffuse spreading glabrous or slightly pubescent annual or perennial weed with stems reaching 2–3 feet. *Leaves* 4 in. long; leaflets 3 pale green membranous, 3-lobed or, especially the terminal, at times entire, less often 3-fid to -partite, small suborbicular ·75–1 in. in diam. rarely oblong 1·5 in. long by 1 in. wide; petiole long 2–3 in. usually glabrous, petiolules ·2 in.; stipels ovate-acute under ·1 in.; stipules ·25–5 in. long, ovate-oblong. *Racemes* axillary subcapitate, at ends of erect stoutish peduncles 6–12 in. long, bracts ovate-acute ·15–·2 in. long deciduous; pedicels ·1 in. *Calyx* campanulate ·07–·1 in. yellowish-green, teeth minute deltoid, bracteoles at base lanceolate longer than calyx. *Corolla* yellow ·2–·25 in. long glabrous. *Pod* cylindric 1–2 in. long, ·15 in. in diam. glabrous straight or slightly recurved, 6–12 seeded. Roxb. Hort. Beng. 54; Flor. Ind. III, 298; Wall. Cat. 5588, chiefly; W. & A. Prodr. 246; Wight, Ic. t. 94; Miq. Flor. Ind. Bat. I, 198. *Dolichos trilobus* Linn. Mantiss. I, 101; Burm. Flor. Ind. 160, t. 50, f. 1; DC. Prodr. II, 399. *D. stipulaceus* Lamk, Encyc. Meth. II, 300

Andamans; an introduced weed. Distrib. Northern Africa, S.-E. Asia, Malay Archipelago.

An annual crop and a perennial weed throughout its natural area. The perennial form has usually more deeply lobed leaflets; in the annual form lobed and entire leaflets are generally met with in varying proportions on the same plant. Though not as yet recorded from the Malay Peninsula proper, it may be expected to occur there as an introduced weed.

4. Phaseolus calcaratus Roxb. Hort. Beng. 54. A twining annual, or perennial with annual pubescent rarely glabrous stems 6–10 feet long,

rarely suberect with stems 1–2 feet high. *Leaves* usually 4–5 in. long; leaflets 3 membranous sparsely adpressed-pubescent on both surfaces, ovate to lanceolate, acute or shortly acuminate, entire or faintly repand rarely slightly lobed, base of terminal leaflet cuneate of lateral truncate or subauriculately lobed to outer side, 2–4 in. long, 1–2·5 in. wide; petioles 2–4 in. long, pubescent with spreading or slightly reversed hairs, petiolules ·15 in. long, pubescent, stipels ·15 in. long, glabrous lanceolate, stipules ·2–·25 in. long, lanceolate glabrescent. *Racemes* subspicate ·75–1·5 in. long, at end of stoutish peduncles 5–8 in. long, pubescent with at first decidedly reflexed hairs; flowers 2–3 together from 6–8 nodes at length ·2 in. apart, lower pedicels at length ·2 in. long, bracts lanceolate ·25 in. long fixed above the base. *Calyx* ·15 in. long teeth short deltoid, bracteoles narrowly lanceolate ·2 in. long. *Corolla* yellow ·5–·75 in. long, glabrous. *Pod* 2·5–3 in. long ·2 in. wide, recurved glabrous; *seeds* 10–12 subtruncate at ends with prominent hilum half as long as seed.

Var. *typica*; stems pubescent. Roxb. Flor. Ind. III, 289; Wall. Cat. 5611; W. & A. Prodr. 245; Bak. in Flor. Brit. Ind. II, 203. *P. hirtus* Wall. Cat. 5593 not of Retz. *P. sublobatus* Wall. Cat. 5598 not of Roxb. *P. pubescens* Blume Cat. Bog. 94; Miq. Flor. Ind. Bat. I, 200.

Perak; Batu Kuran, common, *Scortechini! Curtis* 2984! Andamans; common, cultivated and as an escape. Distrib. S.-E. Asia and Malaya.

Var. *gracilis*; stems slender, glabrous.

Perak; Larut, *Scortechini* 1476! *Wray* 1756! Goping, *Kunstler* 990! Durian, *Kunstler* 1035! 2467! Pahang; at Pekan, *Ridley* 1124! Distrib. Sumatra (*Forbes*).

But for the more slender and glabrous stems there is no character to separate var. *gracilis* from *P. calcaratus* which is otherwise a sufficiently variable species. Except that it is described as having subtorulose pods even when old, the writer would have no hesitation in referring *P. luteus* Bl. to var. *gracilis*. As a matter of fact the pods of all the varieties of *P. calcaratus* are subtorulose when young, and in Roxburgh's *P. torosus*, which is referable to *P. calcaratus*, they continue so; but, not having seen specimens, the writer does not feel justified in formally reducing Blume's plant, and would leave the matter to be settled by the botanists of the Dutch Indies.

5. Phaseolus Mungo Linn. Mantiss. I, 101. A spreading annual or perennial with slender annual pubescent stems 6–10 feet long, growing in open grassy places (*Kunstler*). *Leaves* 8–10 in. long; leaflets 3 blueish-green membranous ovate-acute, base wide-truncate—of lateral leaflets oblique, sparsely pubescent on both surfaces, 3–5 in. long, 2·5–4 in. wide, petioles 5 in. long sparsely pubescent with spreading hairs,

petiolules ·2 in. long densely pubescent, stipels slender subulate ·2 in. long, stipules lanceolate sparsely pubescent ·3 in. long. *Racemes* dense few-fld. at the end of sparsely pubescent peduncles 4 in. long, bracts lanceolate densely pubescent ·3 in. long, pedicels ·1 in. *Calyx* ·15 in. long puberulous externally, teeth triangular except the lowest lanceolate which is twice as long as the others and half as long as calyx-tube; bracteoles at base as long as bracts but rather narrower. *Corolla* bright yellow ·5 in. long glabrous. *Pods* ascending or almost erect, densely clothed with spreading hairs, 1·5–2 in. long, ·25 in. wide, compressed, 6–8 seeded. *Seeds* ·15 in. long, ·1 in. wide, dark brown, flat, oval, hilum one-third as long as seed not very prominent, dissipiment between seeds not pronounced. W. & A. Prodr. 245; Wall. Cat. 5889 in part only. *P. radiatus* Roxb. Hort. Beng. 54; Flor. Ind. III, 296; Miq. Flor. Ind. Bat. I, 197 in part, not of Linn. *P. Mungo* VAR. *radiatus* Bak. in Flor. Brit. Ind. II, 203.

PROV. WELLESLEY; at Prye Dock, *Curtis* 2211! PERAK; at Goping, *Kunstler* 946! DISTRIB. Wild in S.-E. Asia and also largely cultivated.

Very nearly related to *P. sublobatus* Roxb. (*P. trinervius* Heyne) which differs in having narrower pods, more distinct dissepiments between the much smaller seeds, and a rusty-red pubescence. This is the wild form of the plant cultivated in India as the *másh-kulai* or *urd* crop; though it happens to have been named *P. Mungo* by Linnæus it is quite distinct from the *Máng* plant which has spreading pods with smaller seeds and dark green leaves. The *Máng* is the species named *P. radiatus* by Linnæus.

9. VIGNA Savi.

Twining herbs or shrubs with pinnately 3-foliolate stipellate leaves. *Flowers* in copious axillary racemes bracteoles conspicuous. *Calyx* campanulate; teeth short or long, the upper often connate. *Corolla* much exserted; keel truncate or exserted not spirally twisted. *Stamens* diadelphous, anthers uniform. *Ovary* sessile many-ovuled; style long filiform, bearded along the inner face below the oblique stigma. *Pod* linear, subterete, subseptate. Species 40–50, mostly tropical; one widely cultivated.

Keel not prolonged into a beak; pods glabrous:—		
Stems trailing, pods short few-seeded; a wild sea-coast species	1.	*V. retusa.*
Stems suberect or twining, pods long very many-seeded; a widely cultivated plant	2.	*V. Catjang.*
Keel prolonged into a beak; pods pilose	3.	*V. pilosa.*

1. VIGNA RETUSA Walp. Rep. I, 778. An extensively spreading perennial trailing sea-coast species with glabrous stems. *Leaves* 3–4 in. long, leaflets 3, pale green, glabrous ovate to obovate thinly fleshy,

entire; apex obtuse or sometimes retuse base cuneate or rounded, 2 in. long, 1·5 in. wide; petiole 1·5 in., glabrous, petiolules ·15 in. sparsely hairy, stipels ·06 in. recurved lanceolate glabrous, stipules ·1 in. lanceolate basifixed. *Racemes* rather densely 12–20-fld. on peduncles 2–6 in. long, nodes 1–2-fld., the lowest ·15 in. apart; pedicels slender puberulous ·2 in. long, bracts ·15 in. long membranous ovate-lanceolate very early deciduous. *Calyx* campanulate faintly puberulous ·12 in. long teeth short deltoid. *Corolla* yellow, glabrous, ·5 in. long. *Pod* 1·5–2·5 in. long ·4 in. wide ·25 in. thick, glabrous subtorulose, seeds 4–8. *V. anomala* Walp. Rep. I 779. *V. lutea* A. Gray in Bot. Wilkes Exped. I, 452; Bak. in Flor. Brit. Ind. II, 205. *Dolichos luteus* Sw. in Prodr. Veg. Ind. Occ. 105; DC. Prodr. II. 398. *Phaseolus obovatus* Grah. in Wall. Cat. 5609.

Andamans and Nicobars; common on all the coasts from the Coco group and Narcondam south to Katschall and Kamorta. Perak; *Scortechini! Ridley* 8011! Malacca; *Griffith!* A cosmopolitan littoral species.

2. Vigna Catjang Walp. in Linnæa XIII, 533. A suberect or twining annual with glabrous stems. *Leaves* 4–8 in. long; leaflets 3 membranous pale-green ovate-rhomboid entire or slightly lobed, apex acute base shortly wide-cuneate—of lateral leaflets obliquely, glabrous on both surfaces, 2·5 in. long by 1·75 in. wide or rather larger (var. *typica*) to 4 in. long by 3·5 in. or rather less (var. *sinensis*); petiole 1·5–4 in. long glabrous, petiolules ·15 in. long glabrous or puberulous; stipels ovate obtuse ·1 in., stipules ·3–·4 in. long attached above the base, membranous persistent ovate-lanceolate. *Racemes* subcapitately few-fld. on peduncles usually 1–4 in. long (var. *typica*) sometimes 8–12 in. long (var. *sinensis*); pedicels short (under ·1 in.), bracts membranous, fixed above base, deciduous. *Calyx* glabrous ·4 in., teeth deltoid-cuspidate one-third as long as tube. *Corolla* yellow, white, or pinkish ·75 in. long. *Pod* 4–24 in. long, ·3–·4 in. wide, scarcely depressed between the seeds; seeds 12–30 (in much elongated pods the spaces between the seeds are greatly widened). Bak. in Flor. Brit. Ind. II, 205.

Var. *typica*; suberect, leaves smaller and pods shorter. *V. Catjang* Walp.; Endl. ex Miq. Flor. Ind. Bat. I, 188. *Dolichos Catjang* Linn. Mantiss. 269; DC Prodr. II, 399; Roxb. Hort. Beng. 55; Flor. Ind. III, 303; Wall. Cat. 5549.

Cultivated in most of the provinces.

Var. sinensis; twining, leaves larger and pods longer. *Vigna sinensis* Endl. ex Hassk. Pl. Jav. Rar. 386; Savi ex Miq. Flor. Ind. Bat. 1, 187. *Dolichos sinensis* Linn. Cent. Pl. II, 28; Amoen. Acad. IV, 326; DC. Prodr. II, 399; Roxb. Hort. Beng. 55; Flor. Ind. III, 302;

Wall. Cat. 5550; Bot. Mag. t. 2232; W. & A. Prodr. 250. *D. tranquebaricus* Jacq. Hort. Vidob. III, t. 70; DC. Prodr. II, 400.

Cultivated in most of the provinces.

Widely cultivated in the Eastern Hemisphere; probably a native of S.-E. Asia, but apparently not now known in a truly wild state.

3. Vigna pilosa Bak. in Flor. Brit. Ind. II, 207. A slender twining perennial with hirsute stems. *Leaves* 5–8 in. long, leaflets 3, green, downy to subscabrid on both surfaces, entire ovate-acute 3–6 in. long, 1·5–2·5 in. wide, base truncate—of lateral leaflets unequally; petiole 2 in. long, closely downy, petiolules ·05 in. only, stipels subulate minute; stipules ·1 in. lanceolate caducous. *Racemes* many-fld. 2–3 in. long on peduncles ·5–2 in. long, nodes 1–2-fld. all close together in flower, at length ·15 in. apart, pedicels ·1 in. downy, bracts minute. *Calyx* campanulate oblique thinly silky, ·3 in. long, lower tooth lanceolate as long as tube one half exceeding the others. *Corolla* purple ·75 in. long. *Pod* 4–5 in. long, subcylindric ·25 in. in diam., densely hirsute with spreading hairs, septate within between the 8–12 subreniform shining black seeds with truncated ends, ·25 in. long ·15 in. wide. *Dolichos pilosus* Roxb. Hort. Beng. 55; Flor. Ind. III, 312; DC. Prodr. II, 397: W. & A. Prodr. 249. *Phaseolus difformis* Wall. Cat. 5599.

Andamans; common, *King's Collectors!* Distrib. India and Indo-China.

10. Pachyrhizus Rich.

Wide-climbing herbs. *Leaves* pinnately 3-foliolate with stipellate lobed leaflets. *Racemes* long, with tumid nodes and fascicled pedicels; bracts and bracteoles setaceous, caducous. *Calyx* 2-lipped, the limb as long as the tube, the upper lip emarginate, the lower deeply 3-toothed. *Corolla* much exserted, the petals subequal; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled; style long circinate at the apex, bearded down the inner side below the very oblique stigma. *Pod* large, linear, turgid, deeply depressed between the seeds. Species 2 or 3; the others Mexican and Angolan.

The oldest name for this genus is *Cacara* under which designation it was published by Thouars (*Dict. Sc. Nat.* V, 35) twenty years before Richard's name was issued.

Pachyrhizus angulatus Rich. ex DC. Prodr. II, 402. A large strong climber with a tuberous root; stems stout, suffruticose, young stems and branches deciduously downy. *Leaves* 8–9 in. long, trifoliolate; leaflets large, membranous glabrous as broad as long base entire deltoid from middle of circumference anterior half deeply or shallowly lobed, 4 in. long, as much across; petiole 5–6 in. long glabrous, petiolules ·2 in.

long pubescent; stipels ·1 in. subulate, stipules lanceolate puberulous ·2 in. long. *Racemes* lax elongated 6–10 in. long on axillary peduncles 12 in. long and upwards, nodes 2–6-fld., lower sometimes 1 in. apart often produced into branches ·5 in. long; bracts lanceolate ·25 in. long silky. *Calyx* campanulate, teeth triangular nearly equalling tube, ·25 in. long, pedicels ·3 in. long, bracteoles setaceous silky shorter than calyx. *Corolla* purple 1 in. long. *Pod* at first adpressed-pubescent, at length almost glabrous 6–9 in. long ·5 in. wide, ·2 in. thick, deeply depressed along the valves between the 7–12 shining cinnamon-brown flattened seeds ·3 in. long, ·25 in. wide. Wall. Cat. 5526; W. & A. Prodr. 251; Miq. Flor. Ind. Bat. I, 191; Bak. in Flor. Brit. Ind. II, 207. *P. trilobus* DC. Prodr. II, 402. *Dolichos erosus* Linn. Sp. Pl. 726. *D. bulbosus* Linn. Sp. Pl., Ed. II, 1020; Roxb. Flor. Ind. III, 309. *D. trilobus* Lour. Flor. Cochinch. II, 535. *Cacara erosa* Kuntze Rev. Gen. Pl. I, 165.

Cultivated in most of the provinces. DISTRIB. Cosmopolitan in the tropics, probably originally American.

This is known, Mr. Curtis notes, as *Obie Songnang* in the Island of Penang. The large tuberous root, white outside and inside of the appearance and consistence of a turnip, is occasionally, according to Dr. Watt's *Dictionary of Economic Products*, 6–8 feet long and as thick as a man's thigh. It is eaten both cooked and uncooked, is palatable enough but rather insipid. If the rules as to priority of names be rigidly applied this must be known as *Cacara erosa* Kuntze.

11. DOLICHOS Linn.

Twining herbs with stipellate 3-foliolate leaves and minute subpersistent bracts bracteoles and stipules. *Flowers* racemose or axillary. *Calyx-tube* campanulate, teeth long or short. *Corolla* much exserted; its petals usually equal in length; keel obtuse or rostrate not spiral. *Stamens* diadelphous; anthers uniform. *Ovary* nearly sessile, many-ovuled; style thickened upwards and bearded down the inner edge or filiform and penicillate round the terminal stigma. *Pod* flat, linear or oblong, recurved. Species about 20, wide-spread in the tropics of both hemispheres.

The only species so far reported from the Malay Peninsula belongs to the group LABLAB, with a style thickened upwards from a narrow base, bearded down the inner edge. This group is treated by Baker as a subgenus, by Taubert as a section, of *Dolichos*. De Candolle, Wight & Arnott, and Kurz consider however, with Savi, that it would be preferable to deal with this as the type of a distinct genus *Lablab*.

DOLICHOS LABLAB Linn. Sp. Pl. 725. A tall subglabrous wide twining perennial or annual with round smooth or slightly downy stems. *Leaves* 4–12 in. long, 3-foliolate; leaflets entire ovate-acute, base cuneate or deltoid, rather pale green, glabrous or slightly pubescent beneath,

2–6 in. long and almost as broad; petiole 2–8 in. long, glabrous; petiolules ·2 in. long puberulous; stipels ·15 in. long subulate smooth; stipules lanceolate ·2 in. long basifixed. *Racemes* lax 6–9 in. long on peduncles 5–8 in. long; pedicels fascicled ·15–·25 in. long on nodes ·5–·75 in. apart; bracts early deciduous. *Calyx* ·2 in., teeth short deltoid, bracteoles oblong ·15–·2 in. *Corolla* white or pink ·6 in. long. *Pod* 1·5–2 in. long (in one rather unusual form 3 in. long) tipped with the hooked persistent base of the style. Bak. in Flor. Brit. Ind. II, 209.

Var. *typica*; pods longer, seeds with long axis along the pod. *D. Lablab* Linn. Sp. Pl. 725. *D. lignosus* Roxb. Flor. Ind. III, 305 not of Linn. *Lablab vulgaris* Savi, Diss. 19; DC. Prodr. II, 401; W. & A. Prodr. 250; Miq. Flor. Ind. Bat. I, 189. *D. cultratus* Forsk. Flor. Ægypt. Arab. 134.

Perak; cultivated, *Scortechini!* Andamans; cultivated, common. Cultivated everywhere in the tropics of the Old World.

Var. *lignosa*; pods shorter broader at the end, seeds with long axis across the pod. *D. lignosus* Linn. Sp. Pl. 726. *D. Lablab* Roxb. Flor. Ind. III, 307 not of Linn. *D. cultratus* Thunb. Trans. Linn. Soc. II, 320 not of Forsk. *Lablab cultratus* DC. Prodr. II, 402; W. & A. Prodr. 251; Miq. Flor. Ind. Bat. I, 190. *L. microcarpus* DC. Prodr. II, 402; Miq. Flor. Ind. Bat. I, 190.

Andamans; cultivated. Cultivated throughout south-eastern Asia.

In deference to the great authority of Mr. Baker these two very distinct plants are united specifically; they are however so different that they must be treated as at least separate varieties.

12. Psophocarpus Neck.

Twining herbs, with large tuberous roots. *Leaves* 3-foliolate, stipellate; stipules fastened above the base. *Flowers* rather large, lilac. *Calyx* teeth shorter than the tube, the two upper connate. *Corolla* much exserted, the petals equal in length; keel much incurved, but not beaked. *Stamens* monadelphous, the upper free downwards; anthers uniform. *Ovary* substipitate, many-ovuled; style long, much recurved, flattened laterally, densely bearded round the terminal stigma. *Pod* square, with a distinct wing to each angle, distinctly septate between the seeds. Species 3-4, all tropical in the Old World.

Psophocarpus tetragonolobus DC. Prodr. II, 403. A slender annual glabrous twiner with tuberous roots. *Leaves* 5–10 in. long; leaflets 3 ovate, acute or acuminate, base rounded or wide-cuneate, margin entire or slightly waved, glabrous, green above, paler sometimes slightly glaucescent beneath, 3–6 in. long, 2–6 in. wide; petiole 2–4 in.

glabrous, petiolules ·15 in. sparsely hairy along the sides; stipels lanceolate, glabrous ·1 in. long, stipules oblanceolate acute towards both ends from the almost median insertion, ·3 in. long, glabrous. *Racemes* lax 4–6 fld.; peduncles 2–6 in. long; pedicels geminate ·5 in. long, bracts small ovate, ·08 in long. *Calyx* campanulate glabrous oblique; upper connate teeth rounded emarginate, lateral oblong rather exceeding lowest; bracteoles 2 ovate, striate, glabrous, attached slightly above the base ·15 in. long twice as large as bracts, half as long as buds. *Corolla* blue or white 1·5 in. long. *Pod* 6–12 in. long, 1·35 in. wide, the wings along the angles membranous ·5 in. wide their margins crisped dentate and laciniate; seeds 8–16, rounded. W. & A. Prodr. 252; Hassk. Pl. Jav. Rar. 388 (VAR. *a.* only); Miq. Flor. Ind. Bat. I, 181 (VAR. *a.* only). *Dolichos tetragonolobus* Linn. Syst., Ed. X, 1162; Roxb. Flor. Ind. III, 305 (in part). *D. ovatus* Grah. in Wall. Cat. 5540.—Rumph. Herb. Amb. V. t. 133.

SINGAPORE; *Hullett* n. 75!

Cultivated throughout Southern Indo-China and Malaya.

13. CLITORIA Linn.

Scandent or suberect undershrubs, with showy flowers, 3–7-foliolate leaves, stipellate leaflets and persistent membranous small stipules and bracts and large bracteoles. *Calyx* membranous, tubular; teeth deltoid or lanceolate. *Corolla* much exserted; standard spoon-shaped, very large; wings and incurved keel much shorter. *Stamens* monadelphous or diadelphous; anthers uniform. *Ovary* stalked, many-ovuled; style incurved, flattened, bearded along the inner side. *Pod* linear, flattish or turgid. Species 27, in tropics of old and new world, mostly the latter.

Pod flattish, valves not keeled on the face (SUBGEN. *Ternatea*); stems scandent ... ... 1. *C. Ternatea.*
Pod turgid, with a rib along face of valves (SUBGEN. *Neurocarpum*); stems suberect ... ... 2. *C. cajanifolia.*

1. CLITORIA TERNATEA Linn. Sp. Pl. 753. A climber with slender terete downy stems. *Leaves* 4 in. long, petiole ·75 in., rachis glabrous; leaflets terminal and in 2–3 opposite pairs ovate or oblong obtuse subcoriaceous; 1–2 in. long ·75–1 in. wide, stipules small ·2 in. long lanceolate, stipels minute linear. *Flowers* axillary solitary pedicels ·35–·5 in., bracteoles large roundish obtuse ·25–·5 in. long. *Calyx* ·5–·75 in.; teeth lanceolate nearly as long as tube. *Corolla* 1·5–2 in. long; standard 1 in. broad, bright blue with an orange centre or (in a commonly cultivated form) white. *Pod* flattish, valves smooth, 2–4 in. long, ·35 in. wide, sparsely hirsute; 6–10-seeded. DC. Prodr. II, 233; Bot. Mag. t. 1542; Roxb. Flor. Ind. III, 321; Wall. Cat. 5344; Miq. Flor. Ind. Bat. I, 226; Bak. in Flor. Brit. Ind. II, 208.

Andamans; commonly cultivated. Panokore; *Scortechini!* Distrib.; common throughout the tropics in gardens and as an escape.

2. Clitoria cajanifolia Benth. in Mart. Flor. Brasil. XV, 121. A suberect undershrub with terete pilose branches. *Leaves* 2–3·5 in. long; petiole ·1 in. and rachis adpressed-pilose; leaflets terminal and in 1 lateral pair lanceolate or oblanceolate obtuse subcoriaceous 2–5 in. long, ·75–1 in. wide, glabrous above, densely grey-canescent beneath; stipules shortly triangular, pubescent, stipels subulate. *Flowers* axillary usually 2 on a pubescent peduncle 1–1·5 in. long; bracteoles small ovate or lanceolate. *Calyx* ·75 in. long, teeth much shorter than tube. *Corolla* 1·5–2 in. long; standard 1·5 in. wide pale-violet with a dull-purple centre. *Pod* turgid, with a rib along face of valves, 1·25 in. long, ·35 in. wide quite glabrous, 5–7 seeded. Bak. in Flor. Brit. Ind. II, 209. *Neurocarpum cajanifolium* Presl. Symb. 17, t. 9; Miq. Flor. Ind. Bat. I, 225. *N. retusum* Hassk. Pl. Jav. Rar. 376. *Lotus fluminensis* Vell. Flor. Flum. VII, t. 152.

Malacca and Singapore, in old clearings, common. Distrib. A native of Brazil now naturalised in the localities mentioned, in Java, and in Siam.

14. Centrosema Benth.

Twining herbs or shrubs; stems with woody base. *Leaves* pinnately 3-foliolate, stipellate; stipules persistent basifixed. *Flowers* very large and showy with persistent bracts and large persistent bracteoles. *Calyx*-teeth short the upper pair connate or obsolete. *Corolla* much exserted; standard orbicular emarginate shortly spurred near base, longer than the falcate obovate wings and the broad incurved slightly shorter keel. *Stamens* usually diadelphous; anthers uniform. *Ovary* subsessile, many-ovuled, style incurved dilated at the apex, stigma terminal beardless. *Pod* subsessile linear flattened, 2-valved, slightly septate between the seeds, both sutures thickened and both valves strongly ridged along the face parallel to the sutures. Species about 25, all American.

Dr. Kuntze states (*Rev. Gen. Pl.* I, 163) that *Bradburya* Raf., reduced in the *Index Kewensis* to *Wistaria*, is in reality this genus, and that Rafinesque's description refers to *Centrosema virginianum* a species widely cultivated in Asia and now quite naturalized in Java though not yet reported as an escape in our area.

Centrosema Plumieri Benth. in Ann. Wien. Mus. II, 118. A large climber with woody base and twining slender firm glabrous or puberulous branches. *Leaves* 6–10 in. long; leaflets 3 papery dark green glabrous above puberulous on the nerves beneath broadly ovate acute or acuminate 3–6 in. long, 2·5–5 in. across; petioles 3–6 in., glabrous or puberu-

lons; petiolules ·15 in. pubescent; stipels ·25 in. long, lanceolate; stipules ovate-oblong persistent subscarious ·4 in. *Racemes* 2–6-fld., peduncles thick 1–2 in. long, pedicels usually geminate ·1–·15 in. long, bracts pubescent orbicular-cucullate as long as pedicels. *Calyx* ·25 in. long, oblique wide-campanulate glabrescent, upper tooth very short, lateral wide blunt, lower longer lanceolate, completely hidden by the large persistent coriaceous striate ovate obtuse bracts ·6–·75 in. long. *Corolla* large, standard 1·75 in. long, 1·5 in. wide, white, or white with crimson centre, pubescent externally; wings white tipped with violet or rose 1 in. long, ·5 in. wide; keel sometimes white, sometimes crimson. *Pod* 6 in. long, ·5 in. wide, straight, beaked by the persistent style 1 in. long, both sutures thickened, the lower with narrow longitudinal wings ·1 in. remote from the suture; seeds 10–12 oblong or subglobose, hilum oblong-linear. Mart. Flor. Bras. XV, I, 127. *Clitoria Plumieri* Juss. in Pers. Synops. II, 303; Edwards, Bot. Reg. IV, 268. *C. fluminensis* Vell. Flor. Flum. VII, 312, t. 128. *Cruminium giganteum* Desv. Ann. Sc. Nat. Ser. I, IX, 423.

Perak; at Kampar, *Curtis* 3140! Singapore; *Hullett* 57! 669! no doubt an escape from gardens, as it also is in Sumatra where it has been found growing in forests near Lampar (*Forbes* n. 2599!) A native of South America; cultivated in Asiatic gardens on account of its handsome flowers.

15. Teramnus Sw.

Twining herbs, of slender habit. *Calyx-tube* campanulate; teeth distinct, subequal or two upper not so long. *Corolla* little exserted; petals about equal in length; standard not spurred. *Stamens* monadelphous; alternate anthers small, abortive. *Ovary* sessile, many-ovuled; style short, curved, beardless, stigma capitate. *Pod* linear, hooked with the persistent style at the tip, flattish, septate between the seeds. Species 4, belting the world in the tropics.

Teramnus labialis Spreng. Syst. III, 235. A wide-spreading climber of slender habit with a few adpressed hairs on the stem. *Leaves* 2·5–4·5 in. long, petiole 1–1·5 in. sparsely adpressed-hirsute; leaflets 3 membranous or subcoriaceous ovate-oblong base rounded apex subacute or at times, especially of lateral pair, obtuse, terminal 1–2·5 in. long 75–1·5 in. wide, lateral slightly smaller, green glabrescent above sparsely adpressed-hirsute beneath; stipules minute lanceolate deciduous ·15 in. long, stipels subulate ·1 in. *Inflorescence* of elongated lax axillary 8–12-fld. racemes 2–3 in. long; pedicels ·2 in. solitary below fascicled upwards, bracts narrowly lanceolate ·1 in. long, bracteoles close under calyx minute subulate. *Calyx* ·15–·2 in. long, 2-labiate, teeth subequal

lanceolate about as long as the narrowly campanulate tube. *Corolla* ·25 in. long reddish, standard emarginate, wings overarching the slightly shorter keel. *Pod* glabrous recurved linear 1·5–2 in. long, ·2 in. broad, 8–12 seeded. Benth. in Journ. Linn. Soc. VIII, 265; Bak. in Flor. Brit. Ind. II, 184. *Glycine labialis* Linn. fil. Suppl. 325; Roxb. Flor. Ind. III, 318; W. & A. Prodr. 208; Wight, Ic. t. 168; Miq. Flor. Ind. Bat. I, 222. *G. parviflora* DC. Prodr. II, 242; Wall. Cat. 5508 (excl. G., H.) *G. debilis* DC. Prodr. II, 242. *G. pallens* Grah. in Wall. Cat. 5518.

Penang; *Wallich* 5518! Distrib. Throughout the tropics.

Var. *mollis* Baker (*Teramnus mollis* Benth), should be looked for in the Malay Peninsula, for though it has not yet been reported from our area it occurs in Burma where it has been collected by Wallich and by Kurz, and again in Java where it appears to be commoner than *T. labialis* proper. It is distinguished from *T. labialis* by the presence of spreading hairs on the stem and by the pods being strigosely hirsute with long spreading hairs. Its leaflets also are densely pubescent beneath and its calyx-teeth are shorter than the tube.

16. Dioclea H. B. K.

Climbing shrubs. *Leaves* pinnately 3-foliolate, stipellate. *Flowers* blue or white, in elongated racemes with thickened nodes; bracts and bracteoles caducous. *Calyx*-tube campanulate, teeth shorter than tube, two upper quite connate. *Corolla* exserted; petals about equal in length; keel incurved but not beaked. *Stamens* monadelphous; the vexillary stamen free below connate with the others in the middle shorter than the rest and with a perfect anther; anthers of keel stamens (in Malay species) alternately perfect and abortive. *Ovary* subsessile hirsute, few-ovuled, style incurved beardless, stigma capitate. *Pod* oblong turgid 1–3-seeded, flattened along the upper suture. Species 17–18, one Indo-Malayan, one extending to Africa and America, the rest tropical American.

Leaflets glabrescent beneath, larger; flowers ·75 in. long; calyx teeth half as long as tube ... ... 1. *D. reflexa.*
Leaflets densely velvety beneath; flowers 1 in. long; calyx teeth wider one-third the length of tube ... ... 2. *D. javanica.*

1. Dioclea reflexa Hook. f. Niger Flora 306. A strong woody climber 20–30 feet long with rounded black early glabrescent branches. *Leaves* 3-follolate 9 in. long; leaflets 3, dull green above paler beneath, subcoriaceous when young sparsely hairy on both surfaces but early becoming glabrous above and glabrous except for a few adpressed hairs on the nerves beneath, ovate shortly acuminate with subtruncate base 5 in. long 3 in. across, petiole 4 in. long channelled above sparingly adpressed hirsute; petiolules ·25 in. rusty pubescent, stipels ·2 in. long, subulate,

stipules lanceolate ·25 in. long, deciduous. *Inflorescence* in dense subspicate racemes 6 in. long on axillary peduncles 8–12 in. long with 2–3 widely separated empty bracts; rachis rusty-tomentose, flowers 2–3 together on rounded alternate nodes ·2–·25 in. apart; bracts ·5 in. long linear reflexed rusty-pubescent early deciduous. *Calyx* campanulate ·4 in. long with two small obtuse bracteoles at base; pedicels ·15 in. long rusty-puberulous; calyx teeth subequal except the broader truncate upper triangular, half as long as tube. *Corolla* pale-pink ·75 in. long, standard-limb orbicular emarginate. *Pods* few, 1–2-seeded; 3–4 in. long, 2 in. wide, ·5 in. thick along upper suture, at first sparsely adpressed rusty-silky at length glabrescent; seeds discoid dark brown 1·25 in. in diam. Bak. in Flor. Brit. Ind. II, 196. *Dolichos hexandra* Roxb. Hort. Beng. 55. *D. coriaceus* Grah. in Wall. Cat. 5562.

ANDAMANS; very common, *Helfer* 1752! *King's Collectors!* PENANG or SINGAPORE; *Wallich!* PERAK; Larut, *Kunstler* 5718! DISTRIB. Silhet; trop. Africa; trop. America.

The vexillary stamen in this and the next species is free at the base though not above; it is rather shorter than the others and bears a perfect anther; the anthers of the 9 stamens that constitute the keel-sheath are alternately perfect and abortive thus giving 5 perfect anthers on the sheath and a sixth perfect anther on the vexillary stamen; hence Roxburgh's excellent specific name.

Dr. Wallich did not obtain this species at Penang *and* Singapore; his note on the sheet of *Cat.* n. 5562 at Calcutta states that he had forgotten the precise locality but was of opinion that he obtained the specimen either at Penang or at Singapore.

2. DIOCLEA JAVANICA Benth. Pl. Jungh. 236. A rather slender woody climber 20–30 feet long with rounded black early glabrescent branches. *Leaves* 3-foliolate 6–7 in. long; leaflets dull green above, coriaceous, beneath densely rusty-velvety, ovate shortly acuminate with subtruncate base 4 in. long 2·25 in. across, petiole 2–3 in. long channelled above, rusty-velvety; petiolules ·25 in., velvety, stipels ·2 in. long subulate; stipules lanceolate ·25 in. long, deciduous. *Inflorescence* in dense subspicate racemes 6 in. long on axillary peduncles 8–12 in. long with 2–3 widely scattered empty bracts; rachis densely velvety, flowers 2–3 together on rounded alternate nodes ·2–·25 in. apart; bracts ·5 in. long linear reflexed rusty-pubescent early deciduous. *Calyx* campanulate ·5 in. long with two small obtuse bracteoles at base; pedicels ·15 in. long rusty-puberulous; calyx teeth subequal except the broader truncate upper wide triangular, one-third as long as tube. *Corolla* pale-pink 1 in. long, standard-limb orbicular. *Pods* few usually 1–2-sometimes 3-seeded; 3–5·5 in. long, 2 in. wide, ·5 in. thick along upper suture; at first densely rusty-tomentose at length glabrescent; seeds discoid 1·25 in. in diam. Miq. Flor. Ind. Bat. I, 217. *D. Fergusonii* Thwaites Enum. 412.

Perak; Larut, *Kunstler* 5196! 10320! *Wray* 2000! Malacca; *Maingay* 520! Distrib. Ceylon; Chittagong; Java.

Very nearly related to the preceding and perhaps only a form of that species. At the same time the characters by which they are separable are very constant in all the specimens of both that the writer has seen, and from the field-botanist's point of view, at least, it is just as well to follow Mr. Bentham in separating them.

17. Pueraria DC.

Twining shrubs or herbs with stipellate pinnately 3-foliolate leaves; leaflets sometimes palmately lobed. *Flowers* sometimes appearing before leaves, large or small, densely fascicled, in long often compound racemes. *Calyx* teeth long or short the two upper connate. *Corolla* distinctly exserted; standard usually spurred at the base equalling in length the obtuse wings and keel. *Stamens* more or less thoroughly monadelphous; anthers uniform. *Ovary* sessile or nearly so, many-ovuled; style filiform much incurved beardless, stigma capitate. *Pod* linear, flattish. Species about 12, mostly Indo-Chinese.

1. Pueraria phaseoloides Benth. in Journ. Linn. Soc. IX, 125. A slender creeper 20–30 feet long with adpressed-pubescent slender hardly woody stems, and slender twining branches clothed with spreading greyish-brown hairs. *Leaves* contemporaneous with flowers, 6–8 in. long; leaflets 3, membranous dull-green thinly adpressed-hirsute above, dark greenish-grey and densely velvety-tomentose beneath, triangular ovate base wide cuneate—of lateral pair obliquely, apex subobtuse margin entire repand or slightly 3-lobed, sub-3-nerved at base, 3–4 in. long, 2–3 in. wide, petiole 3–4 in., densely clothed with spreading hairs, petiolules ·2 in. long; stipels small subulate weak ·1 in. long, stipules small lanceolate basifixed. *Inflorescence* of long-peduncled axillary racemes of fascicled flowers; peduncle 6–8 in. and rachis puberulous; racemes 4 in. long, fascicles ·25–·5 in. apart 4–5-fld., pedicels ·2 in. puberulous, bracts and bracteoles lanceolate rather rigid clothed with adpressed bristly hairs, the bracteoles subpersistent. *Calyx* campanulate ·25 in. long clothed with adpressed bristly hairs, teeth unequal upper broad, and lower lanceolate as long as tube and one-third larger than lateral triangular, all setaceous at tip. *Corolla* pale-blue and white, ·6 in. long, standard-limb suborbicular distinctly spurred. *Pods* numerous, at first puberulous, at length glabrescent slightly recurved at the tip, 3·5 in. long only ·2 in. wide. *Seeds* about 16, ·15 in. long ·1 in. wide, truncate at ends, dark brown, testa dull minutely rugulose. Bak. in Flor. Brit. Ind. II, 199 (excl. syn. *P. subspicata* Bth.). *Dolichos phaseoloides* Roxb. Flor. Ind. III, 316. *D. viridis* Ham. in Wall. Cat. 5559. *Neustanthus phaseoloides* Benth. Pl. Jungh. 235; Miq. Flor. Ind. Bat. I, 219. *Phaseolus decurvus* Grah. in Wall. Cat. 5612.

Andamans; at Port Blair, *Prain!* Penang; *Wallich* 5612! Perak; Goping, *Kunstler* 1062! 2456! 5117! *Scortechini* 591! 1441! Ipoh, *Curtis* 3151! Distrib. S.-E. Asia.

18. Canavalia DC.

Large twining perennials or biennials with stipellate pinnately 3-foliolate leaves and showy flowers. *Calyx* deeply tubular, limb 2-labiate, the upper lip projecting, entire or emarginate the lower shortly 3-toothed. *Corolla* far exserted; standard large roundish; wings shorter equalling the incurved obtuse keel. *Stamens* monadelphous; anthers uniform. *Ovary* obscurely stalked many-ovuled; style incurved beardless, stigma terminal. *Pod* large linear or oblong, flat or turgid with a longitudinal ridge along each margin of the flattened upper suture. Species 10–12, mostly American.

Pods not turgid, deeply double-channelled along the dorsal suture:—

- Pods 1·5–2 in. across; flowers many ... ... 1. *C. ensiformis.*
- Pods ·5–·75 in. across; flowers few ... ... 2. *C. lineata.*

Pods turgid, almost flat along the dorsal suture; endocarp separating ... ... 3. *C. obtusifolia.*

1. Canavalia ensiformis DC. Prodr. II, 404. A large biennial or perennial climber with glabrous stems and branches. *Leaves* 3-foliolate 10–12 in. long; leaflets green paler beneath, membranous, when young puberulous, very soon quite glabrous ovate-acute, base rounded—in lateral pair slightly obliquely; 5–6 in. long, 2·5–4 in. wide; petiole 6 in. long glabrous, petiolules ·25 in.; stipels ·15 in. subulate very early deciduous; stipules small triangular ·1 in. long, caducous. *Inflorescence* in lax 12–20-fld. racemes 3–8 in. long on axillary peduncles 4–6 in. long; flowers solitary or geminate from swollen nodes ·3–·5 in. apart, pedicels ·1–·15 in., bracteoles minute ovate caducous. *Calyx* campanulate, sparsely puberulous reticulate-veined ·6 in. long, upper lip oblong emarginate one-third the length of tube. *Corolla* lilac or white 1·5 in. long, limb of standard orbicular emarginate. *Pods* few, long, linear-oblong, slightly curved, dorsal suture strongly 3-keeled and deeply 2-grooved between the keels, 5–20-seeded, in length varying from 6–24 inches, in depth from 1·5–2 in., distance between outer ridges of dorsal suture ·5 in. *Seeds* white, grey or more usually red, 1·25 in. long, ·75 in. wide. Bak. in Flor. Brit. Ind. II, 195. *C. gladiata* DC. Prodr. II, 404; Wall. Cat. 5531; W. & A. Prodr. 253; Miq. Flor. Ind. Bat. I, 216. *Dolichos ensiformis* Linn. Sp. Pl. 725. *D. gladiatus* Jacq. Coll. II, 276; Roxb. Hort. Beng. III, 300.

In some of the provinces, cultivated; as it almost universally is throughout the tropics.

The writer follows Mr. Baker in identifying the American *Dolichos gladiatus* (*Canavalia gladiata* DC.) with the Asiatic *Dolichos ensiformis* (*Canavalia ensiformis* DC.)

2. CANAVALIA LINEATA DC. Prodr. II, 404. A glabrous perennial on rocky or sandy sea-coasts. *Leaves* 3-foliolate 8–9 in. long; leaflets pale-green thickly membranous ovate or orbicular, obtuse with or without a short point, or retuse, base cuneate, 2–3 in. long and 2–3 in. across; petiole 3–5 in. long somewhat fleshy, glabrous; petiolules .25 in., stipels ·15 in. subulate very early deciduous; stipules small triangular ·1 in. long caducous. *Inflorescence* in long-peduncled 4–8-fld. racemes on peduncles 10–16 in. long; flowers solitary or geminate from swollen nodes ·3–·5 in. apart, pedicels ·1–·15 in. bracteoles minute ovate caducous. *Calyx* campanulate sparsely puberulous reticulate-veined ·6 in. long, upper lip oblong subentire one-fourth the length of tube. *Corolla* violet 1 in. long, limb of standard orbicular emarginate. *Pods* few, short, linear-oblong, straight, dorsal suture strongly 3-keeled and deeply 2-grooved between the keels, 4–6-seeded, 3–5 in. long, ·75 in. deep; width between outer ridges of dorsal suture ·3 in. *Seeds* dark-brown · 5 in. long. Somoko-Dusets XIII, t. 20. *Dolichos lineatus* Thunbg. Flor. Japon. 280. *D. obcordatus* Roxb. Flor. Ind. III, 303. *Canavalia obtusifolia* Bak. in Flor. Brit. Ind. II, 196, not of DC; Cleghorn, Madr. Journ. (n. s.) I, t. 4.

PAHANG; Sungei Kelang, *Ridley!* PENANG; common on sand-banks along the coast, *Curtis* 1714! SINGAPORE; *Hullett* 514! DISTRIB. Coasts of India, Indo-China, Malaya, China, Japan, Polynesia, Australia.

3. CANAVALIA OBTUSIFOLIA DC. Prodr. II, 404. A large biennial climber with glabrous stems and branches. *Leaves* 3-foliolate 10–12 in. long; leaflets green, membranous, when young puberulous very soon quite glabrous, ovate-acute to rounded with a shortly acuminate tip, base rounded to subtruncate; 5–6 in. long 3·5–4·5 in. wide; petiole 6 in. long, glabrous; petiolules ·25 in.; stipels ·15 in. subulate, very early deciduous; stipules small triangular ·1 in. long, caducous. *Inflorescence* in lax 12–16-fld. racemes 3–8 in. long, on axillary peduncles 6–12 in. long; flowers solitary or geminate from swollen nodes ·3–·5 in. apart, pedicels ·1–·15. in., bracteoles minute ovate caducous. *Calyx* campanulate, sparsely puberulous, faintly ridged and not very distinctly reticulate-veined, ·5 in. long, upper lip rounded hardly emarginate, scarcely longer than lower and not one-sixth the length of tube. *Corolla* blue and white, 1 in long, limb of standard orbicular slightly emarginate. *Pods* few, short, turgid, slightly curved, dorsal suture faintly 3-keeled, spaces between keels wide and plane, not grooved, 3–6-seeded, length 3–5 in., depth 1·75–2·25 in., width of dorsal suture between outer keels ·75 in. *Seeds* pale umber with gamboge streaks, ·75 in. long ·5 in. broad,

embedded in the woolly separable endocarp. Miq. Flor. Ind. Bat. I, 215. *C. turgida* Grah. in Wall. Cat. n. 5534 A; Miq. in Flor. Ind. Bat. I, 215. *C. ensiformis* VAR. *turgida* Bak. in Flor. Brit. Ind. II, 196. *Dolichos obtusifolius* Lamk. Encyc. Meth. II, 295. *D. rotundifolius* Vahl, Symb. II, 81; Roxb. Flor. Ind. III, 302.—Rheede Hort. Malab. VIII, t. 43; Pluken. Almag. t. 51, f. 2.

ANDAMANS; Coco Group and Narcondam, *Prain!* Mid. Andaman, *Kurz!* S. Andaman, *Kurz! Man! King's Collector!* Little Andaman, *Prain!* PERAK; *Scortechini* 1391! *Kunstler* 1123! PANGKORE; *Scortechini* 978! PENANG; *Wallich* 5534! SINGAPORE; Pulo Obin, *Hullett* 330! DISTRIB. Indian, Indo-Chinese and Malayan coasts.

There is no doubt that, in the first place, this is *C. obtusifolia* DC.; that, in the second place, it is not *C. obtusifolia* Bak., in *Flor. Brit. Ind.*; and that, finally, it is specifically distinct from *C. ensiformis* of which the *Flora* makes it a variety. It is however, particularly unfortunate that, while the leaflets of *C. lineata* are almost always "obtuse," those of *C. obtusifolia* rarely are.

19. MUCUNA Adans.

Perennials and annuals of wide-twining habit. *Leaves* ample, stipellate, always 3-foliolate. *Flowers* large, showy, usually dark purple, turning quite black when dried. *Calyx-tube* campanulate; two upper teeth quite connate; lowest longer than the middle ones. *Corolla* much exserted; standard not more than half as long as the rostrate keel, which usually a little exceeds the wings. *Stamens* diadelphous; anthers dimorphous, like those of the *Genisteæ*. *Ovary* sessile, many-ovuled; style incurved, beardless, stigma capitate. *Pod* very variable in shape and sculpture, usually covered with brittle needle-like irritating bristles. Species about 30, spread everywhere in the tropics.

Perennials; pods flat, seeds large flattened, with a hilum extending round the greater part of their periphery (Subgen. ZOOPHTHALMUM):—
- Pods with plaits across their faces (§ *Citta*):—
  - Racemes long lax simple, bracts large boat-shaped; pods with broad wings, over which the plaits do not extend, down the sutures ... ... 1. *M. imbricata.*
  - Racemes short corymbose, bracts small; pods with transverse plaits that extend across the usually narrower sutural wings:—
    - Peduncles naked at base; bracteoles longer than buds; calyx-teeth long; pods one-seeded; margins of transverse plaits simple, and of sutural wings entire 2. *M. monosperma.*
    - Peduncles bracteate at base; bracteoles shorter than buds; calyx-teeth very short; pods two-seeded; margins of plaits 2-plicate, and of sutural wings incised ... ... 3. *M. biplicata.*

Pods without plaits across their faces (§ *Carpopogon*); (wide-winged down both sutures):—		
Racemes short corymbose, bracts large boat-shaped ...	4.	*M. acuminata.*
Racemes long-peduncled, umbelliform, bracts minute...	5.	*M. gigantea.*
Annuals; pods turgid, hooked; seeds small oval with small lateral hilum (Subgen. STIZOLOBIUM)	6.	*M. pruriens.*

SUBGEN. 1. ZOOPHTHALMUM. Perennial climbers; seeds large more or less flattened, with a long hilum extending round the greater part of the periphery.

§ CITTA. Pods plaited across their faces.

1. MUCUNA IMBRICATA DC. Prodr. II, 406. A large woody climber with slender glabrescent branches. *Leaves* 9–15 in. long: leaflets 3, membranous, green, glabrous above, glabrous or with a few adpressed hairs beneath, ovate-oblong cuspidate, base rounded—of lateral leaflets obliquely, 5–7 in. long, 3–3·5 in. across, petiole glabrous 4–8 in. long, petiolules ·2 in., stipels subulate ·15 in.; stipules linear ·25 in. long. *Inflorescence* of lax 8–10-fld. axillary racemes, pedicels ·35 in. long 1–3 together from swollen nodes towards upper third to fourth of peduncle 5–15 in. long, and in the axils of large boat-shaped deciduous bracts 1·25 in. long 1 in. wide glabrous on both surfaces rounded at apex except the acute or subacute lowest, forming at first a strobilate head. *Calyx* ·75 in. long sparsely covered externally with brown deciduous irritating bristles, tube wide-campanulate hardly longer than the wide triangular teeth; flower-buds with a bracteole similar to bracts but much smaller and more early deciduous, at base of calyx. *Corolla* 2–2·25 in. long dull purple or white with purple spots; keel abruptly inflexed at tip standard 1 in. across 1·25 in. long; wings ·5 in. wide. *Pod* oblong 4·5–6 in. long 2·25 in. across, wings along the sutures ·5 in. wide, plaits ·35 in. deep hardly crossing the wings; clothed in all parts with brown deciduous bristles; seeds 2–3. Bak. in Flor. Brit. Ind. II, 185. *Citta nigricans* Lour. Flor. Cochinchin. 557. *Carpopogon imbricatum* Roxb. Hort. Beng. 54. *Stizolobium imbricatum* Kuntze Rev. Gen. Plant. I, 208. *Zoophthalmum nigricans* Prain MSS.

ANDAMANS; in the interior forests, common. DISTRIB. Himalayas from Kamaon, eastward; and throughout Indo-China.

Most nearly related, amongst Malayan species, to *Stizolobium Junghuhnianum* Kuntze (*Rev. Gen.* Plant. I, 208) from Java, which has very similar bracts. The pods, however, are in that species slightly narrower with rather narrower wings across which the plaits extend more completely. The branches, petioles, leaves and bracts of *M. Junghuhniana* are moreover strigosely hispid and the calyx and pods are more densely bristly. Nearly related also is *M. cyanosperma* K. Schum., from the Moluccas.

2. MUCUNA MONOSPERMA DC. Prodr. II, 406. A large woody climber with deciduous rusty down on young branches. *Leaves* 6–9 in. long; leaflets 3 thinly subcoriaceous green glabrous above, when young rather closely rusty-downy beneath, ovate-oblong cuspidate base rounded—of lateral leaflets obliquely, 3–4 in. long 2–2·25 in. across, petiole 3–5 in. long at first rusty, soon glabrescent; petiolules ·25 in., stipels subulate ·15 in.; stipules linear ·2 in. *Inflorescence* corymbose 6–12-fld., axillary, peduncles usually ·5–1 in. occasionally elongated 2·5–3 in. long, at first rusty-puberulous as are the pedicels ·25–·5 in. long; bracteoles at base of calyx lanceolate ·6 in. long, exceeding the buds; bracts small triangular ·15 long very early deciduous and leaving small scars at base of pedicels. *Calyx* ·4 in. long densely covered with pungent deciduous bristles, tube campanulate twice as long as unequal teeth; upper tooth truncate lateral deltoid lower linear. *Corolla* 1·5 in. long, purple; keel abruptly inflexed at tip, wings ·25 in., standard ·6 in. long ·5 in. wide. *Pod* 2·75 in. long 2·25 in. wide broadly oblong, wings along the dorsal sutures ·5 in. wide along ventral ·25 in., plaits ·3 in. high crossing the wings to their margins; clothed in all parts with brown deciduous bristles; seeds solitary. Wight in Hook. Bot. Misc. II, 346, Suppl. t. 12; W. & A. Prodr. 254; Miq. Flor. Ind. Bat. I, 214; Bak. in Flor. Brit. Ind. II, 185. *M. anguina* Wall. Pl. As. Rar. III, 19 t. 236. *Carpopogon monospermum* Roxb. Hort. Beng. 54; Flor. Ind. III, 283. *C. anguineum* Roxb. Hort. Beng. 54. *Zoophthalmum monospermum* Prain MSS.

ANDAMANS; everywhere very common in the interior jungle.

3. MUCUNA BIPLICATA Teysm. & Binnend. Cat. Hort. Bog. 261. A large woody climber 30–40 feet long with slender glabrous branches. *Leaves* 9–12 in. long; leaflets 3, chartaceous dull green, glabrous on both surfaces ovate-oblong, cuspidate, base rounded—of lateral leaflets obliquely, 6–8 in. long, 5 in. across, petiole glabrous 4–6 in. long, petiolules ·25 in., stipels subulate ·15 in. long; stipules linear ·2 in.; pulvinus swollen puberulous. *Inflorescence* corymbose axillary 2 in. long; peduncle rusty-pubescent arising from an axillary node, its neck surrounded by a number of small triangular acute scaly bracts ·15 in. long emitting at once 1–4 3–6-fld. branches 1–5 in. long, main rachis corymbosely branched or simple 15–18-fld., bracts at base of pedicels small triangular immediately deciduous; pedicels ·2 in. long; bracteoles at base of calyx ·2 in. long, oblong much shorter than buds. *Calyx* greenish-brown densely covered with deciduous pungent bristles, ·35 in. long, tube wide-campanulate, teeth extremely short. *Corolla* dark-purple 1·75 in. long; keel abruptly inflexed at tip, wings 1·25 in. long, standard ·75 in. wide. *Pod* hardly stipitate 3·5 in. long 1·75 in. wide; plaits oblique very close-set their

edges double with reflexed margins, covered with close pungent brown bristly pubescence; marginal wings lobed between the plaits. *M. atropurpurea* Bak. in Flor. Brit. Ind. II. 186 in part and as to the Malacca plant only. *M. anguina* Scheff. Nat. Tijd. Ned. Ind. XXXII. 413 not of Wall. *Zoophthalmum biplicatum* Prain MSS.

Malacca; *Maingay*, 590. Penang; Gapis Pass, *Curtis* 2989! Perak; Ulu Kewanta, *Scortechini* 925! Sunga Ryah, etc. *Kunstler* 868! 3915! 6805! 8330! *Wray* 3746! Distrib. Sumatra (*Forbes* 2649!) Borneo.

There are at Calcutta both flowering and fruiting examples of Teysmann and Binnendyk's original species cultivated in the Buitenzorg garden; these are identical in every detail with this common Sumatra and Malay Peninsula plant. The pods much resemble those of *M. atropurpurea*, to which it comes nearest and with which it has been identified by Mr. Baker. But, besides the double edge to the plaits on the pods, whence the name, the Malayan differs from the Indian species in having larger leaflets, shorter inflorescences, a calyx with an almost truncate mouth and a collar of scaly bracts at the neck of the peduncle similar to but smaller than those that occur at the base of the peduncle in *M. bracteata* of the subgenus *Stizolobium*.

§ Carpopogon. Pods not plaited across their faces.

4. Mucuna acuminata Grah. in Wall. Cat. 5621. A slender creeper 20–30 feet long with sparingly adpressed-puberulous branches. *Leaves* 6–10 in. long; leaflets 3, membranous dull green glabrous above sparingly puberulous especially on the nerves beneath, ovate-oblong rather abruptly acuminate, base rounded or subtruncate—of lateral leaflets obliquely, 2·5–4 in. long 2–3·5 in. wide, petiole glabrous, 4–6 in. long; petiolules ·25 in. adpressed-puberulous; stipels subulate ·15 in. long, stipules linear ·2 in. *Inflorescence* when young in strobilate heads, corymbose, axillary, 2–3 in. long, peduncle grey-pubescent arising from an axillary node, its neck with a collar of small triangular acute scaly bracts ·15 in. long emitting at once 1–4 4–8-fld. usually bifurcate branches; bracts at base of pedicels deciduous large boat-shaped externally finely grey-pubescent, ·75 in. long, ·5 in. wide; pedicels grey-pubescent at length ·4–·6 in., bracteoles at base of calyx ·3 in. long, deciduous, lanceolate, as long as buds. *Calyx* glossy pale-brown densely covered with deciduous pungent bristles, ·5 in. long, tube wide campanulate twice as long as unequal teeth; upper tooth truncate, lateral wide-deltoid, lower linear longer than the others. *Corolla* 1·75–2 in. long, keel not abruptly inflexed at tip; wings as long as keel and twice as long as the standard ·7 in. wide. *Pod* not quite ripe, 3 in. long, 1·5 in. across, broadly winged down both sutures but not plaited on the faces, copiously clothed especially along the wings with deciduous yellow-brown irritating bristles; seeds 3. *Zoophthalmum acuminatum* Prain MSS.

Penang; *Wallich* (Cat. n. 5621)! Perak; Kinta, *Kunstler* 7038! Singapore; Chan Chu Kang, *Ridley* 2075! Distrib. Java (*Forbes* n. 493!)

5. Mucuna gigantea DC. Prodr. II, 405. A long very slender climber sometimes reaching 250 feet! with slender glabrous branches. *Leaves* 5–9 in. long; leaflets 3, subcoriaceous dark green, dull, glabrous on both surfaces; oblong cuspidate, base of terminal cuneate of lateral obliquely rounded, 4–5 in. long, 2·5 in wide, petiole glabrous 5 in. long; stipels subulate ·15 in., stipules linear ·2 in. long. *Inflorescence* a pendulous umbelliform corymb terminating a slender glabrous peduncle 4–18 in. long and bearing near its apex usually 3 sometimes 5–7 small projecting puberulous nodes each emitting 3–5 slender readily disarticulating grey-pubescent pedicels ·75 in. long; bracts and bracteoles both minute and very early deciduous. *Calyx* ·5 in. long green with a few pungent bristles, tube rather cylindric ·5 in. across, teeth all very short the upper wide subtruncate, the other three in bud shortly triangular at length obsolete. *Corolla* sickly greenish-yellow or white 1·25–1·5 in. long, keel not abruptly inflexed at tip; wings 1–1·25 in., standard ·75 in. long ·6 in. wide. *Pod* broadly winged down both sutures faces smooth or with oblique cross ridges but never distinct plaits; 3·5–6 in. long, 2 in. across, clothed with deciduous yellow-brown irritating bristles; seeds 2–4. Wall. Cat. 5619; W. & A. Prodr. 254; Wight in Hook. Bot. Misc. II, 351, Suppl. t. 14; Miq. Flor. Ind. Bat. I, 213; Bak. in Flor. Brit. Ind. II, 186. *M. corymbosa* Grah. in. Wall. Cat. 5622. *Dolichos giganteus* Willd. Sp. Pl. III, 1041. *Carpopogon giganteum* Roxb. Hort. Beng. 54; Flor. Ind. III, 286. *Stizolobium giganteum* Kuntze Rev. Gen. Plant. I, 208. *Zoophthalmum giganteum* Prain MSS.

Andamans; Coco Group, *Prain!* Middle Andaman, *Kurz!* South Andaman, *Liebig! Kurz! Man!* Little Andaman, *Prain!* always close to salt-water creeks or in Mangrove-swamps. Narcondam, near sea beach, *Prain!* Perak; *Scortechini!* Pahang; *Ridley* 1227! Distrib. A littoral species on Indian, Indo-Chinese, Malayan and Polynesian Coasts.

Subgen. 2. Stizolobium. Annual climbers; seeds ovoid with a small lateral hilum.

6. Mucuna pruriens DC. Prodr. II, 405. A slender annual climber with adpressed-pubescent branches at length glabrescent. *Leaves* 6–9 in. long; leaflets 3, membranous ovate-rhomboid, green glabrescent above grey-silky and lustrous beneath, the lateral pair very oblique truncate at base, all 3–5 in. long 2–3 in. wide; petioles 2·5–4·5 in. long, adpressed silky, petiolules ·2 in. long, stipels ·15 in. long subulate, stipules lanceolate ·2 in. long. *Inflorescence* of short-peduncled racemes varying from 1 in. to 1 foot in length and from 3–30-fld., drooping, rachis

finely silky, pedicels short ·15–·25 in. usually solitary from lateral projecting nodes; bracts ·5 and bracteoles ·3 in. lanceolate, grey-silky, lustrous. *Calyx* ·4 in. long with a few pungent bristles, tube campanulate hardly as long as the lower lanceolate tooth and equalling the lateral lanceolate and upper triangular tooth. *Corolla* purple 1·25–1·5 in. long; keel slightly incurved, wings nearly as long, standard ·6 in. long and about as broad. *Pod* 2–3 in. long ·5 in. wide, turgid, ridged longitudinally, recurved in the lower half and abruptly hooked at the tip; clothed with dense, intensely pungent subpersistent bristles at first dark purplish brown at length steel grey to pale rusty-brown; seeds 5–6. Wall. Cat. 5616; Wight in Hook. Bot. Misc. II, Suppl. t. 13.; Bak. in Flor. Brit. Ind. II, 187. *M. prurita* Hook. Bot. Misc. II, 348; W. & A. Prodr. 255; Miq. Flor. Ind. Bat. I, 211. *M. utilis* Wall. ex Wight Ic. t. 280. *Dolichos pruriens* Linn. Syst. Ed. X, 1162. *Stizolobium pruriens* Pers. Synops. II, 299; Kuntze Rev. Gen. Plant. I, 208, *Carpopogon pruriens* Roxb. Hort. Beng. 54; Flor. Ind. III, 283.

Andamans: Great Coco, near N. Andaman, common, *Prain!* Perak; Kampong Kota, *Wray* 3326! Distrib. Throughout the tropics.

20. Strongylodon Vogel.

Twining herbs, with firm stems and with stipellate 3-foliolate leaves *Flowers* in long lax racemes. *Calyx* campanulate, gibbous; teeth short, obtuse, imbricated. *Corolla* much exserted; standard lanceolate, recurved; wings obtuse, more than a third as long; keel curved, as long as the standard, narrowed into a long beak. *Stamens* diadelphous anthers uniform. *Ovary* stalked, few-ovuled, style filiform beardless; stigma capitate. *Pod* oblong, turgid. *Seeds* as large as a bean, with a hilum running more than half round. Species 3, Polynesian.

Strongylodon ruber Vogel, Linnæa X, 585. An extensive climber with quite glabrous thin hollow but firm stems. *Leaves* 8 in. long, petioles 2 in. long glabrous; leaflets 3, bright green, glabrous on both surfaces membranous shining above, ovate, shortly bluntly cuspidate subequal, 4 in. long 2·5 in. wide, terminal rounded at base with petiolule 1 in., lateral obliquely cuneate at base with short petiolules; 3-nerved at base, central nerve with 2–3 pairs of arching lateral nerves all visible beneath; stipels lanceolate membranous ·15 in. long, stipules triangular ·25 in. long membranous. *Inflorescence* in copious axillary racemes with peduncles 4–6 in. long of 30–40 1–3 fld. fascicles of pedicellate flowers arising from small produced nodes with obsolete bracts; pedicels slender spreading, ·5–·75 in. long. *Calyx* glabrous ·3 in. long tubular; teeth very short rounded; 2-bracteolate at base, bracteoles caducous. *Corolla* bright-red 1 in. long, standard lanceolate acute, the short obtuse wings

intimately attached to lamina of narrowly-lanceolate curved keel. *Pod* oblong 3 in. long, obliquely pointed, distinctly stalked, 2 seeded. Walp. Ann. IV, 559; A. Gray, Bot. Amer. Explor. Exped. 146 t. 48; Thwaites Enum. 89; Bak. in Flor. Brit. Ind. II, 191. *Rhynchosia lucida* DC. Prodr. II, 389.

Andamans; common, *Prain! King's Collectors!* Distrib. Ceylon; Polynesia.

21. Erythrina Linn.

Trees with prickly branches. *Flowers* large, coral-red, in dense racemes, produced usually before the development of the large constantly 3-foliolate leaves. *Calyx* oblique, spathaceous, finally slitting down to the base or campanulate-bilabiate. *Petals* very unequal; standard always much exserted and considerably exceeding the keel and wings. Upper *stamen* free down nearly to the base or connate with the others half way up the filaments; anthers uniform. *Ovary* stalked, many-ovuled; style incurved, beardless; stigma capitate. *Pod* linear, fertile turgid and torulose throughout, or flat and seedless below. Species 25–30, principally tropical, in both the New World and the Old, and at the Cape.

Pods turgid and seed-bearing throughout their length; stipels replaced by ovate-glands as long as broad; seeds with a very large oval hilum:—	
Calyx spathaceous, oblique not at all 2-lipped, splitting to the base down the back (§ *Stenotropis*); leaflets membranous subreniform or triangular, green on both surfaces; flowers narrow, standard entire at apex ...	1. *E. indica.*
Calyx campanulate, somewhat 2-lipped, not splitting to the base (§ *Micropteryx*); leaflets subcoriaceous ovate-oblong, glaucous beneath; flowers broad, standard emarginate	2. *E. ovalifolia.*
Pods flat, seedless and indehiscent in their lower half (§ *Hypaphorus*); stipels replaced by oblong glands longer than broad; seeds with a small hilum; (calyx somewhat 2-lipped; leaves membranous ovate-acute, green on both surfaces; flowers narrow, standard entire at tip)	3. *E. lithosperma.*

Subgen. 1. Stenotropis Hassk. *Calyx* spathaceous, oblique not at all 2-lipped, finally split to the base down the back. *Pod* turgid and seed-bearing throughout.

1. Erythrina indica Lamk Encyc. Meth. II, 391. A tree 60 feet high with thin grey bark, armed with minute conical dark-brown prickles. *Leaves* 8–12 in. long; petioles 4–6 in. long unarmed, when young densely brownish-grey puberulous when full-grown glabrescent

especially in the upper half; leaflets 3, membranous, uniformly bright green, densely brownish-grey puberulous when young when full-grown quite glabrous, terminal subreniform lateral pair slightly oblique triangular, all subcuspidate at apex and subtruncate at base, 4–6 in. long, terminal rather broader than, lateral hardly so broad as long; petiolules ·3–·4 in. long; stipels represented by ovate glands ·1 in. diam. that remain attached to the rachis on the fall of the leaflets; stipules flaccid lanceolate ·4 in. long softly brown-puberulous early caducous. *Inflorescence* of dense racemes 4–6 in. long on stout spreading woody peduncles 3–4 in. long; flowers 1–3 in axils of small triangular puberulous deciduous bracts, pedicels ·25 in. long at first brown-puberulous with 2 subulate puberulous deciduous bracteoles ·15 in. long at base of calyx. *Buds* narrowly spindle-shaped slightly falcate puberulous. *Calyx* 1–1·25 in. long, soon glabrescent, mouth very oblique splitting to the base down the back the tip with 5 teeth of which 2 or casually 3 are narrowly subulate ·2 in. long much exceeding the others. *Corolla* bright-red 2–2·5 in. long, standard 1 in. wide, wings and free keel-petals subequal about ·5–·6 in. long. *Ovary* softly grey-puberulous 2 in. long, stalked. *Pod* 6–12 in. long on a stalk ·75–1 in. long, black glabrescent distinctly torulose 6–8-seeded, usually the lowest and 1–3 of the uppermost seeds abortive, valves ultimately irregularly shred, hardly distinctly dehiscent; seeds subreniform ·6 in. long ·4 in. wide testa warm-brown, hilum large oval dark-grey with pale margin. DC. Prodr. II, 412; Roxb. Flor. Ind. III, 249; Wall. Cat. 5963; W. & A. Prodr. 260; Wight, Ic. t. 58; Miq. Flor. Ind. Bat. I, 207; Bak. in Flor. Brit. Ind. II, 188. *E. spathacea* Wall. Cat. 5965, fide Baker. *E. Corallodendrum* Linn. Sp. Pl. 706, in part. *E. cuneata* Grah. in Wall. Cat. 5967, fide Baker.

Andamans; on all the coasts common, *Kurz! Prain!* Nicobars; common behind the sea beaches, *King's Collectors!* Perak; *Scortechini!* Malacca; fide Baker in *Flora of British India*. Distrib. Sea-shores of S.-E. Asia, from the Sunderbuns to the Malay Archipelago and Polynesia.

This, as a wild species, is purely littoral; where it occurs inland it has certainly been planted.

Mr. Baker refers here *E. cuneata* Grah. which the writer has not seen; also *E. spathacea* Wall. Cat. 5965. What Wallich's 5965 B. & C. (which were doubtfully identified with 5965 A) may have been, it is difficult to say; they were Himalayan plants and are not at Calcutta. But the Calcutta example of 5965 A is not named *E. spathacea* as in the Lith Cat., but is named *E. stricta*; the specimen belongs moreover to *E. stricta* and not to *E. indica*.

Subgen. 2. Micropteryx Walp. *Calyx* campanulate, more or less distinctly 2-lipped, but not splitting down to the base. *Pod* turgid and seed-bearing throughout.

2. ERYTHRINA OVALIFOLIA Roxb. Hort. Beng. 53. A tree 30–40 feet high with spreading branches, bark grey, stem 1·5–2 feet diam., armed with thick-based dark-brown prickles. *Leaves* 8–12 in. long; petioles 4–5 in. long sparsely prickly, when young very sparingly puberulous, when full grown quite glabrous; leaflets 3 subcoriace deep green above glaucous beneath quite glabrous on both surfaces terminal ovate or ovate-oblong 4–6 in. long 2·5–3·5 in. across, lateral pair similar but rather smaller, base rounded or wide-cuneate apex obtuse or subacute; petiolules ·25 in. long; stipels represented by ovate persistent glands ·1 in. in diam.; stipules membranous orbicular deciduous ·15 in. across. *Inflorescence* in lax 8–20-fld. racemes 3–6 in. long on stout spreading peduncles 5–8 in. long; flower 1–3 in axils of small broadly ovate deciduous puberulous bracts; pedicels puberulous ·3 in. long with similar but smaller bracteoles at base of calyx. *Buds* narrowly ovate, puberulous. *Calyx* ·5 in. long, ·6 in. wide deeply 2-lobed. *Corolla* 2 in. long dark velvety-brown with deep scarlet tinge, standard 1·5 in. wide emarginate, wings ·75 in., keel-petals coherent 1 in. long. *Ovary* softly grey-puberulous, stalked. *Pod* 6–8 in. long 6–8-seeded on a stalk ·5 in. long, pale-brown puberulous, valves more distinctly dehiscing by the sutures; seeds subreniform ·5 in. long, ·3 in. wide, testa brown, hilum large oval. Roxb. Flor. Ind. III, 254; Wall. Cat. 5961; Wight Ic. t. 247; Benth. Pl. Jungh. 237; Miq. Flor. Ind. Bat. I, 207; Bak. in Flor. Brit. Ind. II. 189. *E. holosericea* Kurz, Journ. As. Soc. Beng. XLII, pt. 2, 69 as to flowers. *Duchassaingia ovalifolia* Walp. in Linnæa XXIII, 742.

PERAK; Kinta, *Kunstler* 7215! MALACCA; *Maingay* 528! DISTRIB. S.-E. Asia, from Assam and Bengal to the Malay Archipelago and Polynesia.

Mr. Kurz's *Erythrina holosericea* (*Corallodendron holosericeum* O. Kuntze, Rev. Gen. Pl. I, 172) is a spurious species manufactured by combining in one diagnosis a description of the flowers of *E. ovalifolia* and of the leaves of *E. lithosperma*; the *mélange* had been sent to Herb. Calcutta by an officer of the Indian Forest Department under the idea that it came from one tree. The citation of this species by Kuntze (*loc. cit.*) while that author is taking the opportunity to (as the writer thinks) unnecessarily restore an obsolete generic name, might lead to the conclusion that Kuntze had made an effort to verify the validity of the Kurzian species, as to the existence of which Mr. Baker had already expressed a doubt (*Flora of British India* II, 190). It is obvious, however, that Kuntze has done nothing of the kind and it would seem from this citation that the object of much of the *bouleversement* effected by priority-hunting "botanists" is less the restoration of generic names that have been improperly suppressed than a search for opportunities of posing as the authorities for species of whose characters they are ignorant.

In the Herbarium of Mr. Curtis, of the Penang Forest Department, is a solitary

specimen of an *Erythrina* belonging to this section, collected in Langkawi. The flowers are precisely those of *E. suberosa*, a glabrous form of which is common in Burma and Tenasserim; it may, therefore, well belong to that species. But the solitary branchlet is densely prickly whereas it is a feature of both the tomentose Indian and the glabrous Indo-Chinese form of *E. suberosa* to have almost unarmed branchlets. As moreover, Mr. Curtis' specimen is without leaves, the writer cannot on its authority alone, formally include *E. suberosa* among the Malayan species.

Subgen. 3. Hypaphorus Hassk. *Calyx* campanulate more or less distinctly 2-lipped, but not splitting down to the base. *Pod* flat seedless and indehiscent below, 1–3-seeded towards upper half.

3. Erythrina lithosperma Miq. Flor. Ind. Bat. I, 209 not of Blume. A tree 40–60 feet high with spreading branches, bark white, stem 2 feet in diam., armed with strong prickles. *Leaves* 10–12 in. long; petioles 4–5 in. long with a few prickles or unarmed, when young brownish-grey puberulous soon glabrous; leaflets 3 membranous uniformly bright green densely brownish-grey puberulous when young soon quite glabrous, triangular-ovate cuspidate at apex, terminal wide-cuneate at base 4–6 in. long 3–4 across, lateral pair rounded at base rather smaller; petiolules ·3 in. long; stipels represented by oblong glands ·15 in. long ·1 in. across; stipules deciduous shortly ovate-acute flaccid densely puberulous. *Inflorescence* in short rather dense racemes 3–4 in. long on stout spreading woody peduncles 5–8 in. long, flowers 1–3 in axils of minute ovate-acute bracts; pedicels ·2 in. long puberulous, minutely bracteolate at base of calyx. *Buds* puberulous ovate. *Calyx* ·3 in. long, softly persistently puberulous, equally 2-lipped. *Corolla* 1·5 in. long, standard oblong obtuse, crimson or crimson with white stripes, wings and keel ·5 in. long subequal. *Ovary* compressed faintly puberulous. *Pod* glabrous pale-yellow, 4–8 in. long, 1·25 in. wide in the wing like compressed seedless indehiscent lower half to two-thirds, ·6 in wide in the upper 1–3 seeded dehiscent portion; seeds subreniform ·75 in. long ·4 in. wide, testa almost black, hilum small elliptic pale. Bak. in Flor. Brit. Ind. II, 190. *E. sumatrana* Miq. Flor. Ind. Bat. Suppl. 304; Kurz, As. Soc. Beng. XLII, 2, 70. *E. secundiflora* Hassk. Pl. Jav. Rar. 378; Benth. Pl. Jungh, 237 not of Brotero. *E. holosericea* Kurz, Journ. As. Soc. Beng. XLII, 2, 69 as to leaves.

Penang; *Wallich!* Perak; at Kinta, *Kunstler!* at Waterloo, *Curtis* 2982! *Scortechini* (a MSS. description only.) Singapore; *Hullett!* Distrib. Indo-China, from the Shan Plateau, to the Malay Archipelago.

Mr. Kurz, as Mr. Baker remarks, has pointed out that the present species is *Erythrina sumatrana* Miq.; authentic examples of *E. sumatrana* in Herb. Calcutta, show that this is the case. But the only difference between *E. sumatrana* Miq. and *E. lithosperma* Bl. (ex Miq. in Flor. Ind. Bat.),—to which Mr. Baker has referred the Indo-Chinese plant that agrees in every respect with the Sumatra and Perak one,—

is in the size of the pods; those of *E. sumatrana* are rather larger than those of *E. lithosperma*. Both species are retained in the *Index Kewensis* but the writer agrees with Mr. Baker in believing that they do not deserve to be treated even as separate varieties. Kurz further states that *E. lithosperma* Blume ex Miq. in Flor. Ind. Bat. is not the same as *E. lithosperma* Bl. Cat. Bogor., which, according to Kurz, was introduced to the Buitenzorg garden from Mauritius. Koorders and Valeton, in their valuable Java Herbarium, issue the common wild Java plant which only differs from *E. sumatrana* in having rather smaller pods, under the name *E. lithosperma*; they have however in every case named the plant *E. lithosperma* Miq. not *E. lithosperma* Bl. In their *Bijdragen* II, these authors explain that Blume's "*E. lithosperma*" is only *E. indica*; this being the case the name *E. lithosperma*, but on Miquel's authority, not as that of Blume, is still available for the present species. Here again Kuntze's pretentious *Revisio* fails to assist the serious student; Kuntze claims the authorship of both, as *Corallodendron lithospermum* and *C. sumatranum* respectively, thus clearly indicating that he has failed to make himself acquainted with the characters of either.

22. Spatholobus Hassk.

Woody climbers, with 3-foliolate stipellate leaves. *Flowers* small or middle-sized, in ample terminal panicles, extending into the axils of the upper leaves, the pedicels densely fascicled at the tumid nodes. *Calyx* campanulate; teeth lanceolate or oblong-deltoid, the upper two connate. *Corolla* distinctly exserted, its petals subequal, the keel obtuse, nearly straight. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or stalked, 2-ovuled; style incurved, beardless, stigma capitate. *Pod* flat, winglike, indehiscent, seedless below; thick, 1-seeded, tardily dehiscent at tip. Species 10, the others Malayan and one Tropical African.

Leaflets not twice as long as broad, the terminal leaflets dissimilar, rhomboid; (leaflets large 3 in. across manifestly pubescent beneath, rachis prolonged beyond attachment of lateral leaflets; flowers blue or purple) :—

Leaflets puberulous above, uniformly tomentose beneath; flowers ·25 in. long, distinctly pedicelled ... ... 1. *S. ferrugineus.*

Leaflets glabrous above, tomentose only on the nerves beneath; flowers ·15 in. long, very shortly pedicelled . 2. *S. gyrocarpus.*

Leaflets at least twice as long as broad, all subsimilar lanceolate or oblanceolate to ovate :—

Leaf-rachis hardly prolonged beyond the insertion of lateral leaflets, leaflets large 3·5 in. across (sparsely pubescent on the nerves beneath) ... ... 3. *S. bracteolatus.*

Leaf-rachis distinctly prolonged beyond the insertion of lateral leaflets, leaflets medium or small not more than 2 in. across :—

Petiolules and leaflets beneath finely adpressed puberulous (stipels manifest flexuous) :—

Petiolules twice as long as stipels, flowers pink, branches of panicle lax; leaflets elliptic-acuminate... 4. *S. acuminatus.*

Petiolules shorter than stipels, flowers white, branches of panicle strict, leaflets ovate-lanceolate acute 5. *S. dubius.*

Petiolules and leaflets beneath glabrous:—

Leaflets thickly coriaceous (oblong, stipels obscure rigid) flowers purple, calyx densely rusty-pubescent .. 6. *S. crassifolius.*

Leaflets chartaceous, flowers white, calyx glabrescent or puberulous:—

Leaflets oblong, stipels obscure rigid, calyx glabrescent, branches of panicle strict .. ... 7. *S. Maingayi.*

Leaflets oblanceolate, stipels manifest flexuous, calyx finely puberulous, branches of panicle lax ... 8. *S. Ridleyi.*

1. SPATHOLOBUS FERRUGINEUS Benth. Pl. Jungh. 238. A robust woody climber 30–60 feet long with a stem 3–6 in. thick; branchlets densely rusty-tomentose, brown beneath the tomentum, cylindric. *Leaves* 9 in. long; leaflets 3, coriaceous dull green puberulous above, everywhere rusty-pubescent beneath, terminal ovate apex obtuse base rounded, 5–6 in. long 3 in. across, lateral obliquely elliptic 4·5–5·5 in. long as wide as terminal, lateral nerves 5–7 pairs ascending and midrib prominent beneath, cross-nerves and fine reticulate venation very distinct; petiole 3–4 in. long rusty-pubescent, petiolules ·25 in. also densely rusty; stipels subulate small; stipules broad-based triangular ·25 in. long, very densely rusty, deciduous. *Inflorescence* 8–10 in long, in lax axillary panicles with stout densely rusty-pubescent somewhat flattened peduncles, branches 4–6 in. long again paniculate the bracts at their bases triangular subpersistent; pedicels distinct ·2 in. long in fascicles of 2–5, bracteoles shorter than buds. *Calyx* densely rusty-pubescent ·2 in. long, teeth deltoid shorter than tube subequal except the rounded slightly emarginate upper. *Corolla* claret-coloured to dark-blue, ·25 in. long, standard oblong deeply notched. *Pod* 3–5 in. long, softly velvety, semi-transparent except at the seed-bearing tip, ·7 in wide below ·3 in. wide at seed-bearing apex. Miq. Flor. Ind. Bat. I, 204. *Drebbelia ferruginea* Zoll. in Nat. en Geneesk. Arch. III, 79.

PERAK; very common at low elevations, *Wray* 1941! 2008! 2381! 3258! *Scortechini* 213! 1466! *Kunstler* 3566! 6862! 7904! PENANG; Govt. Hill, *King! Abrams! Curtis!* MALACCA; *Maingay* 530! *Griffith! Derry* 1203! *Goodenough* 1437! SINGAPORE; *Hullett* 211! *Ridley.* 3609! DISTRIB. Sumatra, Java, Borneo.

From Singapore comes also a form collected twice by Mr. Ridley (n. 5578! n. 6394!) with a close red-silky tomentum beneath. This bears to ordinary *S. ferrugineus* very much the relationship that *Butea sericophylla* Wall. bears to *S. Roxburghii* (*Butea parviflora*) and it has not therefore been here separated as a variety, though it is certainly a very distinct "form" of *S. ferrugineus*. While very near *S. gyrocarpus* this species is quite readily separable by its nearly always rather smaller leaves; its always different tomentum; its always larger flowers with much longer pedicels, and its differently shaped more persistent bracts. The fruits are however,

exceedingly similar; but this is true also of *S. acuminatus*, *S. riparius*, *S. squamiger* and *S. Listeri*, four species that have fruits hardly distinguishable from those of *S. gyrocarpus* and *S. ferrugineus*.

Judging from the field notes of Mr. Kunstler and from a manuscript description written by Father Scortechini, *S. ferrugineus*, though a large climber, rarely if ever attains the dimensions of *S. gyrocarpus*, the next species.

2. Spatholobus gyrocarpus Benth. Pl. Jungh. 238. A robust woody climber sometimes over 100–150 feet long with a stem 4–6 in. thick; branchlets closely shortly rusty-pubescent, black beneath the tomentum, slightly angular. *Leaves* 12 in. long; leaflets 3 subcoriaceous bright green and glabrous above rusty-pubescent on all veins and nerves beneath, terminal obovate-rhomboid apex rounded with a short point base cuneate, 5–6 in. long, 4·5–5 in. wide, lateral obliquely elliptic 5–6 in. long 3·5–4 in. wide base obliquely rounded apex as in terminal; lateral nerves 6–8 pairs ascending and midrib prominent beneath, cross-nerves and fine reticulate venation very distinct; petiole 4–6 in. rusty puberulous, petiolules ·3 in. also rusty; stipels subulate small; stipules broad-based ovate-lanceolate ·3 in. long very early deciduous. *Inflorescence* in lax axillary panicles sometimes 12 in. long with stout somewhat flattened rusty-puberulous peduncles, branches 6–8 in. long again paniculate, the bracts at their bases small lanceolate early deciduous; pedicels very short, bracteoles at base of calyx linear shorter than buds early deciduous. *Calyx* grey silky-pubescent ·1 in. long, teeth deltoid shorter than the tube subequal except the triangular slightly notched upper. *Corolla* deep-claret to dark-blue, ·15 in. long, standard wide-orbicular deeply notched. *Pod* 3–5 in. long 1 in. wide below, seed-bearing tip ·3 in. wide, softly velvety, semitransparent except at the seed-bearing apex. Bak. in Flor. Brit. Ind. II, 193; Miq. Flor. Ind. Bat. I, 204. *Butea gyrocarpa* Wall. Cat. 5442.

Perak; very common at low elevations, *Kunstler* 3181! 7770! 8182! 10390! 10458! Penang; *Wallich* 5442! *Stoliczka!* Distrib. Philippines.

This, though common, appears to be hardly so frequent as the last species which it much resembles, especially as regards pods. The tomentum of this species is however, less dense and less red than in *S. ferrugineus* and the flowers are about half the size. This has never been sent to Calcutta from Malacca though *S. ferrugineus* is very plentiful there.

3. Spatholobus bracteolatus Prain. A slender creeper 15–20 feet long with sparsely rusty-pubescent branches. *Leaves* 10–12 in. long; leaflets 3 ovate-acute or shortly acuminate, the tip slightly mucronate, subcoriaceous glossy bright green on both surfaces very sparsely beset with short rusty adpressed hairs, midrib beneath prominent more densely adpressed-pubescent, lateral nerves ascending 8–9 pairs promi-

nent, cross-nerves distinct, terminal and lateral subequal subsimilar- 8–9 in. long, 3·5 in. across; petiole 2–2·5 in. long densely adpressed rusty-pubescent, scarcely prolonged beyond attachment of lateral leaflets, petiolules ·3 in. long also densely rusty; stipels short subulate, stipules ·25 in. long, deciduous, membranous, densely rusty, lanceolate; leaves towards ends of branches sometimes 1-foliolate. *Inflorescence* in terminal and axillary panicles 1·5–2 ft. long, branches 3–4 in. long again paniculate, with smaller sometimes 1-foliolate leaves at their bases, or bractless; pedicels very short, bracteoles at base of calyx lanceolate ·2–·25 in. long, longer than buds, early deciduous. *Calyx* pale-brown pubescent, ·15 in. long, lower teeth sublinear central longer than lateral all shorter than calyx tube, upper lip triangular notched at apex. *Corolla* shortly exserted small, colour not noted, standard orbicular-oblong slightly retuse. *Pod* not seen.

Perak; in dense jungle on Gunong Batu Pateh, at 3000–4000 feet, *Kunstler* n. 8079!

This in externals more resembles *S. Roxburghii* than it does any other Malayan species, and may possibly be the plant from Penang, noted by Mr. Baker as having been confused by Dr. Wallich with *S. gyrocarpus* under *Cat.* n. 5442; at Calcutta, however, *all* the specimens of *Cat.* n. 5442 are genuine *S. gyrocarpus*. The present plant was not identified with any species at Kew and in any case it is certainly not a form of *S. Roxburghii*; it differs in having smaller flowers; narrower, relatively longer bracteoles, and much longer stipules—the latter in *S. Roxburghii* are triangular and though wider at the base are only ·15 in. long. The stipels on the other hand are small and obscure and the most striking difference between this plant and *S. Roxburghii*, or indeed between it and any other species of *Spatholobus* is that the rachis of the leaf is so shortly prolonged beyond the attachment of the lateral pair of leaflets that the leaf is at times subdigitately 3-foliolate.

4. Spatholobus acuminatus Benth. Pl. Jungh. 238. A robust climber with branches at first minutely downy soon glabrescent. *Leaves* 8–10 in. long; leaflets 3, all oblong-cuspidate rounded at the base, 4–6 in. long, 1·5–2 in. across, subcoriaceous, pale green on both surfaces glabrous above, under the lens very minutely and sparsely puberulous beneath, midrib prominent beneath very sparsely shortly puberulous, lateral nerves 8–10 pairs spreading very slender, fine reticulations distinct but not prominent; petiole 2–4 in. long glabrescent, petiolules ·2 in. adpressed puberulous; stipels short subulate, stipules ovate-lanceolate ·25 in. long ·15 in. wide, very early deciduous. *Inflorescence* in short axillary panicles 6–8 in. long, branches 1·5–2 in. long again paniculate; pedicels slender usually 2–3 together ·2 in. long. *Calyx* puberulous ·15 in. long, teeth oblong obtuse half as long as tube the upper slightly emarginate. *Corolla* ·4 in. long, bright red (*fide* Baker), standard orbicular emarginate. *Pod* 3–5 in. long, softly velvety, semi-transparent except at seed bearing tip, ·7 in. wide below ·3 in. wide at tip. Miq.

Flor. Ind. Bat. I, 204; Bak. in Flor. Brit. Ind. II, 194. *Sapindacea* Wall. Cat. 8082. *Butea acuminata* Wall. Cat. 5443.

PENANG: *Wallich* 8082! ANDAMANS; common, *King's Collectors!* DISTRIB. Martaban.

The solitary Malayan specimen at Calcutta that appears referable to this species is one issued by Dr. Wallich as *Sapindacea* sp. (*Cat.* n. 8082); this specimen is not dealt with in the *Flora of British India*. So far as it goes it agrees better with Dr. Wallich's Martaban specimens of *S. acuminatus* (*Cat.* n. 5443) than it does with any Malayan species of *Spatholobus*, to which genus it manifestly belongs; the specimen is, however, only in very young flower. No one has met with it in Penang since Dr. Wallich collected it.

Mr. Baker's description of *S. acuminatus* does not apply to Dr. Wallich's *Butea acuminata* in so far as the lengths of the panicles and of the pedicels are concerned. His description would apply to *Wall. Cat.* 5907 (Pongamia rosea *Grah.*) which Mr. Baker also includes here; *Pongamia rosea* certainly is a *Spatholobus* but is a species very distinct from *S. acuminatus*. There are not at Calcutta examples of *Wall. Cat.* 5908 or *Wall. Cat.* 9054; both are here excluded because Mr. Baker expresses a doubt regarding both. The first may indeed prove to be the same as *Spatholobus riparius* Prain; of the second nothing can be said because, in the *Flora of British India*, it is referred not only to *S. acuminatus*, but also to *Derris thyrsiflora*.

The Andamans specimens are absolutely identical with Wallich's original specimens (*Cat.* 5443) from Martaban.

5. SPATHOLOBUS DUBIUS Prain. A large climber 100–150 feet long, stem 6–8 in. diam. with round adpressed-puberulous branches. *Leaves* 6–8 in. long; leaflets 3 ovate-acuminate base rounded the tip slightly mucronate, coriaceous glossy bright green, glabrescent above adpressed-puberulous beneath, lateral nerves ascending 8–9 pairs prominent beneath, cross-nerves distinct; terminal 2–6 in. long 1·5–3 in. wide, lateral subsimilar rather smaller; petioles 1·5 in. long puberulous, petiolules ·15 in. pubescent; stipels subulate ·15–·2 in. long, stipules lanceolate ·2 in. deciduous; leaves towards ends of branches sometimes 1-foliolate. *Inflorescence* in terminal and axillary spreading panicles the former sometimes 8 in. the latter 4 in. long, sometimes 2–3 from same axil. *Bracts* lanceolate persistent adpressed-pubescent ·15 in. long equalling the pubescent solitary or fasciculate pedicels; bracteoles minute. *Calyx* adpressed-pubescent, ·12 in., campanulate, teeth short triangular except the 2-fid upper. *Corolla* ·25 in. long, pure white, standard orbicular retuse. *Pod* not seen.

PERAK; Gunong Bubu, 800–1200 feet, *Kunstler* 7585! PENANG; Govt. Hill, *Curtis* 2970!

A very distinct species apparently nearest to *S. littoralis* Hassk. from which it differs in having the lower lip of calyx toothed and the leaves uniformly puberulous beneath. The shortness of its petiolules, which are equalled and often exceeded in length by the subulate stipels, renders the species easily distinguishable.

6. SPATHOLOBUS CRASSIFOLIUS Benth. Pl. Jungh. 238. Apparently

a strong climber, branches at first rusty-pubescent at length glabrescent. *Leaves* 8–10 in. long, all oblong-cuspidate, cuneate at the base, 4–6 in. long 1·5–2 in. wide, thickly rigidly coriaceous, dark green and quite glabrous on both surfaces midrib prominent beneath glabrous, lateral nerves 6–7 pairs and secondary nervation very slightly raised; petiole 2–4 in. long glabrous, petiolules ·2 in. glabrescent; stipels short subulate often obscure, stipules lanceolate ·2 in. long very early deciduous. *Inflorescence* of short axillary panicles 8–9 in. long, branches about 2 in. long, again paniculate, peduncles rusty-pubescent with a few ovate-acute deciduous leaf-scales at their base; pedicels very short, rusty-pubescent. *Calyx* densely rusty-velvety, ·1 in. long, teeth all deltoid shorter than the tube. *Corolla* ·2 in. long, dark-purple, limb of standard much broader than deep, deeply emarginate at apex subcordate at junction with claw. *Pod* not seen; when immature with a stalk (*fide* Baker.) Bak. in Flor. Brit. Ind. II, 194. *Pongamia? crassifolia* Grah. in Wall. Cat. 5913.

Penang; *Wallich!* Distrib. Silhet.

This is very distinct by reason of its leaves and (from Mr. Baker's description) on account of its stipitate pod. Dr. Wallich's original specimens from Silhet and Penang seem undoubtedly examples of one species; strangely, it has not been sent again to Calcutta from either locality.

7. Spatholobus Maingayi Prain. A large climber with glabrous branches. *Leaves* 4–5 in. long; leaflets 3 ovate-acute base rounded tip slightly mucronulate, thickly coriaceous glabrous on both surfaces, lateral nerves ascending 5–6 pairs slightly prominent beneath cross-nervation distinct but not prominent; terminal 3 in. long 1·75 in. wide; lateral rather smaller; petiole 2 in. glabrous, petiolules ·25 in. quite glabrous; stipels subulate ·1 in. long, stipules ovate ·1 in. long, deciduous. *Inflorescence* in terminal and axillary panicles 6–8 in. long. *Bracts* minute subulate persistent puberulous, as are the rachis and pedicels shorter than calyx; bracteoles very minute. *Calyx* adpressed-puberulous ·12 in. long, campanulate, teeth all short rounded. *Corolla* white ·25 in. long, the standard orbicular deeply emarginate. *Ovary* hirsute 2-ovuled.

Malacca; *Maingay* 611! Perak; *Kunstler* 3535! 4652! 6906! 10428! *Scortechini* 206! 1537! Singapore; *Ridley!*

This evidently quite common species has never yet been reported in fruit. It appears from a note in Herb. Calcutta that Mr. Kurz had supposed it might be the same as *S. macropterus* Miq.; the flowers, however, differ slightly and, in their venation, the leaves of the two species differ markedly. Father Scortechini on the other hand thought when he collected it that this might be *Derris (Aganope) macrophylla*, a reasonable supposition in the absence of fruit since the flowers of *Spatholobus* are very like the flowers of *Aganope* and since the obscureness, and indeed at times apparently total absence, of stipels from the leaves of this species leads to their being

easily overlooked. There are, however, very few specimens without stipels on *some* of their leaves and the writer has therefore followed Mr. Kurz in referring the plant to *Spatholobus*. The matter cannot, however, be conclusively settled till pods are obtained and examined. The only other species with equally obscure stipels is *S. crassifolius*, of which, however, Mr. Baker has seen immature fruit.

8. Spatholobus Ridleyi Prain. A climber with glabrous slightly-angled branches. *Leaves* 6 in. long; leaflets 3 subequal oblanceolate apex acuminate tip mucronulate base cuneate, papery quite glabrous on both surfaces, 3–3·5 in. long 1–1·25 in. wide; petiole glabrous 1·5 in. long, petiolules glabrous ·2 in. long; stipels small rigid subulate, often very obscure; stipules lanceolate ·25 in. long subrigid parallel-veined. *Inflorescence* in axillary racemes 3 in. long 1 in. wide, bracts and bracteoles minute deciduous. *Calyx* ·12 in. campanulate adpressed-pubescent, upper tooth truncate the others rounded half as long as tube, pedicels ·2 in. long, adpressed-puberulous. *Corolla* ·25 in., white, standard orbicular, limb slightly auriculate, apex retuse. *Pod* 4 in. long, 1 in. wide below, seed-bearing tip ·4 in. across; sparsely puberulous, reticulate-veined, semitransparent except at apex.

Singapore; *Ridley* 6401!

A very distinct species though nearest to *S. macropterus* Miq.

23. Indigofera Linn.

Herbs or shrubs more or less densely clothed with adpressed hairs, with (in Malayan species) compound odd-pinnate leaves. *Flowers* small in copious axillary racemes. *Calyx* minute campanulate; teeth 5, subequal or the lower longest. *Corolla* caducous, standard obovate; keel straight, not beaked, laterally spurred near base. *Stamens* diadelphous, anthers uniform apiculate. *Ovary* sessile many-ovuled; style short incurved, stigma capitate penicillate. *Pod* linear-cylindric several-seeded. Species about 250; in all tropical regions and in temperate South Africa.

The genus is hardly a Malayan one; the above definition applies, as to foliage, only to the species that occur in the Malay Peninsula.

Herbaceous; stems densely pubescent; pod short straight pubescent ... ... 1. *I. hirsuta.*

Shrubby; stems faintly hoary; pod glabrous:—

Calyx deeply cleft, about half as long as corolla; pods reflexed:—

Leaflets ovate-acute; racemes dense, pods short much recurved ... ... 2. *I. Anil.*

Leaflets obovate-obtuse; racemes lax, pods longer straight or only slightly recurved at the tip ... ... 3. *I. tinctoria.*

Calyx shortly toothed, hardly ½ as long as corolla; pods ascending ... ... 4. *I. galegioides.*

1. Indigofera hirsuta Linn. Sp. Pl. 751. An annual or biennial suberect herb 1–3 or 4 feet high; stem densely covered with soft short spreading grey or brown pubescence. *Leaves* 2–5 in. long, short-petioled; leaflets terminal and in 2–5 opposite pairs, obovate 1–2 in. long, membranous greyish-green above, glaucous beneath, densely coated with adpressed hairs; stipules setaceous, plumose. *Racemes* 2–6 in. long, short-peduncled, very dense-fld. *Calyx* densely pubescent, ·15 in. long; teeth setaceous plumose; tube very short. *Corolla* ·2 in. long, little exserted, purple or red. *Pod* ·5–·7 in long, straight, densely covered with spreading grey pubescence, 6–8 seeded. DC. Prodr. II, 228; Roxb. Flor. Ind. III, 376; Jacq. Ic. I, 569; Wall. Cat. 5450; Hook. Comp. Bot. Mag. t. 24; W. & A. Prodr. I, 204; Miq. Flor. Ind. Bat. I. 304; Bak. in Flor. Brit. Ind. II, 98. *I. ferruginea* Schum. & Thonn. Pl. Guin. 370.

Pahang; *Ridley!* Penang; *Curtis!* Malacca; *Ridley!* Singapore; *Hullett!* Distrib. Tropics generally.

2. Indigofera Anil Linn. Mantiss. 272. A shrub 4–6 feet high with twiggy woody thinly silvery branches. *Leaves* 2–3 in. long, petioles ·5–1 in.; leaflets terminal and in 5–8 opposite pairs, ovate-acute ·5–1 in. long, membranous, green; stipules subulate. *Racemes* 1–2 in. long, dense-fld., nearly sessile. *Calyx* ·04 in. silvery, teeth acute as long as tube. *Corolla* purple ·15–·2 in., distinctly exserted. *Pods* ·4–·6 in. long ·1 in. thick glabrescent retro-falcate 4–6-seeded. Miq. Flor. Ind. Bat. I, 307. Bak. in Flor. Brit. Ind. II, 99. *I. tinctoria* var. *Anil* Kurz Journ. As. Soc. XLV, pt. 2, 269 excl. all syn.

Andamans; Port Blair, not uncommon. A native of America but not uncommon in cultivation and as an introduced escape or weed in the Old World. This is apparently much commoner in Indo-China than it is in India; it is frequently mistaken for *Indigofera coerulea* Roxb. which however appears to be exclusively an Indian plant.

3. Indigofera tinctoria Linn. Sp. Pl. 751. A shrub 4–6 feet high with twiggy woody thinly silvery branches. *Leaves* 1–2 in. long, petioles ·5–1 in.; leaflets terminal and in 4–6 opposite pairs, obovate-oblong, ·5–1 in. long membranous, green; stipules subulate. *Racemes* 2–4 in. long, lax-fld. nearly sessile. *Calyx* ·04 in., silvery, teeth acute as long as tube. *Corolla* reddish-yellow ·15–·2 in., distinctly exserted. *Pods* ·7–1 in. long ·1 in thick, glabrescent straight, or slightly recurved towards tip, 8–12-seeded. DC. Prodr. II, 224 (*var.* α. only); Roxb. Flor. Ind. III, 379; Wall. Cat. 5474; W. & A. Prodr. I, 202; Wight, Icon. t. 365; Miq. Flor. Ind. Bat. I, 306; Bak. in Flor. Brit. Ind. II, 99. *I. indica* Lamk, Encyc. Meth. III, 245. *I. sumatrana* Gærtn. Fruct. II, 317, t. 148.

Penang; cultivated, *Curtis!* Malacca; *Griffith!* Pangkore; *Scortechini!* Pahang; "growing near Sultan's tomb," *Ridley!* Singapore;

Ridley! A native apparently of the Old World; often cultivated and occasionally occuring as an escape.

4. INDIGOFERA GALEGIOIDES DC. Prodr. II, 225. A tall shrub, reaching 8 feet high, with twiggy woody branches at first adpressed-pubescent at length glabrescent. *Leaves* distinctly petioled, 8–12 in. long; petioles ·5–2 in.; leaflets terminal and in 6–12 lateral pairs, oblong obtuse, of varying size generally ·5 in. long by ·3 in. across but sometimes 1–2 in. long, membranous, green above glaucescent beneath very obscurely adpressed hirsute; stipules distinct, stipels minute. *Racemes* 2–3 in. long, short-peduncled, very dense-fld. *Calyx* ·04 in. long, hoary, teeth very short, deltoid. *Corolla* pale-red ·4–·5 in., finely canescent externally. *Pods* glabrous 2·5–3 in. long, cylindric, straight, beaked, 15–18-seeded. Miq. Flor. Ind. Bat. I, 310; Bak. in Flor. Brit. Ind. II, 100. *I. uncinata* Roxb. Fl. Ind. III, 382; Wall. Cat. 5472. *I. Finlaysoniana* Wall. Cat. 5488.

MALAY PENINSULA; Perak; *Kunstler*, 316! Malacca, *Griffith!* Langkawi, *Curtis*, 2865! DISTRIB. Ceylon; Indo-China; S. China; Philippines; Malay Archipelago.

Very easily distinguished from other species by the fact that its pods instead of spreading or being reflexed, are fastigiately grouped with their apices pointing in the direction of the apex of the peduncle. It is often planted for ornament and is perhaps not really native in Malaya.

24. SESBANIA Pers.

Soft-wooded shrubs or trees with long, very narrow abruptly * pinnate leaves with very numerous deciduous linear-oblong obtuse mucronate leaflets. *Flowers* in axillary racemes. *Calyx* campanulate shallowly 2-lobed or 5-toothed. *Corolla* much exserted; petals all with long claws; standard broad keel straight and obtuse or subrostrate and recurved. *Stamens* 2-adelphous; anthers uniform. *Ovary* stipitate, linear, many-ovuled; style filiform, incurved glabrous; stigma capitate. *Pod* very long and narrow, dehiscent; septate between the very many seeds. Species about 40, cosmopolitan in the tropics.

Flowers small, bud straight (§ *Eusesbania*); annual shrubs:—		
Pod twisted pendulous; stems thick pith-like; flowers ·75 in. long	1.	*S. paludosa.*
Pod not twisted usually ascending; stems woody very slender; flowers ·4 in. long	2.	*S. cannabina.*
Flowers large, bud falcately recurved (§ *Agati*); a tree ...	3.	*S. grandiflora.*

1. SESBANIA PALUDOSA Roxb. Hort. Beng. 56 (*sub* Aeschynomene). A large tree-like herb with annual stems reaching 12 feet in height,

* By an unfortunate oversight this character is not made prominent in the Keys to the tribes and genera, p. 22 and p. 33.

2 in. in diam. full of white soft pith, quite unarmed as are the leaf rachises. *Leaves* 4–12 in. long, sessile, leaflets 10–30 pairs dark-green sparingly hirsute above. *Racemes* drooping 8–12-fld., 4–5 in. long equalling or slightly exceeding the leaves in whose axils they arise. *Flowers* yellow the standard externally dotted with small purple spots ·75 in. long. *Pods* 10–12 in. long flexible with strong not indented sutures always pendulous and always twisted. *S. grandiflora* Miq. Flor. Ind. Bat. I, 288, not of Pers. *S. cochinchinensis* Kurz Journ. As. Soc. Beng. XLV, 2, 271, not of DC. *S. punctata* Benth. MSS. in Herb. Kew, not of DC. *S. aculeata* VAR. *paludosa* Bak. in Flor. Brit. Ind. II, 115 (in part only and excluding the syn. *Aeschynomene uliginosa*). *Aeschynomene paludosa* Roxb. Hort. Beng. 56; Flor. Ind. III, 333, not *S. paludosa* Jacq.

KEDAH; open marshy ground near rice-fields, *Kunstler* 1712! DISTRIB. Bengal; Burma; China; Java.

Roxburgh, who knew the Bengal *Sesbanias* well, has left of most of them, under the name of *Aeschynomene*, unmistakeable descriptions and figures which subsequent Indian botanists have for some reason treated with little consideration. A careful examination of living plants shows, however, that Roxburgh's treatment of the forms is probably accurate, and his views of the limitation of the species are certainly preferable to any that have since been proposed.

The present species is the familiar *Kathsola* (as opposed to the true *Sola* which is *Aeschynomene aspera*), so common in marshes throughout the Gangetic Delta.

Though recognised as distinct by Prof. Miquel, that author unfortunately has used a specific name that is pre-occupied in the genus. Mr. Kurz thought it might be *Coronilla cochinchinensis* Lour. but that species has erect toruloso pods and the identification is therefore impossible. Mr. Bentham has suggested its being *Sesbania punctata* but the pods and the stem structure forbid this identification also. As *Sesbania paludosa* Jacq. is not this species but is Roxburgh's *Aeschynomene uliginosa* it seems best to conserve Roxburgh's specific epithet *paludosa* for the very distinct plant to which he originally applied it.

Dr. Kuntze (*Rev. Gen. Plant.* I, 181) would reduce this to *Sesbania ægyptiaca*! an excellent instance of the unscientific use of the imagination.

2. SESBANIA CANNABINA Pers. Synops. II, 316. A tall and slender unarmed woody herb, stems reaching 20 feet in height without exceeding ·5 in. in diam. at base. *Leaves* 2–3 in. long, sessile; leaflets 8–20 pairs, glabrous, very dark green. *Racemes* short (under 1 in.) but distinctly pedunculed, 2–4-fld.; flowers yellow, the standard externally closely purple-streaked, ·4 in. long. *Pods* very often solitary rarely more than 2, spreading or pendulous rarely erect, 4–8 in. long; sutures stout straight, valves not depressed between the seeds. DC. Prodr. II, 265; Miq. Flor. Ind. Bat. II, 286, excluding syn. *S. cannabina* W. & A. *S. affinis* Schrad. in DC. Prodr. II, 265. *S. polyphylla* Miq. Flor. Ind. Bat. II, 288. *S. aculeata* VAR. *cannabina* Bak. in Flor. Brit. Ind. II, 115. *Aeschynomene cannabina* Retz. Obs. V, 26; Roxb. Flor. Ind. III, 335.

Tongkah; *Curtis' Collector* 2861! Distrib. Lower Bengal, commonly cultivated; Lower Burma; Java.

This species has, like the last, been much misunderstood. It is the familiar *Dunchi* plant of Bengal, where it is widely cultivated; to a slight extent on account of its fibre which, being more resistent to water than other kinds is employed in making fishing nets and lines; to a greater extent for its long lithe stems that are used as the wattles of which are constructed the walls of the houses in which *Piper Betle* is grown in Bengal. Probably this is an introduced plant in Malay countries.

3. Sesbania grandiflora Pers. Synops. II, 316. A soft-wooded tree 20–30 feet high and 8–10 in. in diam. at base, with virgate terete branches. *Leaves* 6–12 in. long, leaflets 16–30 pairs, linear-oblong glabrous, pale-green. *Racemes* short (1 in. long), 2–4-fld., but distinctly peduncled; flowers white or pink. *Calyx* ·8 in. deep, glabrous, shallowly 2-lobed. *Corolla* 3–3·5 in. long. *Pods* up to 20 in. long, falcate or straight, firm, sutures thick straight, valves slightly depressed between the seeds. Bak. in Flor. Brit. Ind. II, 115. *Agati grandiflora* Desv. Journ. Bot. I, 120, t. 4; Miq. Flor. Ind. Bat. I, 289.

Perak; Thaipeng, *Scortechini* 525! Singapore; *Kunstler* 1147! *Hullett* 819! Distrib. Mascarene Islands to N. Australia, usually planted.

The *Agati* tree, which is very doubtfully native either in India or Malaya, is often grown as a support for Pepper-vines in Southern India. In Northern India it is chiefly planted for the sake of its showy flowers.

25. Tephrosia Pers.

Herbs or undershrubs with compound odd-pinnate or, rarely, simple leaves; the leaflets opposite, subcoriaceous. *Flowers* in terminal and leaf-opposed racemes. *Calyx* campanulate with distinct subequal teeth. *Corolla* much exserted, petals clawed, standard suborbicular; keel incurved, not beaked. *Stamens* diadelphous, anthers uniform, obtuse. *Ovary* sessile, linear, many-ovuled; style much incurved, flattened or filiform, silky or glabrous; stigma capitate often penicillate. *Pod* linear flattened, many-seeded, 2-valved, continuous or obscurely septate between the seeds. Species about 100, in all tropical regions.

The above definition applies only to the species of the Malay Peninsula.

An undershrub; calyx-teeth short, deltoid ... ... 1. *T. candida.*

Herbs; calyx-teeth narrow cuspidate as long as the tube:—

Pods glabrescent ... ... 2. *T. purpurea.*

Pods clothed with persistent brownish silky hairs ... 3. *T. Hookeriana.*

1. Tephrosia candida DC. Prodr. II, 249. A low shrub, 4–6 feet high, with slender woody grooved branches clothed with brown or grey

persistent velvety pubescence. *Leaves* short-petioled 6–9 in. long; leaflets terminal and in 9–12 opposite pairs, ligulate, acute, 1·5–2 in. long, green and glabrous above, grey and thinly silky beneath; stipules setaceous, ascending. *Racemes* copious, terminal and lateral, 6–9 in. long, lower flowers fasciculate; pedicels ·25–·4 in., silky. *Calyx* densely silky, ·2–·25 in. long, teeth much shorter than tube. *Corolla* ·75–1 in., rose or white, standard densely silky. *Pods* 3–4 in. long, 10–15-seeded, slightly recurved, clothed with adpressed brown silky hairs; style silky, flattened. Wall. Cat. 5627; W. & A. Prodr. 210; Bak. in Flor. Brit. Ind, II. 111. *Robinia candida* Roxb. Flor. Ind. III, 327. *Kiesera sericea* Reinw. in Miq. Flor. Ind. Bat. I, 291. *Xiphocarpus candidus* Hassk. Pl. Rar. Jav. 336.

Singapore; *Anderson!* *Hullett!* Distrib. Himalayas, Western Indo-China, Malay Archipelago.

2. Tephrosia purpurea Pers. Synops. 329. A copiously branched suberect herbaceous perennial with slender firm terete glabrescent stems. *Leaves* short-petioled 3–6 in. long; leaflets terminal and in 6–10 opposite pairs, narrowly oblanceolate obtuse, ·5 in. long, green and glabrescent above, glaucous and obscurely silky beneath; stipules subreflexed. *Racemes* copious all lateral, 3–6 in. long, lax-fld.; lowers flowers fasciculate; pedicles ·1–·2 in., bracteoles minute. *Calyx* densely silky ·1–·15 in. long; teeth linear as long as tube. *Corolla* ·25–·3 in. long, red, standard thinly silky. *Pods* 1·5–2 in. long, 6–8-seeded, slightly recurved, glabrescent; style glabrescent; stigma penicillate. DC. Prodr. II, 251; Wall. Cat. 5638; W. & A. Prodr. 213; Miq. Flor. Ind. Bat I, 296; Bak. in Flor. Brit. Ind, II, 112. *Galega purpurea* Linn. Sp. Pl. ed. II, 1063; Roxb. Flor. Ind. III, 386.

Malacca; *Griffith!* Penang; *Curtis!* Pahang; *Ridley!* Selangor; roadsides, *Ridley* 7291! Distrib. S.-E. Asia.

The form found in the Malay Peninsula is the typical plant described by Linnaeus and by Roxburgh as *Galega purpurea*. Mr. Ridley has noted on his Selangor specimens:— "*Indigofera*, introduced by Tamils, now established."

3. Tephrosia Hookeriana W. & A. Prodr. 212; var. *amoena* Prain. A slightly-branched erect herbaceous perennial with firm terete finely downy branches. *Leaves* short-petioled 4–8 in. long; leaflets terminal and in 6–9 opposite pairs narrowly oblanceolate, truncate, 1 in. long, green and glabrous above, grey and thinly silky beneath; stipules linear erect. *Racemes* copious all lateral, 6–9 in. long, lax-fld.; pedicels ·1 in. long: bracteoles minute. *Calyx* densely silky ·15–·2 in. long: teeth setaceous rather longer than tube. *Corolla* ·35–·5 in. long, red, standard thinly silky. *Pods* 2–2·5 in. long, 8–10-seeded, slightly recurved, densely clothed with persistent brownish silky hairs; style flattened

glabrescent; stigma penicillate. *Tephrosia amœna* Wall. in Hort. Calcutt. not of Eckl.

PENANG; *Curtis!* MALACCA; *Maingay! Derry!* DISTRIB. N. India.

This differs from Wight and Arnott's *T. Hookeriana* (*T. calutea* Wight in Wall. Cat. 5647 not of Pers.) in having leaflets almost twice as long and glabrous above; in true *T. Hookeriana* the leaflets are pubescent above as well as beneath. As Hamilton in *Trans. Linn. Soc.* XIII, 546 gives the alternative name *Tephrosia hirta* to the *Galega hirta* cited under this species by Mr. Baker, it must follow, if Mr. Baker's identification be correct, that the name *T. hirta* Ham. should be cited for the species. Dr. Hamilton's diagnosis, however, is of a plant with "falcate" pods in "dense" racemes, two characters which exclude *T. hirta* from this species and which point to its being a form of *T. villosa*.

There is little doubt that in a critical review of the genus the Malayan and North Indian plant should be looked on as specifically distinct from the true *T. Hookeriana* of Southern India; but as an African *T. amœna* Eckl. has already been published, Dr. Wallich's MSS. name is not available. The species might, however, be known as *Tephrosia subamœna*. The *Tephrosia amœna* "Pers." cited by Mr. Baker does not exist.

26. MILLETTIA W. & A.

Trees, shrubs or large woody climbers with odd-pinnate, rarely-1-foliolate leaves; the leaflets opposite and usually large, generally stipellate. *Flowers* large and showy in axillary solitary or fascicled racemes and in terminal panicles, the florets single or in fascicles along the rachis. *Calyx* cup-shaped lobed or slightly toothed; teeth 5 or the 2 upper connate or absent. *Corolla* much exserted, petals long-clawed; standard broad spreading or reflexed, auricled or not at the base; wings free or only cohering at the tip, oblong sickle-shaped; keel incurved obtuse. *Stamens* monadelphous or diadelphous, the vexillary filament being united at the base or as far as the middle with the others, or being quite free; anthers uniform, filaments filiform. *Ovary* linear sessile or shortly stalked surrounded at base by an annular disc-like sheath; ovules rather numerous; style filiform incurved glabrous, stigma capitate. *Pod* linear, lanceolate or oblong, usually compressed and flat, occasionally turgid; thickly coriaceous or woody; late or hardly dehiscent. Species about 60; especially prevalent in Indo-China and Malaya.

The genus *Millettia* is retained here because its species are familiar to residents in the east under this name. But, as Baron von Mueller has shown, there is no room for a genus *Millettia* apart from *Wistaria*. The name *Wistaria* unfortunately, though it has come into common use among horticulturists, is not the one that was originally given to the genus. The oldest name, as pointed out by Dr. O. Kuntze, is *Phaseoloides* and this, in a modified form, that author proposes to employ. Adjectives are not, however, advisable as generic names and the name *Kraunhia* which, as Sir Joseph Hooker and Mr. Jackson point out, is the earliest unobjectionable name, appears to be that which, when the two genera are united, must be employed for their species.

Inflorescences in axillary or terminal racemes or panicles; leaves scattered along the branches:—

Standard not auricled at the base of the lamina (§ *Eumillettia*), or auricles only represented by callosities:—

Leaves *lustrous beneath with thin lepidote silky pubescence*; (pods turgid silky; leaves exstipellate) ... 1. *M. sericea.*

Leaves opaque beneath, glabrous when mature, or silky only on the nerves beneath (*M. Hemsleyana*); (pods woody):—

Pods turgid rugose; leaves rigidly coriaceous; racemes densely thyrsoid; flowers dark-red or purple: (leaves without stipels):—

Bracts large suborbicular, *young racemes strobilate*; standard silky externally; pods pubescent ... 2. *M. eriantha.*

Bracts small ovate early deciduous; standard glabrous externally; pods glabrous ... ... 3. *M. atropurpurea.*

Pods flat smooth (lenticelled in *M. glaucescens*); leaves membranous (subcoriaceous in *M. cærulea*); racemes lax; flowers white, pink or blue:—

Leaflets without stipels, membranous; racemes distinctly peduncled; pods glabrous *(standard 2-callose)*:—

Standard glabrous externally:—

Pods lenticelled, the sutures slightly winged; leaflets subglaucous quite glabrous beneath ... 4. *M. glaucescens.*

Pods not lenticelled the sutures thickened but not winged; leaflets pubescent on midrib and nerves beneath ... ... 5. *M. Hemsleyana.*

Standard silky externally; (pods not lenticelled, sutures not winged; leaflets glabrous beneath) 6. *M. decipiens.*

Leaflets stipellate, subcoriaceous; racemes very close and short peduncled; pods pubescent externally; (leaves glabrous beneath; flowers blue) ... 7. *M. cærulea.*

Standard auricled at base of lamina (§ *Otosema*); (leaves subcoriaceous opaque beneath, pods pubescent):—

Pods very wide turgid; leaflets small many obtuse; flowers pink, or white with pink tinge; panicles wide short:—

Leaflets densely velvety beneath; pod obpyriform, longitudinally channelled, pubescence short, pale-purple brown ... ... 8. *M. Maingayi.*

Leaflets glabrescent beneath; pod oval, not chanelled, pubescence long, dark-brown ... ... 9. *M. oocarpa.*

Pods flat; leaflets large few caudate-acuminate; flowers pure white:—

Leaflets 5–7, rarely 3; pods soft brown-velvety ... 10. *M. albiflora.*

Leaflets *solitary*; pods pale yellowish-velvety ... 11. *M. unifoliata.*

Flowers *solitary along leafless stem* on conical processes in axils of leaf-scars; leaves *tufted at top of slender stems* ... 12. *M. cauliflora.*

1. Millettia sericea W. & A. Prodr. 263. A large woody climber 80–100 feet long, in dense forest; in the open a low spreading shrub 8–25 feet high; stems 3–6 in. diam.; branches striate shortly finely pubescent. *Leaves* 8–12 in. long, leaflets terminal and in 3–4 opposite petiolulate pairs, without stipels; obovate to elliptic-oblong, entire, apex bluntly cuspidate, base rounded or cuneate, 3–5 in. long 1·5–3 in. wide; coriaceous, deep-green and glabrous above glossy and silvery-grey or light-brown from a minute scale-like pubescence beneath; petiolules ·2 in. long. *Racemes* axillary nearly as long as the leaves, slightly pubescent, the nodes not produced, each with the scars of 7–8 flowers. *Flowers* on pedicels ·15 in. long bracteolate under the calyx. *Calyx* wide-tubular, limb truncate ·15 in. deep, dark-brown silky externally. *Corolla* ·5 in. diam., standard orbicular long-clawed, whitish pink or blue internally, brown-silky externally, wings clawed, purple or pink with white stripes. *Vexillary filament* hardly cohering at base with the remaining stamens. *Ovary* pubescent, style glabrous. *Pod* 3–7 in. long 1 in. across, densely brown-tomentose with a rusty shining velvety tomentum, turgid when ripe. *Seeds* 1–3, rarely 4, testa dark-brown smooth; 1 in. long, ·75 in. diam. Miq. Flor. Ind. Bat. I, 153; Bak. in Flor. Brit. Ind. II, 104. *Pongamia sericea* Vent. Hort. Malmais. sub. t. 28; DC. Prodr. II, 416. *Phaseolodes sericeum* Kuntze Rev. I, 201.

Var. *typica;* leaflets silvery beneath; sutures of young pods distinctly thickened; seeds 1–2, rarely 3.

Perak; common; *Scortechini! Kunstler! Wray!* Distrib. Sumatra (*Teysmann! Forbes* 3103A!); Java (*Kurz!*)

A small-leaved form of *M. sericea* is reported from Penang (*Curtis n.* 844!); Lobb *n.* 310 in Herb. Kew, not seen by the writer, is noted by Mr. Hemsley as identical with it; and the same plant is also at Kew from Singapore, as it is at Calcutta from Perak (*Kunstler n.* 401! *Wray n.* 2364!). But the Perak specimens have in some cases leaflets of the ordinary size on the same twig with the small leaflets; the flowers of this form are exactly like those of *M. sericea* and the Penang plant is therefore not even separable as a variety.

Var. *malaccensis;* leaflets brownish underneath; sutures of young pods hardly thickened; pods longer seeds 3–4.

Malacca; *Griffith* 1764! *Maingay* 518! *Goodenough* 1706!

A distinct local form but perhaps hardly a good variety.

2. Millettia eriantha Benth. Pl. Jungh. 250. A rather slender woody climber 50–80 feet long with only the youngest twigs silky. *Leaves* 8–11 in. long, rachis glabrous, leaflets terminal and in 2, rarely 3, opposite pairs, petiolulate without stipels; obovate-oblong or elliptic shortly cuspidate 2–4 in. long, 1·25–2·5 in across, rigidly coriaceous pale green and glabrous on both surfaces; petiolules ·25 in. *Racemes* copious, at first short dense 1–1·5 in. long and strobilate with large

suborbicular cuspidate densely silky bracts, ultimately thyrsoid 6 in. long; the bracts deciduous ·3 in. in diam.; pedicels ·15 in. long. *Calyx* wide-campanulate ·4 in. long, externally uniformly pubescent with brownish silky hairs; the teeth triangular two-thirds as long as tube. *Corolla* dark-red within, the standard externally densely glossy-brown silky nearly 1 in. long. *Pod* turgid, 3 in. long 1·75 in. across, 1-seeded; woody, rugose, clothed with pale brown hairs; slightly beaked. Miq. Flor. Ind. Bat. I, 155; Bak. in Flor. Brit. Ind. II, 108.

Perak; common, *Wray!* *Scortechini!* *Kunstler!* Malacca; very common, *Griffith!* *Maingay!* *Derry!* *Goodenough!* Singapore; *Ridley* 6396! 6663! Pahang; *Ridley* 2644!

3. Millettia atropurpurea Benth. Pl. Jungh. 249. An erect tree 30–80 feet high 3–4 feet in girth; branches and thick branchlets grey but glabrous. *Leaves* 15–18 in. long, leaflets terminal and in 3–4 opposite pairs petiolulate without stipels; narrow-oblong, base rounded or rarely cuneate apex obtuse or shortly cuspidate, 4–6 in. long 1·5–2 in. across, rigidly coriaceous green and glabrous on both surfaces, upper surface shining; petiolules ·25 in. *Racemes* copious in a dense terminal thyrsoid hoary-tomentose panicle 6–8 in. across; bracts small ovate deciduous, ·1 in. in diam.; pedicels ·2 in. long, rusty-pubescent thickening in fruit. *Calyx* ·25 in., campanulate, teeth small the two upper truncate the others acute, thinly silky externally. *Corolla* dark-purple, standard 1 in. long ovate-obtuse, glabrous externally. *Vexillary stamen* free; ovary pubescent. *Pod* turgid, 3 in. long 2 in. across, 1–2 seeded; woody subrugose quite glabrous; slightly beaked. Miq. Flor. Ind. Bat. I, 157; Bak. in Flor. Brit. Ind. II, 108. *Pongamia atropurpurea* Wall. Cat. 5910; Pl. As. Rar. I, t. 78.

Perak; *Scortechini* 193! 273! *Kunstler* 2012! Penang; *Wallich* 5910! Malacca; common. Singapore; *Hullett* 60! Distrib. Tenasserim; Sumatra.

4. Millettia glaucescens Kurz in Journ. As. Soc. Beng. XLII, 2. 67. A large tree with glabrous branches the smaller ones slightly angled. *Leaves* 8–9 in. long; rachis glabrous; leaflets terminal and in 4–5 opposite petiolulate pairs; lowest pair broadly ovate the rest obovate-oblong all acuminate, 3·5–5 in. long 1·25–1·75 wide; membranous, bright green above glaucescent beneath, glabrous from an early stage on both surfaces; petiolules ·2 in. *Racemes* axillary slender 6 in. long, at first puberulous as are the capillary solitary, paired, or fascicled pedicels, ·2 in. long. *Calyx* wide shallow-tubular, slightly pubescent, obscurely toothed, ·15 in. deep. *Corolla* ·4 in. long, standard orbicular glabrous externally, 2-callose at base, steel-blue (*fide* Kurz); wings clawed. *Vexillary filament* cohering half way up staminal

sheath. *Ovary* pubescent style glabrous. *Pod* 5–6 in. long, 1 in. wide, thickish, woody, usually tubercled rarely reticulated on the faces, quite glabrous; both sutures thickened and expanded into narrow wings. Bak. in Flor. Brit. Ind. II, 107.

Perak; Kapayong Kurta, *Wray* 168! *Scortechini* (specimens with reticulated but not tubercled pods)!

By its pods this species is most nearly allied to *M. tetraptera* Kurz, but it has very different leaves which resemble those of *M. pubinervis* and *M. Hemsleyana* except in being glabrous. It agrees with these two species also as regards structure of flowers though not as regards pods. As regards leaves it likewise much resembles *M. decipiens* and *M. dehiscens*; in these species, however, not only are the pods without wings along the thickened sutures but the standard is silky externally.

5. Millettia Hemsleyana Prain. An erect bushy tree 20–40 ft. high, stem 10–15 in. in diam.; branches puberulous when young. *Leaves* 6–8 in. long, rachis pubescent, leaflets terminal and in 3–4 opposite petiolulate pairs, without stipels; lowest pair broadly ovate the rest elliptic-obovate all obtusely acuminate, 2–3·5 in. long, 1·25–1·5 in. wide; membranous bright green glabrous from an early stage above subglaucous and pubescent beneath with scattered flexuous spreading hairs which quickly disappear except from the midrib and main lateral nerves; petiolules ·2 in., stipules large, ·25 in., deciduous. *Racemes* axillary, slender simple, 2·5–4 in. long, at first puberulous as are the capillary, solitary or fascicled pedicels, ·25 in. long, subtended by lanceolate deciduous bracts ·2 in. long. *Calyx* wide shallow-tubular, slightly pubescent, obscurely toothed, ·15 in deep, red, or green with a reddish tinge. *Corolla* ·4 in. long, standard orbicular 2-callose at base glabrous externally, white or faintly tinged with pink, wings clawed. *Vexillary filament* cohering nearly half way up staminal sheath. *Ovary* pubescent, style glabrous. *Pod* 3·5–4 in. long ·5 in. wide, thin, quite glabrous, sutures slightly thickened not winged. *Kraunhia Hemsleyana* Prain MSS.

Perak; *Wray* 3310! 3608!

Millettia Hemsleyana is very closely related to *M. pubinervis* Kurz, a Tenasserim species; it has however rather narrower leaflets and differs especially in having large stipules and bracts. To *M. glaucescens* it is also closely related, but it differs in having pods that are neither winged along the sutures nor lenticelled along the valves. Both in pods and in foliage it likewise closely resembles *M. decipiens* but that species differs in having a pubescent standard.

6. Millettia decipiens Prain. An erect wide-spreading tree 40–60 feet high, stems 2–3 feet in diam.; branches all glabrous the smaller slightly angled. *Leaves* 8–9 in. long; rachis glabrous; leaflets terminal and in 4–5 opposite petiolulate pairs; lowest pair broadly ovate the rest elliptic-obovate all acuminate 2–3·5 in. long 1·25–1·5 in. wide;

membranous rather dark green on both surfaces glabrous from an early stage on both surfaces except for occasionally a few scattered hairs on the midrib beneath; petiolules ·2 in. *Racemes* axillary slender simple 6–8 in. long, at first puberulous as are the capillary solitary or fascicled pedicels, ·2 in long. *Calyx* wide shallow-tubular, slightly pubescent, obscurely toothed, ·15 in. deep. *Corolla* ·4 in. long, standard orbicular, densely silky externally, 2-callose at base, pink, or white with a pink tinge, wings clawed. *Vexillary filament* cohering half way up staminal sheath. *Ovary* pubescent, style glabrous; ovules 4. *Pod* 4–5 in. long, nearly 1 in. across, glabrous, sutures not thickened. *Kraunhia decipiens* Prain MSS.

Perak; Ulu Slim, 400 feet, *Kunstler* 10718! Kwala Dipong, *Scortechini* 1749! Pluss river, *Wray* 548! Pahang; Kwala Tahan, *Ridley* 2591!

The flowers of this species so much resemble those of *Pongamia glabra* that, with flowering examples, only careful dissection to ascertain the number of ovules satisfactorily distinguishes the two. Another species extremely nearly related to this is *Millettia dehiscens* (*Pongamia dehiscens* Koord. & Val. *Bijdr.* II. 96) a Java tree with the same silky standard, but with the ovary 5- or more-ovuled; its leaves are like those of *M. glaucescens*, its pods like those of *M. ovalifolia*.

7. Millettia coerulea Bak. in Flor. Brit. Ind. II, 107. A woody climber with glabrous branches. *Leaflets* terminal and in 3 petiolulate pairs, stipellate; obovate-oblong cuspidate 4–6 in. long; subcoriaceous, glabrous on both sides from an early stage; petiolules ·15 in. long. *Racemes* short-peduncled, close, axillary. *Flowers* short-pedicelled, densely fascicled. *Calyx* campanulate ·1 in., faintly silky, nearly truncate. *Corolla* three times the calyx, the standard densely white-canescent on the back. *Stamens* monadelphous. *Pod* large flat rather woody, linear-oblong 7–8 in. long, 1·5–1·75 in. wide, recurved, late in dehiscing, clothed with dense short persistent brown-velvety pubescence. *Pongamia coerulea* Grah. in Wall. Cat. 5894.

Malacca; *Griffith.* Distrib. Burma.

The above description is taken from the *Flora of British India*, there being no specimen at Calcutta either of the Burmese or of the Malacca types of Mr. Baker's species. The specimens here that accord best with the description are some from Penang (*Curtis* n. 2459); they are in fruit only and may prove to belong to *M. coerulea*. The plant is noted, however, as a "tree;" the specimens have 5-foliolate leaves and the leaflets resemble those of *M. albiflora*, of which it may equally well be a variety.

8. Millettia Maingayi Bak. in Flor. Brit. Ind. II, 110. A creeper over 100 feet long; young branches pale brown-pubescent. *Leaves* 8–10 in. long, leaflets terminal and in 5–8 opposite pairs, shortly petioluled stipellate; oblong, base rounded, apex rounded or subacute, 1·5–2 in. long 1 in. across, coriaceous, light green and glabrous above, velvety

underneath as is the leaf-rachis; petiolules ·2 in., stipels setaceous, persistent. *Racemes* in small axillary panicles one-third as long as leaves, 2·5 in. long, 1·5 in. across; rachis and pedicels rusty-pubescent, as are the linear deciduous bracts ·1 in. long; pedicels ·1 in. *Calyx* ·2 in. campanulate, externally rusty-pubescent, teeth wide-triangular half as long as tube. *Corolla* white tinged with pink, ·5 in. long, standard orbicular, auriculate at base of lamina, slightly emarginate and slightly puberulous externally. *Pod* oblong or obpyriform, woody indehiscent (*fide* Baker), rounded at both ends, 6 in. long 3·5 in. wide, turgid, shortly pale rusty-brown velvety, the surface traversed by deep longitudinal grooves.

Singapore; cultivated, *Maingay*; *Ridley!* Selangore; in dense jungle at 800–1200 feet elev., *Kunstler* 8759!

A remarkable species, originally described by Mr. Baker from a fruiting specimen. To the kindness of Mr. Ridley, the Calcutta Herbarium owes the possession of excellent flowering and fruiting examples of the plant; from these the above description has been drawn up. Mr. Kunstler's plant from Selangore is unfortunately only in flower; it agrees however in every detail with the flowering specimens sent from the Singapore garden by Mr. Ridley.

The only near ally of *M. Maingayi* is the next species from which it differs in having larger pods that, according to Mr. Baker, do not dehisce and in having leaflets densely tomentose beneath.

9. Millettia oocarpa Prain. A large creeper, young branches glabrous. *Leaves* 6–8 in. long, leaflets terminal and in 4–6 opposite pairs, shortly petiolulate stipellate; oblong, rounded at both ends, 2–3 in. long, 1–1·5 in. across, the terminal considerably exceeding the others, subcoriaceous light green and glabrous above, whitish and very sparsely adpressed-puberulous, finely reticulately veined beneath; leaf-rachis puberulous as are the petiolules ·2 in. long; stipels setaceous persistent. *Racemes* in small axillary panicles one-half as long as leaves, 2·5 in. long, 1·5 in. across; rachis and pedicels slightly puberulous as are the linear deciduous bracts ·1 in. long; pedicels ·1 in. *Calyx* ·2 in. long, campanulate, externally grey-puberulous, teeth short obscure. *Corolla* white tinged with pink, ·5 in. long, standard orbicular, auriculate at base of lamina, entire, uniformly sparsely puberulous externally. *Stamens* diadelphous, vexillary filament free. *Ovary* 2-ovuled, pubescent. *Pod* oval, woody, dehiscent, rounded at both ends, 3·5 in. long, 1·75 in. in diam., turgid, densely dark brown-velvety, the surface smooth. *Kraunhia oocarpa* Prain MSS.

Perak; Batu Togoh, 250 feet, *Wray* 2141! *Scortechini* 429!

Very nearly related to *Millettia Maingayi* of which it has exactly the flowers. Its pods however are smaller, densely covered with darker and much longer hairs, and are distinctly dehiscent. In shape and size they resemble the egg of a domestic fowl. The leaflets too differ in not being velvety beneath, and the leaves are shorter.

10. Millettia albiflora Prain. A handsome spreading tree some-

times 80–100 feet high (*Kunstler*), usually 30–50 feet, trunk 2–3 feet in diam., branches glabrous. *Leaves* a foot long, leaflets terminal and in 2–3 more rarely 1, opposite pairs, shortly petiolulate without stipels, elliptic-lanceolate entire apex caudate base cuneate, 5–10 in. long, 1·5–2·5 in. across, lowest pair rather smaller, thickly membranous shining above dull beneath, with 6–9 pairs of ascending rather prominent lateral nerves and a very prominent midrib, quite glabrous on both surfaces, petiolules ·2 in. long. *Racemes* in very long narrow axillary panicles towards ends of branches, 1–1·5 feet long, 2·5 in. across; individual racemes subfastigiate 4–6 in. long with 10–12 solitary short-pedicelled flowers; pedicels ·15 in. long, rusty-puberulous as are the peduncles and main-rachis. *Calyx* ·25 in. long, rusty-puberulous, tube campanulate rather longer than the triangular teeth, the two upper teeth connate emarginate. *Corolla* pure white ·75 in. long, standard orbicular 2-auriculate at base of lamina, externally glabrous. *Vexillary filament* extending half way up the sheath or at length free on one side only, or on both. *Ovary* puberulous. *Pod* linear 7–13 in. long, 1·5–2 in. wide, straight flat rather woody, uniformly soft brown-velvety. *Kraunhia albiflora* Prain MSS.

Perak: Goping, *Scortechini* 1948! Ulu Salama, *Kunstler* 729! 1288! 4467! 5833! 5993! 6077! Larut, *Kunstler* 5357! 6709! 6842! Thaipeng, *Wray* 1864! Kota, *Wray* 1943! *Ridley* 7981! 8004! Pahang; [illegible]han, *Ridley* 2641!

A very fine species apparently extremely common in Perak. Mr. Kunstler notes it is usually found near river-courses or in wet low ground.

11. Millettia unifoliata Prain. A handsome spreading tree 30–40 feet high, trunk 1 foot in diam., branches glabrous. *Leaves* consisting of a solitary terminal leaflet, petiolulate without stipels, obovate-oblong or lanceolate entire, apex acute rarely caudate, base cuneate, thickly membranous shining above dull beneath, with a prominent midrib and 6–9 pairs of ascending lateral nerves not much more prominent than the distinct secondary reticulations; glabrous on both surfaces; petiolule ·25 in. long directly articulate with branch. *Racemes* in very slender axillary panicles shorter than the leaflets, 3–4 in. long ·25–·35 in. across; individual racemes short 3–5-fld. separated from each other by intervals 1 in. long; peduncles and pedicles glabrous. *Calyx* ·2 in. long, externally glabrous, campanulate 2-bracteolate at base, bracteoles ovate-lanceolate minute, teeth shorter than tube hirsute within. *Corolla* pure white ·75 in. long, standard orbicular 2-auriculate at base of lamina, externally glabrous. *Stamens* monadelphous in a sheath split along the vexillary side. *Ovary* puberulous. *Pod* linear 6 in. long 1 in. across, flat, rather woody, tapering to both ends, finely pale yellowish-velvety externally. *Kraunhia unifoliata* Prain MSS.

Perak; Pangkore Island, *Curtis* 1615! *Scortechini* 1023! Tupia, *Wray* 2836! Blanja, *Scortechini* 124! 1711! Larut, *Kunstler* 4251! Goping, *Kunstler* 4492! 8210!

Very closely related to *Millettia albiflora* of which it has much the flowers and also much the fruits. It differs however from all other hitherto known *Millettias* in having 1-foliolate leaves. The pods are never so large as in *M. albiflora* and the inflorescence is very different in appearance owing to its being smaller and more slender.

12. Millettia cauliflora Prain. A small slender unbranched gregarious shrub 6–8 feet high, stems hardly ·5 in. in diam., with black lenticelled bark, bearing a terminal tuft of leaves and having small nodular flower-bearing projections in the axils of leaf-scars along the stem. *Leaves* 1–1·5 feet long, stipules subulate, ·3 in. long, caducous; rachis tawny-pubescent as are the petiolules and the setaceous persistent stipels; leaflets thinly membranous glabrous on both surfaces, lateral nerves in 5–7 ascending pairs impressed above very prominent like the midrib beneath; lowest pair 2 in. long 1·25 in. across, terminal and upper pairs 6 in. long 2 in. wide. *Calyx* ·2 in., glabrescent. *Corolla* (only withered specimens seen) apparently pink, standard apparently auricled. *Pod* solitary, at intervals along the stem, 3–3·5 in. long, ·6 in. wide, narrowed towards base, slightly recurved, rigidly coriaceous early dehiscent, externally grey silky-tomentose; seeds 2. *Kraunhia cauliflora* Prain MSS.

Perak; Larut, *Kunstler* 2555!

A very distinct species with leaves much like those of the African *Millettia macrophylla* Hook. f., but with fewer lateral nerves. It differs from all other known species in having solitary fruits (and apparently solitary flowers) in the axils of old leaf-scars along the stem. The standard seems to be auricled, but whether the stamens are monadelphous or diadelphous cannot yet be said.

27. Pongamia Vent.

A tree. *Leaves* odd-pinnate, leaflets opposite, ex-stipellate. *Flowers* racemed. *Calyx* campanulate, nearly truncate. *Corolla* much exserted; standard broad, silky; keel obtuse the petals cohering at their tip. *Stamens* monadelphous, the upper filament free low down; anthers oblong, versatile. *Ovary* subsessile, 2-ovuled; style incurved, glabrous, stigma capitate. *Pod* woody, somewhat turgid, oblong, indehiscent, not winged nor thickened at the sutures. A single species, on all coasts from the Mascarene Islands to Malaya, North Australia, and Western Polynesia.

Pongamia glabra Vent. Jard. Malm. t. 28. A fairly-large tree 40–60 feet high, with spreading glabrous branches; bark greyish-green soft, wood pale-yellow when cut, darkening on exposure; stem reaching 2–3

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Perak; Larut, *Kunstler* 2555!

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Pongamia glabra Vent. Jard. Malm. t. 28. A fairly-large tree 40–60 feet high, with spreading glabrous branches; bark greyish-green soft, wood pale-yellow when cut, darkening on exposure; stem reaching 2–3

feet in. diam. *Leaves* 8–10 in. long, pale-green, leaflets usually 5–7, more rarely 7–9, oblong or ovate, rarely ovate-lanceolate, acute, base cuneate or deltoid; subequal, 3–7 in. long, 1–3·5 in. wide, subcoriaceous, glabrous on both surfaces or, rarely, slightly puberulous on the nerves beneath, lateral nerves about 8 pairs rather prominent beneath as is the midrib, rachis about 5 in. long glabrous as are the petiolules ·25 in. long. *Flowers* in rather short axillary racemes 4–6 in. long with peduncles 1–1·5 in. long, usually simple; nodes tumid bearing 2–4 subequal filiform pedicels, rachis and pedicels sparsely puberulous, pedicels ·25–·35 in. long, bracteolate at base and 2-bracteolate towards apex. *Calyx* wide-campanulate ·12 in. deep, ·15 in. wide, mouth truncated. *Corolla* ·35–·5 in. long, white with violet or pinkish flush, standard orbicular, silky on the back, subcordate and 2-auriculate at the base. *Stamens* monadelphous. *Ovary* finely pubescent, ovules 2, rarely 1. *Pod* turgid woody glabrous, 1·5–2 in. long, ·8–1·25 in. wide, ·25 in. thick, brownish-green with a short decurved point; seeds 1, very rarely 2, testa white, marbled with slightly raised brownish lines radiating irregularly from the hilum, ·7 in. long, ·5 in. wide.

Var. *typica*; leaflets usually 5, occasionally 7, oblong or ovate 2·5–3·5 in. wide, quite glabrous beneath; racemes always solitary simple, pedicels ·35 in. long, their bracteoles only sub-opposed and situated slightly above the middle. *Pongamia glabra* Vent.: DC. Prodr. II, 416; Wall. Cat. 5878; W. & A. Prodr. 262; Wight, Ic. t. 59; Bedd. Flor. Sylvat. t. 177; Miq. Flor. Ind. Bat. I, 147; Bak. in Flor. Brit. Ind. II, 240. *Pongamia grandifolia* Zoll. & Mor. Syst. Verzeichn. 3; Miq. Flor. Ind. Bat. I, 147. *Pongamia mitis* Kurz, Journ. As. Soc. Beng. XLV, 2. 128. *Robinia mitis* Linn. Sp. Pl. ed. II, 1044. *Galedupa indica* Lamk Encyc. Meth. II, 594 (excl. syn. *Caju galedupa* Rumph.); Roxb. Flor. Ind. III, 239. *Dalbergia arborea* Willd. Sp. Pl. III, 901. *Galedupa arborea* Roxb. Hort. Beng. 53.—Rheede Hort. Malab. VI, t. 3; Rumph. Herb. Amb. III, t. 117; Lamk Ill. t. 603.

In all the provinces, very abundant on the banks of every tidal river and along the margins of all Mangrove-swamps.—Distrib.; of the genus; often planted in inland districts.

Var. *xerocarpa*; leaflets 7–9, very rarely 5, lanceolate 1–1·35 in. wide, usually sparsely puberulous on the midrib and main veins beneath, racemes occasionally 2–3 in same axil and sometimes sparingly branched, the pedicels ·25 in. long with the bracteoles opposed and situated close under the calyx; ovules sometimes solitary. *Pongamia xerocarpa* Hassk. Retz. ed. nov. 208. *Malaparius flavus* Miq. Flor. Ind. Bat. I, 1082 in addend., hardly *Malaparius* Rumphius.

Pahang; *Ridley* 1362! Kedah; *Kunstler* 1740! Perak; Trang,

Kunstler 1420! 5625! MALACCA; *Derry* 939! DISTRIB. Ceylon (Thwaites C. P. 1489); Java; Sumatra.

Pongamia glabra is the well-known littoral species known in Southern India generally as *Pungam*, in Northern India as *Karanj*, in Burma as *Thin-win* and in Malaya as *Malapari*. Throughout India it is very generally planted, both as a timber tree, and for the sake of the oil obtained from its seeds; it does not seem to be planted in the Malayan provinces.

The typical variety appears in two somewhat distinct forms that pass, however, into each other by all kinds of intermediates. These are:—

(α) a form with medium-sized leaflets and flowers (the original *P. glabra*) which is spread throughout the area occupied by the species; also

(β) a form with decidedly larger leaflets and flowers (the form named *P. grandifolia* Zoll. & Mor.) which extends from north to south along the coasts of Chittagong, Arracan, the Andamans, Nicobars, Sumatra and Java, apparently without extending westward to the Sundribuns and India or eastward to Tenasserim and the Malay Peninsula.

VAR. *xerocarpa*, though only separable by characters that individually are trivial, nevertheless looks remarkably different from the type; it resembles far more the two species known as *Millettia decipiens*, and *Millettia dehiscens*. Indeed, with flowers alone, only a careful examination of the ovary, 4- or more-ovuled in the *Millettias*, 1- or 2-ovuled in the *Pongamia*, ensures accurate determination. The fruits of the *Millettias* are, however, dehiscent and therefore unlike those of *Pongamia*.

Roxburgh used for this genus Lamarck's name *Galedupa*, first applied in 1786. Lamarck's use of the name depended on his belief that *Caju galedupa* Rumphius (*Herb. Amboin.* II, t. 13) was this tree. As figured, however, *Caju galedupa* has equally-pinnate leaves, dehiscent pods and arillate seeds; *Pongamia glabra* has unequally-pinnate leaves, indehiscent pods, no arillus and a very small hilum. Moreover Rumphius describes and figures *Pongamia glabra* (*Herb. Amboin.* III, 117) under its Malay name *Malapari*. That Lamarck had detected his mistake is clear from his having abandoned the name *Galedupa* in 1797 (*Illustr.* t. 603) in favour of *Pungamia*—taken from Adanson's name *Pongam* of 1768. This last Ventenat amended to *Pongamia* in 1803, and in that form has become familiar a name which, even were *Galedupa* accurately applicable, is much anterior to *Galedupa*. The point would not indeed call for discussion but for the fact that quite recently Taubert in the authoritative *Natürlichen Pflanzenfamilien* has re-adopted Roxburgh's usage. Kuntze, not satisfied even with this amount of change, desires to use the word *Caju(m)*; that is, he desires to use precisely the synonym which cannot be applied to the plant described by Lamarck, as the name of the plant to which Lamarck's definition belongs.

Loureiro, overlooking both Rumphius' description of the pods and his figure showing its leaflets as opposite, referred *Malaparius* to *Pterocarpus*; he has been followed in this by most subsequent botanists except Miquel, who, having seen specimens of *Malapari* collected in Sumatra by Teysmann, removed the plant from *Pterocarpus* and established it as a genus. Bentham (*Gen. Plant.* I, 465) expresses a doubt as to Teysmann's *Malapari* being conspecific with Rumphius' one. Everything, however, is in favour of the belief (unfortunately the Sumatra plant is unrepresented in Herb. Calcutta) that Teysmann's '*Malapari*' is *Pongamia glabra*, just as Rumphius' '*Malapari*' and the '*Malapari*' recently collected by Derry in Malacca, are *Pongamia glabra*. But it must be noted that while Rumphius' '*Malapari*' appears

to be typical *Pongamia glabra*, Derry's '*Malapari*' is VAR. *xerocarpa*, and so apparently, judging by Miquel's description, is Teysmann's.

28. DERRIS Lour.

Climbers, rarely erect trees. *Leaves* odd-pinnate, with usually exstipellate leaflets. *Flowers* copious, usually fascicled, showy, in axillary or terminal racemes or panicles. *Calyx* campanulate, nearly truncate. *Corolla* much exserted, standard broad; keel obtuse, the petals cohering slightly. *Stamens* usually monadelphous, the upper one free in § *Aganope*; anthers versatile. *Ovary* sessile, few-ovuled; style incurved, filiform, stigma capitate. *Pod* rigid, thin, flat, indehiscent, oblong if one-seeded, strap-shaped if few-seeded, with a distinct wing down the upper or both sutures. DISTRIB. Species about 40, belting the world in the tropics.

Standard not callose at the base:—
- Vexillary stamen free throughout; flowers single in ample thyrsoid panicles with nodes neither tumid nor produced into stalks (§ *Aganope*):—
  - Pod winged only along the upper suture, and sinuate between the seeds; corolla over ½ in. long .. ... 1. *D. sinuata.*
  - Pod winged down both sutures, not sinuate between the seeds; corolla under ½ in. long:—
    - Buds and flowers distinctly pedicelled, bracteoles shorter than buds ... ... 2. *D. Wallichii.*
    - Buds and flowers subsessile, bracteoles exceeding the buds ... ... 3. *D. thyrsiflora.*
- Vexillary stamen united with the others at least in the centre of tube; flowers fascicled on tumid nodes that are sometimes produced into stalks:—
  - Pods winged only along upper suture:—
    - Pod narrow, pointed at both ends, several-seeded (§ *Brachypterum*):—
      - Climbers, leaflets 9–19 medium, acute; flowers in long lax panicles exceeding the leaves ... ... 4. *D. scandens.*
      - Trees, leaflets 25–39 small, rounded; flowers in dense panicles shorter than the leaves ... ... 5. *D. dalbergioides.*
    - Pod suborbicular or shortly broadly-oblong, obtuse, few-seeded (§ *Euderris*):—
      - Leaflets glabrous, not exceeding 5 in. long, exstipellate; pods glabrous ... ... 6. *D. uliginosa.*
      - Leaflets pubescent beneath, often 6–8 in. long, stipellate; pods pubescent ... ... 7. *D. elegans.*
  - Pod winged along both sutures [unknown in *D. affinis* and *D. floribunda*] (§ *Dipteroderris*):—
    - Rachis and branches of panicle densely silky; pod silky; (leaves faintly-veined) ... ... 8. *D. andamanica.*

Rachis and branches of panicle glabrous or sparsely puberulous; pod (where known) glabrous: —
Flowers white in laxly-branching panicles:—
Leaves with 10 pairs of prominent spreading secondary nerves; ovules 4 ... ... 9. *D. affinis.*
Leaves with 4–5 pairs of ascending faint secondary nerves; ovules 2–3 ... ... 10. *D. floribunda.*
Flowers pink in fastigiately-branching panicles (leaves with numerous spreading but not prominent secondary nerves; ovules 2; pod glabrous) ... ... 11. *D. amœna.*
Standard 2-callose at base (§ *Paraderris*):—
Leave and petals pubescent ... ... 12. *D. elliptica.*
Leaves and petals glabrous ... ... 13. *D. malaccensis.*

§ 1. Aganope. Robust climbers with large leaflets; flowers usually rather small in ample thyrsoid panicles, the nodes not produced into stalks; upper stamen quite free from the others down to the base; base of vexillum without callosities; pod winged down one or both sutures.

1. Derris sinuata Thwaites Enum. Pl. Zeylan. 93. A strong climber with dark-brown glabrous branches. *Leaves* 10–16 in. long; leaflets dark-green 5–7, coriaceous ovate- to ovate-oblong or elliptic, shortly cuspidate or subobtuse base rounded or widely deltoid, 4–5 in. long, 2–3 in. wide, glabrous on both surfaces, lateral nerves 5–7 pairs spreading hardly visible, rachis 6–12 in. long glabrous as are the petiolules ·25 in. long. *Flowers* in ample thyrsoid terminal, or terminal and axillary panicles 8–16 in. long, branches 1·5–3 in. long at intervals of ·5–1 in. their nodes not tumid nor produced into stalks, pedicels ·1 in. long (in fruit lengthening to ·25–·3 in.), stout, arranged usually in subopposite pairs ·2–·25 in. apart, occasionally all scattered, rachis and its branches glabrescent, pedicels adpressed rusty-puberulous, with small decidous bract at base and 2 very minute triangular deciduous bracteoles close to calyx. *Calyx* wide-campanulate thinly silky ·2 in. long, with ripe fruit ·25 in. in diam. circumscissile at base. *Corolla* ·6 in., standard erect orbicular ·5 in. wide, with ecallose cordate base. *Stamens* 2-adelphous, the vexillary filament free from the rest to the base. *Ovary* pubescent, ovules 5–7. *Pod* strap-shaped, coriaceous, distinctly reticulated, 2·5–8 in. long, 1·5 in. wide, upper suture narrowly winged, wing never exceeding ·1 in. in breadth, usually much less and sometimes barely perceptible, always more or less sinuate between the 1–5 seeds. Benth. Journ. Linn. Soc. IV, Suppl. 113; Bak. in Flor. Brit. Ind. II, 246. *Pongamia sinuata* Wall. Cat. 5911. *Pongamia grandifolia* Grah. in Wall. Cat. 5882, not of Zoll. & Mor.

Perak; on banks of tidal rivers, *Kunstler* 179! *Scortechini!* Malacca; river banks, *Griffith* 1773! *Maingay* 551! Distrib. Ceylon; Sundribuns: Coasts of Indo-China and the Malay Archipelago.

2. Derris Wallichii Prain. A strong climber with glabrous brownish lenticular branches. *Leaves* 8–12 in. long, leaflets pale-green, 5–9, subcoriaceous oblong-lanceolate acute, base rounded, 4–5 in. long 1·5–2 in. wide, glabrous on both surfaces, lateral nerves ascending 8–9 pairs prominent beneath, rachis 4–8 in. long glabrous as are the petiolules ·25 in. long. *Flowers* in ample thyrsoid terminal and axillary panicles 8–16 in. long, their branches ·5–1·5 in. long at intervals of ·25–·5 in., their nodes not tumid nor produced into stalks, pedicels ·2–·25 in. long arranged in subopposite pairs at intervals of ·2–·3 in., rachis and its branches thinly-silky as are the pedicels and calyx, bracts at base of pedicels ovate, much shorter than buds, lateral pair of bracteoles at their apices very minute. *Calyx* tubular at length campanulate, mouth truncate, ·12 in. long, ·15 in. wide. *Corolla* ·3 in. long, standard erect orbicular with cordate ecallose base. *Stamens* 2-adelphous, the vexillary filament quite free. *Ovary* pubescent, ovules 4. *Pod* broadly strap-shaped, thin, flat, glabrous, finely veined, 1·5–4·5 in. long, 1·5 in. wide 1–2-seeded, not sinuate between the seeds; distinctly winged down both margins. *Pterocarpus floribundus* Wall. Cat. 5846. *Derris thyrsiflora* Prain MSS. in Herb. Calcutta (as to Andamans specimens) hardly of Bentham.

Andamans; *King's Collectors!* Distrib. Silhet, Cachar and Khasia.

The Andaman specimens here described have leaves very like those of *D. thyrsiflora* but they have rather more nerves and are not quite so thick. The long pedicels, however, make it very easy to distinguish the two, while the fruits of *D. Wallichii* are broader than those of *D. thyrsiflora*. In distributing specimens from the Calcutta Herbarium those from the Andamans were unfortunately issued under the name *D. thyrsiflora*.

3. Derris thyrsiflora Benth. in Journ. Linn. Soc. IV, Suppl. 114. A large rambling bush or small tree with spreading branches, 15 to 20 feet high, or a robust climber reaching 60–80 feet in length, in either case with a stem 6–8 in. in diam. with glabrous lenticelled branches. *Leaves* 8–15 in. long, leaflets dark-green, 5–9, coriaceous oblong to oblong-lanceolate usually acute sometimes rounded at apex, base rounded or cuneate, 4–6 in. long, 1·5–2·5 in. wide, glabrous on both surfaces, lateral nerves ascending 5–7 pairs rather prominent beneath, rachis 4–10 in. long, glabrous as are the petiolules ·25 in. long. *Flowers* in ample thyrsoid terminal and axillary panicles 8–24 in. long, their branches ·5–2 in. long at intervals of ·25–·5 in., their nodes not tumid nor produced into stalks, pedicels in fruit under ·1 in. in flower hardly perceptible, arranged usually in close-set subopposite pairs, rachis and its branches thinly silky as is the subsessile calyx with linear deciduous basal bracteole as long as bud and with two very minute lateral bracteoles. *Calyx* tubular, at length campanulate, mouth truncate, ·12 in. long, ·15 in. wide, green-

ish white. *Corolla* white, ·3 in. long, standard erect orbicular ·35 in. wide, with ecallose cordate base. *Stamens* 2-adelphous, the vexillary filament free from the rest to the base, the free portion of all the filaments slightly puberulous. *Ovary* pubescent; ovules 4. *Pod* strap-shaped, thin, flat, glabrous finely-veined, 1·5–3·5 in. long, 1–1·25 in. wide, distinctly winged along both sutures, wings subequal ·2–·25 in. wide, not sinuate between the 1–3 (very rarely 4) seeds. Bak. in Flor. Brit. Ind. II, 246 (excl. syn. *Amerimnum obovatum* and *Pongamia* Wall. Cat. 9054). *Derris pyrrothyrsa* Miq. Flor. Ind. Bat. Suppl. 297. *Aganope floribunda* Miq. Flor. Ind. Bat. I, 151. *Millettia thyrsiflora* Benth. Pl. Jungh. 249.

Nicobars; Kamorta, *Kurz!* Kedah; Yau, *Ridley* 5224! Penang; *Curtis* 248! Malacca; *Griffith* 1776! *Maingay* 552! *Derry* 94! 1030! Perak; *Scortechini*, 907! 1176! 1342! 1533! 1639! 2073! *Wray*, 1985! 2513! 2770! 3068! *Kunstler* 3630! 6419! 7638! 7757! 7919! 10062! 10395! 10850! Pahang; *Ridley* 2456! 2458! Singapore; *Anderson! Kurz! Hullett!* Distrib. Sumatra, Java.

This species is very distinct from *D. sinuata* by reason of its much smaller, more numerous, and more closely set florets, which are as nearly as possible sessile; also on account of its very different pods which are shorter, much thinner, not sinuate between the seeds and are distinctly winged down both sutures. It is much more closely related to the last species from which it can be most easily distinguished by the absence of pedicels.

The synonym *Amerimum obovatum* is excluded because that plant is the same as *Pongamia obovata* Grah., reduced, with justice, to *Derris cuneifolia*. And the synonym *Pongamia* Wall. Cat. 9054 is also excluded, at least as a temporary measure, because Mr. Baker, in another passage, has referred it to *Spatholobus acuminatus*.

There are at Calcutta authentic examples, named by Dr. Miquel himself, both of *Aganope floribunda* Miq. and of *Derris pyrrothyrsa* Miq.; these are specimens of the same species, from Java and Sumatra respectively; they agree exactly with our specimens from the Malay Peninsula.

The variation in habit depends on whether the species is growing in open places or in dense forest.

§ 2. Brachypterum. Trees or climbers with comparatively small leaflets; flowers medium fasciculate on tumid nodes in axillary panicles: stamens monadelphous; base of vexillum without callosities; pod thin strap-shaped, narrow, pointed at both ends, winged only along the upper suture.

4. Derris scandens Benth. in Journ. Linn. Soc. IV, Suppl. 103. A very large climber often exceeding 100 feet in length with branchlets at first obscurely grey downy; stems as thick as a man's wrist with very irregularly excentric annual rings. *Leaves* 4–6 in. long, dark green; leaflets 9–19, rigidly subcoriaceous obovate-oblong to oblong, acute rarely obtuse at apex, cuneate less often rounded at base, 2 in. long, ·75 in. wide, polished and glabrous above, obscurely adpressed

grey-pubescent, dull beneath; rachis 2·5–4 in. long, grooved above, glabrous as are the petiolules ·2 in. long. *Flowers* in very long copious short-peduncled axillary racemes, sometimes 15–18 in. in length, with distant tumid nodes sometimes produced into short branches each bearing a cluster of unequal slender pedicels ·15–·25 in. long, the various flowers from one node expanding successively, rachis and pedicels finely adpressed-pubescent, the pedicels 2-bracteolate under the calyx, the bracteoles ovate minute. *Calyx* ·12 in. long, thinly silky, wide-campanulate, teeth obscure. *Corolla* white to pale-rose, ·35 in. long. *Stamens* monadelphous. *Ovary* finely puberulous; ovules 6–8. *Pod* 1–3 in. long, ·4–·5 in. wide, narrowed to both ends, narrowly winged along the upper suture, 1–4 seeded, uniformly finely adpressed grey-silky, somewhat turgid against the seeds. Bak. in Flor. Brit. Ind. II, 240. *Dalbergia scandens* Roxb. Cor. Pl. II, t. 192; DC. Prodr. II, 417; Wall. Cat. 5857; Roxb. Flor. Ind. III, 232; W. & A. Prodr. 264; Wight, Ic. t. 275. *Dalbergia timorensis* DC. Prodr. II, 417. *Pongamia coriacea* Grah. in Wall. Cat. 5905. *Brachypterum scandens* Benth. in Ann. Wien. Mus. II, 101; Miq. Flor. Ind. Bat. I, 138. *Brachypterum timorense* Benth. in Miq. Pl. Jungh. 253; Miq. Flor. Ind. Bat. I, 138.

ANDAMANS; very common everywhere. NICOBARS: plentiful. PENANG; *Curtis* 979! PAHANG: *Ridley* 2639! DISTRIB. South-Eastern Asia to North Australia, general.

Mr. Baker has described the pod as glabrous; it never becomes quite glabrous even when ripe. Though the name *Derris scandens* is most generally used for this species, it has to be pointed out that, so soon as *Deguelia* is recognised to be the best generic name, this species will have to be known as *Deguelia timorensis* Taub. (*Natür. Pflanzenfam.* III, 3. 345) because *Deguelia scandens* is the original name for the American plant at present known as *Derris guianensis* Bth. The genus was published under the name *Deguelia* before it was published under the name *Derris*.

5. DERRIS DALBERGIOIDES Bak. in Flor. Brit. Ind. II, 241. A spreading tree 30–40 feet high; branchlets silky-pubescent. *Leaves* 6–8 in. long by 1·5–2 in. wide, leaflets 25–39, linear rounded-obtuse at both ends slightly oblique at the base the apex slightly emarginate, 1 in. long, ·35 in. wide, firmly papery, adpressed pubescent on both sides, dark-green above paler beneath, lateral nerves 7–8 pairs, indistinct, rachis 5–6 in. long and petiolules ·1–·15 in. rusty-pubescent. *Flowers* in copious short-peduncled axillary racemes 3–6 in. long very rarely exceeding the leaves, about ·65–·75 in. wide with crowded tumid nodes each bearing a dense cluster of unequal short pedicels ·1 in. long or less, the various florets of a node expanding successively, rachis and pedicels brown silky-pubescent, the pedicels 2-bracteolate under the calyx, the bracteoles linear ·08 in. long. *Calyx* ·15 in. long, densely brown-silky, shortly but distinctly toothed, the teeth deltoid the lower subequal, the

two upper somewhat united. *Corolla* rose-purple, ·45 in. long, standard oblong, base cordate 2-glandular. *Stamens* monadelphous. *Ovary* densely pubescent, ovules 5–8. *Pod* 1–5-seeded narrowed to both ends 1–2·5 in. long, winged along the upper suture.

Perak; very common, *Scortechini* 1995! *Ridley* 3024! *Kunstler* 3039! 5805! Patani; *Machado* 5812! Malacca; *Maingay* 603! *Derry*, 138! 488! *Goodenough* 1829! Distrib. Tenasserim and Martaban.

None of the large suites of specimens sent to Calcutta has fruit; Mr. Baker describes the pod as exactly like that of *D. robusta*; he however describes *D. robusta* as having a glabrous pod which is never the case. Further Mr. Baker has described the leaflets of this species as 'glabrous' and on this account Father Scortechini has proposed for the Perak plant the name *D. dalbergioides* var. *dasyphylla*, to be distinguished by its pubescent leaflets from Mr. Baker's plant. The leaves of the original specimens collected by Parish and Maingay have, however, leaflets pubescent on both surfaces exactly as in the Perak plant.

§ 3. Euderris. Robust climbers with medium to large leaflets; flowers rather large fasciculate on tumid or produced nodes in axillary panicles; stamens monadelphous; base of vexillum without callosities; pod thin, broadly oblong or suborbicular, obtuse, winged only along the upper suture.

6. Derris uliginosa Benth. Pl. Jungh. 252. A widely spreading shrubby climber sometimes 40 feet long, with glabrous branches; stems 2–3 in. in diam. *Leaves* 5–8 in. long, leaflets usually 5, but very often 3, casually solitary, the terminal exceeding the others, rigidly subcoriaceous, ovate, acuminate or caudate-acuminate, base always rounded, 3–5 in. long, 1·5–2·5 in. wide, polished above quite glabrous on both surfaces, lateral nerves 7–8 pairs, very faint, looping at their ends some way within margin, bright green above paler beneath, rachis 2–5 in. long, channelled above and glabrous as are the petiolules ·25 in. long, secondary nerves indistinct. *Flowers* in rather short showy axillary racemes, 3–5 in. long, with nodes produced into short stalks each bearing one or several subequal pedicels the flowers of a fascicle opening subsimultaneously, rachis and pedicels glabrous, the node-stalks ·15 in., the pedicels proper as long, bracteolate at base and again 2-bracteolate a little below the calyx. *Calyx* ·15 in. long, subglabrous except the shortly ciliate subtruncate margin, rather wide-campanulate. *Corolla* delicate rose-pink, ·4 in. long, standard orbicular base subcordate eglandular. *Stamens* monadelphous. *Ovary* finely puberulous, ovules 5–7. *Pod* obliquely rounded-oblong 1–5 in. long, 1·75 in. across, glabrous, pale straw-colour when ripe, thin, flat, distinctly reticulately-veined; seed solitary, yellowish-brown, much compressed, 1 in. long almost as broad. Benth. in Journ. Linn. Soc. IV, Suppl. 107; Miq. Flor. Ind. Bat. I, 141; Bak. in Flor. Brit. Ind. II, 241. *Robinia uliginosa* Roxb.

ex Willd. Sp. Pl. III, 1133. *Galedupa uliginosa* Roxb. Hort. Beng. 53; Fl. Ind. III, 243. *Pongamia uliginosa* DC. Prodr. II, 416; Wall. Cat. 5879 (excl. E.); W. & A. Prodr. 262. *Pterocarpus uliginosus* Roxb. ex G. Don. Gen. Syst. II, 377.

In all the provinces, on the sea-coasts and on muddy tidal-river banks, common. Distrib. Sea-shores from Eastern Africa and the Mascarene Islands to Malaya and Western Polynesia.

Mr. Bentham would refer here *Derris Forsteniana* Bl. (*Miq. Flor. Ind. Bat.* I, 144); this hardly seems probable owing to Miquel's description of the leaves as having 3 pairs of leaflets. Mr. Baker would also refer here *Dalbergia heterophylla* Willd. (*Sp. Pl.* III, 901), but this again is very improbable for *D. heterophylla* has, according to the original description, obtuse leaves, which *Derris uliginosa* never has; as, also, racemes longer than the leaves, which those of *D. uliginosa* never are.

7. Derris elegans Benth. Pl. Jungh. I, 252. A rather slender creeper sometimes 60 feet long, with brown pubescent branchlets. *Leaves* 8–12 in. long, dark-green, leaflets 5 (very rarely 3 or 7) the terminal exceeding the others, rigidly subcoriaceous, from oblong to lanceolate, base always somewhat rounded, 3–8 in. long, 1·5–4 in. wide, glabrous above, when young rusty-pubescent (sometimes persistently so) beneath, rachis rusty-pubescent 4 in. long, petiolules glabrescent ·2 in. long with rigid subulate stipels ·1 in. long, lateral veins 6–8 pairs prominent like midrib beneath. *Flowers* in solitary or fascicled axillary racemes 2–3 in. long, always much shorter than the leaves, nodes bracteate tumid but not produced into stalks, each bearing one or several subequal pedicels, rachis and pedicels rather densely villous with spreading rusty pubescence, the pedicels filiform ·35 in. long with 2 linear bracteoles a little below the calyx. *Calyx* ·15 in. long, black purple, sparsely pubescent, margin subtruncate. *Corolla* pure-white with pink tips, ·4–·5 in. long, standard orbicular-oblong tapering at base eglandular. *Stamens* monadelphous. *Ovary* softly villous, ovules 2–4. *Pod* obliquely rounded-oblong or oblong 1·5 (rarely 2·5 in.) long, 1 in. wide, thin, flat, distinctly reticulated, covered throughout with a fine sparse pubescence; seeds 1, rarely 2, much compressed ·75 in. in diam.

Var. *typica*; leaflets ovate to lanceolate, acute, becoming at length subglabrous beneath, flowers ·5 in. long. *Derris elegans* Benth. Pl. Jungh. I, 252; Journ. Linn. Soc. IV, Suppl. 109; Bak. in Flor. Brit, Ind. II, 242. *Pongamia elegans* Grah. in Wall. Cat. 5883. *Pongamia floribunda* Grah. in Wall. Cat. 5884. *Leguminosa* Wall. Cat. 7540.

Andamans; *King's Collectors!* Perak; *Kunstler* 1419! 3911! Distrib. Tenasserim and Martaban; Sumatra (*Forbes!*)

Var. *vestita*; leaflets oblong-acuminate to ovate-acute, densely persistently rusty-velvety beneath, flowers rather smaller ·4 in. long. *D. vestita* Bak. in Flor. Brit. Ind. II, 242.

Malacca; *Maingay* 608! Perak; *Scortechini* 1758! *Kunstler* 2775! 4014! 5583! 7398! Distrib.; Tenasserim.

The only differences between the two plants are in the points noted; their fruits are identical. The species is evidently closely related to *D. uliginosa* and has very similar pods; these however are always rather narrower in proportion to their length and further differ in occasionally being 2-seeded. But the inflorescence differs in the two in that the nodes of *D. elegans* are not produced; and the leaves differ markedly from those of *D. uliginosa* in shape, and as to pubescence. The most striking peculiarity of *D. elegans* is however the presence of stipels, a feature most unusual in *Derris*, but equally manifest in both varieties.

§ 4. Dipteroderris. Robust climbers with large leaflets, flowers medium on tumid or produced nodes in terminal and axillary panicles; stamens monadelphous, base of vexillum without callosities; pod winged down both sutures.

8. Derris andamanica Prain. A strong climber with fulvous or tawny-pubescent branches. *Leaves* 10–16 in. long; leaflets pale-green 7–9 (rarely 5) coriaceous, oblong or elliptic shortly cuspidate, base rounded, 5–6 in. long 2–3 in. wide, glabrous on both surfaces, lateral nerves 8–10 pairs spreading faint below not visible above except in young leaves, secondary veining fine, rachis 6–12 in. long glabrous as are the petiolules ·25 in. *Flowers* in ample terminal and axillary panicles, the branches rather numerous ascending 5–8 in. long, nodes tumid or produced into short stalks sometimes ·75–1 in. long, bearing several unequal filiform pedicels either clustered at their tips or scattered throughout their extent, rachis and branches pale tawny-pubescent, pedicels puberulous ·2–·3 in. long exceeding the calyx, bracteate at their base and 2-bracteolate under the calyx. *Calyx* wide-campanulate ·12 in. long, densely silky, green, margin subentire. *Corolla* white ·6 in. long, standard orbicular, base ecallose shallow-cordate. *Stamens* monadelphous. *Ovary* finely pubescent; ovules 4. *Pod* finely tawny-silky, thin, strap-shaped, 3–4 in. long, 1 in. wide, winged subequally along both sutures, wings ·12 in. wide; seeds 1–3. *Derris sinuata* Prain in Journ. As. Soc. Beng. LX, 2, 311 not of Benth.

Andamans; from Coco Group southwards; common on the coasts. Nicobars; common.

This fine species has not, so far, been collected outside the limits of the Andamans and Nicobars. Originally referred in the Calcutta Herbarium to *Derris sinuata*, recent and fuller suites of specimens now show that its nearest alliance is with the South Indian *D. ovalata* Bedd., but it has longer pedicels and smaller bracteoles than has that species, and has a silky pod.

9. Derris affinis Benth. Pl. Jungh. 252. A climber with pale-brown lenticular glabrous branches. *Leaves* 6 in. long, pale-green, leaflets 5 subequal, firmly chartaceous, ovate-acute base rounded, 2·5 in.

long, 1·25 in. wide, glabrous on both surfaces, lateral nerves 10 pairs prominent on both sides running almost to margin of blade, rachis 3·5 in., glabrous as are the petiolules ·2 in. long. *Flowers* in lax axillary panicles 6–8 in. long, sparingly branched, branches 2·5 in. long or less, spreading, nodes tumid but not produced into stalks, bearing one or more unequal filiform pedicels, rachis and pedicels sparsely adpressed-puberulous, the pedicels ·2 in. long rather longer than the calyx, bracteate at their base, 2-bracteolate close under the calyx. *Calyx* campanulate ·12 in. long, subglabrous, purplish, margin sinuate-toothed, *Corolla* apparently white, ·35 in. long, standard orbicular ecallose. *Stamens* monadelphous. *Ovary* sparsely hairy; ovules about 4. *Derris uliginosa* VAR. *Loureirii* Benth. in Journ. Linn. Soc. IV, Suppl. 108 in part. *Pongamia uliginosa* Wall. Cat. 5879 (E only) not of DC.

PENANG; *Wallich!*

Nearly related to *D. marginata* Bth. from which it differs mainly in having shorter pedicels 2-bracteolate close under the calyx, and in having rather smaller leaflets with more numerous nerves. It seems also very nearly related to the next species from which it differs in its shorter panicles and its leaflets with more numerous and more prominent nerves. It is besides nearly related to *D. amœna* but differs in having thinner leaves, and laxer panicles with spreading not fastigiate branches.

10. DERRIS FLORIBUNDA Benth. Journ. Linn. Soc. IV, Suppl. 105. A stout rambling shrub with glabrous whitish branches. *Leaves* 4–5 in. long, leaflets 3–5, pale-green, thinly coriaceous, broadly elliptic-oblong, base rounded, apex shortly and obtusely acuminate, 2–2·5 in. long 1–1·5 in. wide, glabrous on both surfaces, lateral nerves 4 pairs very faint beneath not visible above, rachis 3–4 in. long, glabrous as are the petiolules ·25 in. long. *Flowers* in long lax axillary panicles sometimes 15–18 in. long, sparingly branched, the branches 4–6 in. long, spreading, nodes distant tumid, sometimes produced into stalks bearing 2–6 unequal filiform pedicels, rachis and pedicels sparsely spreading-puberulous, the pedicels ·4 in. long, 2-bracteolate at base of calyx. *Calyx* campanulate ·12 in. long, purple-brown, margin crenate. *Corolla* white, ·3 in. long. standard orbicular ecallose with a green spot above the long claw. *Stamens* monadelphous. *Ovary* sparsely puberulous, ovules 2–3. *Brachypterum floribundum* Miq. Flor. Ind. Bat. I, 139.

PERAK; Larut, *Scortechini* 2180! DISTRIB. Java.

The Perak specimens have pedicels rather more glabrous than the Java ones; [illegible]wise they agree very closely. Miquel refers the plant doubtfully to *Bra*[illegible]*m*; to the writer it seems as if its affinities were rather with *Dipteroderris*; [illegible]tely the pod is still unknown. The Perak plant is 2-ovuled, the Java [illegible]d, in all the flowers examined by the writer.

[illegible]ERRIS AMŒNA Benth. Pl. Junghuh. 252. A large glabrous [illegible]ching 50 feet, with black branches. *Leaves* 6–8 in. long, [illegible]. 14

leaflets bright-green, 7 (sometimes 9, rarely 5), rigidly subcoriaceous to coriaceous, ovate-oblong cuspidate, base rounded to cuneate, 2–4 in. long, 1–2 in. wide, glabrous on both surfaces, lateral nerves numerous parallel spreading indistinct beneath visible above, rachis 4–6 in., glabrous as are the petiolules ·25 in. long. *Flowers* in rather dense, fastigiately branched, axillary panicles 6–9 in. long, lower branches almost equalling main-rachis, nodes rather close often produced in short stalks bearing usually 3 unequal filiform pedicels, rachis and pedicels glabrous, the pedicels ·25 in. long, 2-bracteolate a short distance below calyx. *Calyx* campanulate ·12 in., glabrescent, mouth sinuately-toothed. *Corolla* pink (*Ridley*) or purple (*Kunstler*), ·3 in. long, standard orbicular ecallose. *Stamens* monadelphous. *Ovary* sparsely puberulous; ovules usually 2. *Pod* thin glabrous ligulate-oblong flexible finely veined, 3–4 in. long, 1–1·5 in. wide, upper wing ·25 in. wide, lower narrow; seeds usually 2, sometimes solitary.

Var. *typica*; leaves rigidly subcoriaceous green beneath. *D. amœna* Benth. Journ. Linn. Soc. IV, Suppl. 110; Bak. in Flor. Brit. Ind. II. 245. *Pongamia amœna* Wall. Cat. 5912.

Perak; *Kunstler* 1381! *Scortechini* 1736! Malacca; *Maingay!* Distrib. Tenasserim.

Var. *Maingayana*; leaves coriaceous glaucous beneath. *Derris Maingayana* Bak. in Flor. Brit. Ind. II, 245.

Malacca; *Derry!* Singapore; *Maingay! Hullett! Ridley* 6402!

It seems impossible, now that large suites of specimens have been sent from Malacca by Mr. Derry, to treat these two plants as more than varieties of one species. Mr. Derry gives two local names for his plant, '*Aker-tuba-tuba*' and '*Aker-pakidah*.'

§ 5. Paraderris. Robust climbers with large leaflets, flowers large on usually produced nodes in axillary panicles; stamens monadelphous; base of vexillum with two callosities extending along the claw; pod winged down the upper suture.

12. Derris elliptica Benth. Journ. Linn. Soc. IV, Suppl. 111. A large climbing shrub 20–30 feet long with black warted branches and rusty-pubescent young shoots. *Leaves* 9–15 in. long, dull greyish-green, leaflets 9–13 subequal, at first membranous, with age subcoriaceous, oblong to oblanceolate-oblong cuspidate, 3–6 in. long, 1–1·3 in. wide, pubescent beneath, at first puberulous at length glabrous above, rachis 6–9 in. long, rusty-pubescent faintly grooved above, petiolules ·2 in. long rusty-pubescent, lateral veins 8–10 pairs prominent beneath as is the midrib. *Flowers* in copious lax axillary racemes 9–10 in. long, never exceeding the leaves, nodes produced into distinct stalks ·3–1·3 in. long each bearing one or more (usually 3) subequal pedicels, rachis and

pedicels densely rusty-tomentose the pedicels slender ·25 in. long, bracteolate at their bases and 2-bracteolate under the calyx. *Calyx* ·25 in., densely rusty-pubescent, wide-campanulate the mouth sinuately subtruncate. *Corolla* from pure white (*Scortechini*) to white with pink tinge (*Kunstler*) or dull pink (*Wray*), ·65 in. long, standard densely silky on the back, orbicular with rounded 2-callose base. *Stamens* monadelphous. *Ovary* vilious, ovules usually 4 (sometimes 3, rarely 5). *Pod* oblong to lanceolate, 1–4-seeded, 1·5–3·5 in. long, ·75 in. wide, distinctly winged along upper, faintly along lower suture. Bak. in Flor. Brit. Ind. II, 243. *Galedupa elliptica* Roxb. Hort Beng. 53; Flor. Ind. III, 242. *Pongamia elliptica* Wall. Pl. As. Rar. III, 20, t. 237; Cat. 5881; Wight, Ic. t. 420; Miq. Flor. Ind. Bat. I, 148. *Pongamia dubia* Grah. in Wall. Cat. 5899. *Pongamia volubilis* Zoll. & Mor. Syst. Verzeichn. 3; Miq. Flor. Ind. Bat. I, 148. *Millettia pachycarpa* Bak. in Flor. Brit. Ind. II, 106 in part (*as to the Malacca locality*).

Malacca; *Griffith! Maingay!* Perak; *Scortechini* 1738! *Wray* 1678! 1695! 3323! *Kunstler* 1431! Distrib. Northwards through Tenasserim to Chittagong; southwards through Sumatra to Java.

Mr. Wray gives '*Aker-tuba*' as the Malay name of this species. It has a true *Derris* pod but differs markedly from the other species by its standard silky on the outside. When they are only in flower and the leaves of both are still young it is very difficult without careful examination to distinguish this species from *Millettia pachycarpa*. This is Zollinger's *Pongamia volubilis* of which there are authentic specimens at Calcutta; it is also said by Mr. Bentham to be the same as *P. Horsfieldii* Miq. and *P. hypoleuca* Miq.; neither of these is represented in *Herb. Calcutta*.

13. Derris malaccensis Prain. A rather slender creeper 30–50 feet long with glabrous branches. *Leaves* 9–15 in. long, bright-green, leaflets 5–7 (rarely 9), subequal, subcoriaceous, elliptic, base rounded apex caudate-acuminate, 4–6 in. long 2–2·5 in. wide, the caudate tip ·35–·6 in. long, glabrous on both surfaces, rachis 6–8 in. long, glabrous hardly grooved above, petiolules ·25 in. glabrous, lateral veins about 5 pairs indistinct. *Flowers* in solitary axillary racemes 4–6 in. long always much shorter than the leaves, nodes produced in stalks ·15–·2 in. long each bearing one or several subequal pedicels, rachis and pedicels glabrescent, the pedicels filiform ·25 in. long bracteolate at base and with 2 small lanceolate bracteoles very near base of calyx. *Calyx* ·15 in. long reddish, wide-campanulate, glabrous except the ciliate slightly sinuate margin. *Corolla* white or yellow tinged with pink, ·65 in. long, standard orbicular truncate or subcordate at the 2-callose base. *Stamens* monadelphous. *Ovary* densely rusty-pubescent; ovules 4–5. *Pod* oblong winged or not, glabrous, 1–4-seeded, 2–3 in. long.

Var. *typica;* pod 1·5 in. wide, winged along the upper suture, sometimes along both. *Derris cuneifolia* var. *malaccensis* Benth. Journ. Linn. Soc. IV, Suppl. 112.

Pekak; Larut, Goping, etc. *Kunstler* 4028! 4149! 4504! 8551! *Scortechini* 110! Malacca; *Griffith* 1774! Singapore; *Ridley!* Distrib. Tenasserim; Borneo.

Var.? *aptera*; pod 1 in. wide, wingless; leaflets with lateral veins stronger beneath.

Malacca; *Maingay* 613! Perak; *Kunstler* 4518! 6428!

Var.? *millettioides*; pod and leaflets as in var.? *aptera* but the former usually longer and ultimately dehiscing (as in *Millettia*) along both sutures.

Perak; Ulu Bubong, *Kunstler* 10696!

The plant here described as *Derris malaccensis* is extremely closely related to *D. cuneifolia* of which indeed it was treated by Mr. Bentham as a variety. Its leaves differ mainly in having fewer but larger leaflets with long caudate-acuminate tips; the flowers, too, are considerably larger and of a somewhat different colour: the pods of *D. malaccensis* are also much larger than those of *D. cuneifolia*. It must also, from the description of that plant, be very nearly allied to *D. montana* Benth. (*Pl. Jungh.* 253) a Java species not represented in Herb. Calcutta. The foliage of the two is evidently almost identical but the flowers are a little larger in *D. montana*, being ·75 in. long. *D. malaccensis* is thus evidently intermediate between *D. cuneifolia* and *D. montana* as regards its petals; it is likewise intermediate as regards ovary. Mr. Bentham ascribes two ovules to *D. cuneifolia* and this is almost always the case; in one or two flowers, however, three ovules have been found; Mr. Baker indeed says that the pod of *D. cuneifolia* may be 3-seeded,—this no Calcutta specimen shows. To *D. montana* Mr. Bentham ascribes "about 8 ovules;" *D. malaccensis* has had, in almost every flower examined, 4 ovules and in some pods it has 4 seeds; one or two ovaries with 5 ovules have been met with, but never more than 5 have been seen.

The plants named var.? *aptera* and var.? *millettioides* are placed here merely for convenience of reference. They are both reported in fruit only, and as they have almost exactly the leaves of *Derris malaccensis* it seems better for the present to refer to them under that species. As regards var.? *aptera* indeed this is the more essential since two gatherings from Perak (*Wray* 2025! *Kunstler* 3190!), and one from Penang (*Curtis* 2735!) have pods intermediate between those of var.? *aptera* and those of *D. malaccensis*. The pods of var.? *aptera* are, however, obviously those of a *Pongamia* rather than those of a *Derris*, if *Pongamia* be really entitled to a separate generic position, which the writer hardly believes. The distinguishing character is a quite artificial and, as these very plants show, a somewhat inadequate one.

The existence of var.? *millettioides* raises an even more troublesome question, the relationship of *Millettia* to *Derris*. The arrangement adopted in the *Genera Plantarum*, the *Histoire des Plantes* and the *Natürlichen Pflanzenfamilien* places *Derris* and *Pongamia* among the *Dalbergieæ* and *Millettia* among the *Galegeæ*. This then, considering the great authority of the authors who have sanctioned it, must be accepted as the most natural arrangement possible. That a more *inconvenient* one could hardly be devised has, however, been the experience of most field botanists and of most authors who have had to deal with the species belonging to the genera. For these genera are so closely allied that they only differ, and that merely

'on paper,' in the "tardy dehiscence" of the pod in *Millettia*, its "indehiscence" in *Pongamia* and *Derris*. As a matter of fact Mr. Bentham has placed in *Derris* a species (*D. microptera*) the pods of which dehisce, while Mr. Kurz has placed in *Millettia* a species (*M. monticola*) that has the pods of a *Derris*. No taxonomist, however able, can venture in the absence of fruit to do more than suggest to which of the three genera a particular species should be referred. A fourth genus to which similar remarks apply is *Lonchocarpus*; this only differs from species of *Derris* that have thin pods, exactly as *Pongamia* differs from species of *Derris* that have turgid pods, in having sutures without wings. It is, moreover, a suspicious fact that Koorders and Valeton (*Bijdr.* II,) find the same difficulty in separating *Pongamia* from *Millettia*.

In the works of Roxburgh and of Wight and Arnott, also in Bentham's account of the *Leguminosæ* in *Plant. Junghuhn.*, *Millettia* was not divorced from *Derris* and its allies; Miquel and Kurz, too, continued to place the genera side by side. And certainly if they have adopted the less natural method of arrangement, it cannot be denied that, in so doing, these authors have retained a much more convenient one.

29. Kunstleria Prain.

Woody climbers with unequally pinnately 1–7-foliolate exstipellate leaves; stipules small, deciduous. *Flowers* rather small in ample terminal thyrsoid panicles extending into the axils of the upper leaves; pedicels solitary, nodes not tumid. *Calyx* campanulate, teeth lanceolate the two upper connate. *Corolla* distinctly exserted; standard ovate entire; keel boat-shaped the petals slightly cohering. *Stamens* diadelphous the upper one quite free from the other 9 and adnate at base to standard claw; anthers versatile uniform on alternately short and long free filaments. *Ovary* sessile, few-ovuled; style incurved filiform, stigma capitate. *Pod* thin flat strap-shaped membranaceous or coriaceous, indehiscent, style terminal, sutures not winged. *Seeds* 1–3, much compressed, oblong; radicle inflexed. Species 5, Malayan.

This interesting genus possesses the habit of *Spatholobus* with the calyx and almost the corolla and stamens of that genus. It differs, however, in having its flowers solitary in place of fascicled on tumid nodes; in having exstipellate leaflets varying in number in different species from 1–7; and in having the pod quite indehiscent with the seeds centrally not terminally situated, in this last character being indistinguishable from *Lonchocarpus*. From *Lonchocarpus* however *Kunstleria* differs in having the flowers unfascicled, in having the calyx toothed, and in having the stamens diadelphous. As regards inflorescence *Kunstleria* agrees exactly with *Derris* § *Aganope* and agrees moreover with that group of species in having the vexillary stamen free. But here again *Kunstleria* differs in having a wingless pod and a toothed calyx, and in having the free stamen adnate to the standard claw. With the calyx of *Spatholobus* then, we have associated in *Kunstleria* the inflorescence of *Aganope* and the pod of *Lonchocarpus*.

The genus is dedicated to the memory of Herr H. H. Kunstler, one of the most enthusiastic, as he was one of the most painstaking and faithful of the collectors who have laid down their lives in the cause of science in the tropics.

Leaflets solitary, with petiolules attached slightly within margin of lamina :—
Leaflets and petioles glabrous on both surfaces ... ... 1a. *K. Curtisii.*
Leaflets and petioles subscabridly pubescent ... ... 1b. *K. Curtisii* var. *laxiflora.*

Leaflets several, with petiolules attached to margin of lamina :—
Leaves 3-foliate, (leaflets and petioles glabrous ; pods narrower than in the other species of which pods are known) ... 2. *K. Kingii.*
Leaves 5-foliate :—
Leaflets thickly coriaceous, densely ferruginous underneath 3. *K. Forbesii.*
Leaflets chartaceous, glabrous on both surfaces... ... 4. *K. Ridleyi.*
Leaves 7-foliate, (leaflets and petioles subscabridly pubescent) 5. *K. Derryi.*

1. Kunstleria Curtisii Prain. A shrubby climber with slender branches; bark brownish lenticular. *Leaves* 5–8 in. long, leaflet 1, ovate-lanceolate 4–6·5 in. long, 2·5 in. wide, apex acute base rounded, lateral nerves ascending 4–5 pairs rather prominent as is the midrib beneath, margin entire ; rigidly chartaceous, pale-green ; petiole ·75–1·5 in. long, petiolule ·25 in. subpeltately attached. *Flowers* in copious terminal and axillary panicles 8–12 in. long, 5–8 in. across, rachis and branches rusty-pubescent ; pedicels pubescent ·08 in. long. *Calyx* campanulate densely pubescent, ·15 in. long, teeth triangular except the upper broadly deltoid bifid at tip half as long as tube. *Corolla* apparently purple, ·25 in. long, standard ovate-oblong. *Pod* thin flat densely rusty-pubescent, 5 in. long 1 in. wide, 2–3 seeded.

Var. *typica ;* leaves above and petioles glabrous, leaves beneath and petiolules sparsely adpressed-pubescent with whitish hairs ; rachis and branches of panicles sparsely rusty-pubescent ; pods distinctly reticulated.

Penang ; at Tulloh Bahang, *Curtis* 3019 !

Var. *laxiflora ;* leaves on both surfaces subscabridly, petioles and petiolules densely softly pubescent with rusty tomentum, as are the rachis and branches of the laxer more spreading panicles ; pods, more densely velvety not visibly reticulated.

Pangkore ; Tulloh Sera, *Curtis* 1632 !

The calyx and corolla, so far as the limited material goes, are not distinguishable in these two plants. The measurements of pod given are taken from fruits of the typical variety ; the pods of the other are much smaller but are apparently not so far advanced. When fuller material of these two plants is available it may be necessary to consider them specifically distinct ; on the other hand their leaves, but for the different pubescence, are quite similar and it may prove unnecessary to separate them even as varieties.

2. Kunstleria Kingii Prain. A very extensive climber over 100 feet long, with slender branches ; bark brown lenticular. *Leaves* 5–8 in. long, leaflets 3 ovate-lanceolate 4–6 in. long, 1·5–2 in. wide, apex acute,

base of lateral leaflets rounded, of central rather the larger shortly cuneate, lateral nerves ascending 5–6 pairs rather prominent as is the midrib beneath, margin entire; firmly chartaceous pale-green glabrous on both surfaces, petiole glabrous 1·5–2·5 in. long, petiolules glabrous ·2 in. marginally attached. *Flowers* in copious terminal and axillary panicles 8–12 in. long, 5–8 in. across, rachis and branches rusty-pubescent; pedicels pubescent ·08 in. long. *Calyx* campanulate densely pubescent ·15 in. long, teeth triangular except the upper broadly deltoid bifid at tip almost as long as tube. *Corolla* dark-purple, ·25 in. long, standard oblong. *Pod* thin flat densely brown-pubescent and distinctly reticulated, 2–4 in. long, ·6 in wide, 1–2 seeded, seeds oblong 1·25 in. long, ·5 in. wide, cotyledons thin and leaf-like, testa very dark brown.

Perak; Larut, *Kunstler* 3830! 6870! 6935!

Among the many specimens sent by Mr Kunstler only one has a leaf with a solitary leaflet, all the other leaves are 3-foliolate. The individual leaflets are extremely like those of typical *K. Curtisii* and only differ in not being slightly peltate and in being hardly so thick; the pods however are very different.

3. Kunstleria Forbesii Prain. A small shrubby climber 6–10 feet long, with densely rusty-pubescent branches. *Leaves* 8–10 in. long, leaflets 5 elliptic, 3·5–5 in. long, 2–2·5 in. wide, terminal rather exceeding the others, bases of all rounded, apex rounded shortly abruptly acuminate, lateral nerves spreading, 6–9 pairs, rather prominent as is the midrib beneath, margin entire; rigidly coriaceous dark-green subscabrid above densely rusty velvety beneath, petiole rusty-puberulous 3·5 in. long, petiolules ·25 in. densely rusty-pubescent. *Flowers* in rather strict terminal and axillary panicles 12–18 in. long 5–6 in. wide, rachis and branches densely rusty-velvety, as are the very short pedicels and lanceolate bracts ·1 in. long. *Calyx* campanulate, densely rusty-velvety, ·15 in. long, teeth lanceolate except the triangular slightly bifid upper almost as long as tube. *Corolla* deep lake-red, ·25 in. long, standard oblong. *Pod* not seen.

Perak; Salama, *Kunstler* 3094! Distrib. Sumatra (*Forbes* 3241!).

4. Kunstleria Ridleyi Prain. A climber with slender puberulous branches. *Leaves* 6–8 in. long, leaflets 5 elliptic, 2–3·5 in. long, 1·25–2 in. wide, terminal considerably larger than the others, bases of all narrowly truncate, apex tapering to a finally somewhat abrupt blunt point, lateral nerves ascending, 5–6 pairs, rather prominent as is the midrib beneath; margin entire, firmly chartaceous pale-green glabrous on both surfaces, petiole sparsely pubescent 2–3 in. long, petiolules rusty-pubescent, ·2 in. long, marginally attached. *Flowers* in rather strict terminal and axillary panicles 12–18 in. long, 4–5 in. across, rachis and branches sparsely rusty-pubescent; pedicels very short, and subulate bracts ·08 in.

long, densely rusty. *Calyx* campanulate densely rusty, ·15 in. long, teeth triangular except the broadly deltoid slightly bifid upper, rather more than half as long as tube. *Corolla* ·25 in. long, standard broadly ovate. *Pod* thin flat densely rusty-pubescent and distinctly reticulated, 6 in. long 1·25 in. wide.

Singapore; *Ridley*, 6395!

A very distinct species, in inflorescence most resembling *K. Forbesii* but with leaves of the consistence and appearance of those of *K. Kingii*, though with 5 leaflets in place of 3. The pod however is very different from that of *K. Kingii*, and resembles that of *K. Curtisii*, the chief difference being that the meshes of the reticulations on the valves are much opener in *K. Ridleyi* than in *K. Curtisii*.

5. Kunstleria Derryi Prain. A climber with densely pale-rusty pubescent branches. *Leaves* 6–8 in. long, leaflets 7, ovate-lanceolate, 1–3 in. long ·75–1·5 in. wide, terminal with deltoid base considerably exceeding the lateral with rounded bases, all with cuneate apex, lateral nerves ascending 6–7 pairs, rather prominent as is the midrib beneath, margin entire; rigidly chartaceous pale-green subscabridly pubescent on the nerves above, uniformly subscabrid beneath as are the petioles 2·5–3 in., and the marginally attached petiolules ·2 in. long. *Flowers* in rather strict terminal and axillary panicles 12–15 in. long 2–3 in. wide, rachis and branches softly pale-rusty as are the very short pedicels and the very small lanceolate bracts. *Calyx* campanulate, densely rusty-pubescent, ·15 in. long, teeth triangular, upper rather broader, notched, half as long as tube. *Corolla* dark-purple ·25 in. long, standard oblong. *Pod* not seen.

Malacca; Machap Tebung Road, *Derry* 1006!

Leaves and branches with exactly the pubescence of *K. Curtisii* var. *laxiflora* but with 7 leaflets instead of a solitary leaflet and with marginally, not subpeltately attached petiolules.

30. Dalbergia Linn. fil.

Trees or climbing shrubs. *Leaves* with alternate subcoriaceous leaflets. *Flowers* copious, small, in terminal or lateral panicles. *Calyx* campanulate; teeth 5, distinct, usually short. *Corolla* exserted; standard broad; keel obtuse, with its petals only joined at the tip. *Stamens* 9–10, monadelphous, the sheath split above, or diadelphous, the sheath split also down the keel; anthers minute, basifixed, with the cells back to back, and the slit mostly short and apical. *Ovary* stalked, few-ovuled; style short, incurved, glabrous, stigma capitate. *Pod* oblong or strap-shaped, usually thin and flat, 1–4-seeded, indehiscent, not thickened or winged at the sutures. Species 60–70, cosmopolitan in the tropics.

Stamens in two lateral phalanges of 5 filaments each, pod thin and flattened except opposite the seeds (§ *Dalbergaria*) 1. *D. volubilis.*

Stamens monadelphous:—

Pod thin and flattened except opposite the seed (§ *Sissoa*) [unknown in *D. Hullettii*]:—

Flowers contemporaneous with the leaves; climbing species:—

Standard narrow, claws of petals shorter than calyx tube:—

Pod very short-stalked; flowers ·25 in. long in panicles of congested corymbs (leaflets 1 in. or more in length) ... ... 2. *D. confertiflora.*

Pod distinctly stalked; flowers minute (·15–·2 in.) in lax corymbose cymes:—

Leaflets ·6–1·5 in. long; corymbs mostly terminal; ovary puberulous ... ... 3. *D. Junghuhnii.*

Leaflets ·2–·4 in. long; corymbs smaller axillary and terminal; ovary glabrous ... ... 4. *D. subsympathetica.*

Standard orbicular, claws of petals as long as calyx-tube:—

Leaflets rather numerous, membranous, not cuspidate:—

Leaflets 13–17, 1·5–2 in. long, oblong obtuse or subacute; racemes large spreading; calyx and leaves densely pubescent... ... ... 5. *D. velutina.*

Leaflets 25–41, ·6–·75 in. long, rhomboid retuse; racemes small congested; calyx and leaves thinly pubescent ... ... 6. *D. tamarindifolia.*

Leaflets few (1–5), large (2–4 in. long), firm, abruptly cuspidate ... ... 7. *D. pseudo-sissoo.*

Flowers preceding the leaves; a small tree, (claws of petals as long as calyx-tube) ... ... 8. *D. Hullettii.*

Pod uniformly thickened throughout the valves, the upper suture falcate at least when young (§ *Selenolobium*):—

Pods flattened, reticulated, always 1-seeded, (upper suture recurved when ripe):—

Leaflets usually 5, small (under 1 in. long), obovate-oblong obtuse; flowers many in congested panicles 9. *D. torta.*

Leaflets usually 3, large (3–3·5 in. long), ovate-lanceolate acute; flowers few in short spikes ... 10. *D. menoëides.*

Pods turgid, smooth, often 2-seeded:—

Upper suture recurved when ripe, pod puberulous; leaflets acuminate, large (4–6 in. long), prominently veined and when young densely pubescent beneath, thickly coriaceous ... ... 11. *D. Kunstleri.*

Upper suture convex like lower when ripe, pod glabrous; leaflets glabrous obtuse slightly emarginate, smaller (2–3·5 in. long), not prominently veined beneath, thinly coriaceous ... ... 12. *D. parviflora.*

§ 1. DALBERGARIA. *Pod* thin and flattened except opposite the seeds. *Stamens* diadelphous in two lateral phalanges of 5 filaments each.

1. DALBERGIA VOLUBILIS Roxb. Cor. Pl. II, 48 t. 191. A large woody climber, 40–60 feet high, with twining glabrescent branches here and there thickened and twisted into spiral hooks. *Leaves* 4–5 in. long, leaflets 11–13 obovate, or ovate-oblong rounded, obtuse or slightly retuse faintly mucronulate at apex, dark-green above paler beneath, glabrous on both surfaces, ·75–1 in. long ·5–·75 in. across; rachis 3–4 in. long and petiolules ·15 in. long, quite glabrous. *Flowers* in copious terminal and axillary panicles 8–12 in. long with glabrous peduncles and with numerous horizontal or decurved puberulous branches 1–3 in. long bearing corymbose cymes, ultimate corymbs densely congested; bracts at base of branches of panicle small ovate subpersistent; pedicels slender puberulous, lower ·2 in. long upper very short with a small lanceolate persistent bracteole at base and two small ovate ones embracing the lower fifth of calyx-tube. *Calyx* campanulate, densely puberulous ·1 in. long, teeth lanceolate lowest exceeding the others. *Corolla* pale-blue ·25 in. long, standard broadly orbicular emarginate, reflexed at junction of blade and claw. *Stamens* 10, in two lateral groups of 5 each. *Pod* distinctly stalked, linear-oblong obtuse membranous, 2–3 in. long, 1 in. wide; 1–2-seeded. Hort. Beng. 53; Fl. Ind. III, 231; DC. Prodr. II, 417; Wall. Cat. 5874; W. & A. Prodr. 265; Benth. in Journ. Linn. Soc. IV, Suppl. 46; Bak. in Flor. Brit. Ind. II, 235.

ANDAMANS; very common. DISTRIB. Throughout India and Indo-China.

By an oversight this is described in the *F. B. I.* as having ebracteate pedicels; in reality each pedicel has three persistent bracteoles, one at its base, two at its apex.

§ 2. SISSOA. *Pod* thin and flattened except opposite the seeds. *Stamens* monadelphous.

2. DALBERGIA CONFERTIFLORA Benth. Pl. Jungh. 255. A large climber with sparsely puberulous, soon glabrescent branches. *Leaves* 4–6 in. long, leaflets firm 11–15, oblong obtuse or retuse, green and glabrous above paler and sparsely puberulous beneath, 1–1·5 in. long, ·5–·75 in. wide; rachis 3–4 in. long, glabrous as are the petiolules ·2 in. long. *Flowers* rather small in ample terminal and axillary panicles, 3–5 in. long, of corymbosely or subcapitately crowded cymes; peduncle and branches rather densely pubescent; bracts puberulous minute ovate deciduous; solitary bracteoles at base of pedicels also ovate deciduous; pair at base of calyx ovate-lanceolate persistent embracing lower fifth of calyx-tube. *Calyx* ·15 in. long, pubescent, rather narrowly tubular, teeth short obtuse, one-third as long as tube except the lower lanceolate half as long

as tube. *Corolla* white ·25 in. long, claws of petals short. *Stamens* 9 monadelphous. *Pod* thin glabrous, 2–3 in. long ·75–1 in. wide, 1–3-seeded, stalk very short. Benth. Journ. Linn. Soc. IV, Suppl. 41; Bak. in Flor. Brit. Ind. II, 233.

Andamans; very common. Distrib. Eastern Himalaya, Assam, Chittagong, Pegu.

A very distinct species; the description of the pod given in the *Flora of British India* is apparently taken from another species.

3. Dalbergia Junghuhnii Benth. Pl. Jungh. 254. A shrubby climber 15–30 feet long, with twining glabrous branches, here and there twisted and thickened into spiral hooks. *Leaves* 4–5 in. long, leaflets 7–15, oblong or elliptic, rounded at both ends faintly emarginate at the apex, green and glabrous above, glaucescent and glabrous or faintly puberulous beneath, ·6–1·5 in. long ·35–·75 in. wide; rachis 2·5–4 in. long, petiolules ·15 in. long. *Flowers* minute, secund in an ample terminal and in smaller axillary paniculate cymes 2 in. wide and as long as the leaves, peduncle branches and pedicels pubescent; bracts minute caducous; bracteoles all persistent, one at base of short pedicel lanceolate acuminate very minute, two at base of calyx ovate-obtuse embracing the lower third of calyx-tube. *Calyx* ·08 in. campanulate, teeth short obtuse one-third as long as tube, except the lower acute half as long as tube. *Corolla* white, ·15 in. long, claws of petals short. *Stamens* 9 monadelphous. *Ovary* pubescent. *Pod* thin membranous greenish, glabrous, 2·5–3 in. long, 1–1·3 in. wide, 1-seeded, slightly cuneate at base and distinctly stalked.

Var. *typica;* leaflets usually 7–9, oblong, glabrous or only faintly puberulous beneath. *D. Junghuhnii* Benth. Journ. Linn. Soc. IV, Suppl. 33; Miq. Flor. Ind. Bat. I, 129; Bak. in Flor. Brit. Ind. II, 233.

Penang; 500 feet, *Curtis!* Malacca; *Maingay* 547! 547/2! *Goodenough! Derry!* Singapore; *Hullett* 141! *Ridley!* Distrib. Sumatra, Java.

Var. *Scortechinii* Prain; leaflets 11–15 elliptic, beneath more closely puberulous especially on midrib.

Penang; Ayer Etam, *Curtis* 1437! Malacca; Bijong, *Scortechini* 1830! *Maingay* 549! Singapore; Bukit Timah, *Ridley* 6406! Distrib. Borneo.

These two plants differ in no way as regards flowers; the leaves however differ considerably in appearance and it may ultimately be found that the second variety—of which the fruit is as yet unknown—should be known as a distinct species, *Dalbergia Scortechinii*. The original specimens on which Mr. Bentham founded the species were collected by Junghuhn in Sumatra and by Griffith in Malacca; the writer has not seen either. Mr. Bentham describes the ovary as glabrous in his

specimens, it is hairy in all the specimens above cited where there are flowers. The most nearly related species are *D. subsympathetica*, which has much smaller leaflets with rather larger flowers in more numerous less ample cymes; and *D. sympathetica* which also has rather larger flowers and smaller leaflets. In *D. sympathetica* however the leaflets are more numerous and the pod though similar is more shortly stalked.

Mr. Bentham, who had not seen fruit of this when he wrote, suggested that this might prove to be the same as *D. parviflora* Roxb. One objection to this suggestion is the very small number of leaflets described by Roxburgh; a still more fatal objection, however, is in the pod; this Roxburgh describes as falcate,—an indication that *D. parviflora* should be sought for in § *Selenolobium* rather than in § *Sissoa*.

4. Dalbergia subsympathetica Prain. A tall climber 60–80 feet long, less often a scandent shrub or small tree 15–30 feet high, with twining puberulous branches. *Leaves* 1·5–3 in. long, leaflets 9–15 oblong, apex truncate or emarginate base wide-cuneate or rounded, green and glabrous above, paler and pubescent with long adpressed hairs beneath, ·25–·4 in. long, ·2–·3 in. wide; rachis 1–2·5 in. long, densely puberulous as are the petiolules ·1 in. long. *Flowers* minute secund, in small axillary paniculate cymes, ·75–1 in. across, as long as the leaves, peduncle ·5–·7 in., branches and pedicels pubescent; bracts minute caducous; bracteoles all persistent, one at base of short pedicel lanceolate, acuminate, very minute, two at base of calyx ovate-obtuse embracing lower fourth of calyx-tube. *Calyx* ·1 in. campanulate, teeth short obtuse one-third as long as tube, except the lower acute half as long as tube. *Corolla* white, ·2 in. long, claws of petals short. *Stamens* 9, monadelphous. *Ovary* glabrous except along anterior suture. *Pod* thin membranous greenish glabrous, 2·5 in. long, 1 in. wide, 1-seeded; slightly cuneate at base and distinctly stalked.

Penang; *Curtis* 1492! Perak; *Scortechini* 201! 1071! *Wray* 2086! 3205! *Kunstler* 2354! 3562! 4978! 5182!

Very near *D. Junghuhnii* and just possibly only a variety of that species; it is however easily distinguished by its much smaller leaflets and its smaller, more numerous cymes of rather larger but still very minute flowers.

5. Dalbergia velutina Benth. Pl. Jungh. 255. A long climber with rusty densely pubescent branches. *Leaves* 6–8 in. long, leaflets 13–17, oblong obtuse or subacute membranous, 1·5–2 in. long, ·6–·8 in. wide, dark-green glabrescent to puberulous above, rusty-puberulous to pubescent beneath, stipules large densely pubescent, rachis 5–6 in. long puberulous or pubescent, as are the petiolules ·1 in. long. *Flowers* in somewhat dense axillary panicles, with corymbose branches, 4 in. long 2·5 in. wide, the peduncles branches and pedicels densely pubescent bracts rather large ovate and bracteoles narrowly lanceolate persistent pubescent; the pair at base of calyx half as long as pedicel one-third as

long as calyx-tube. *Calyx* ·15 in. long, pubescent, campanulate, teeth acute upper shorter than lanceolate lower. *Corolla* white or pink, ·25 in. long, claws of petals as long as calyx-tube. *Stamens* 9 monadelphous. *Pod* thin obtuse brownish, short-stalked, 1-seeded, 2–3 in. long, ·6–·7 in. wide.

Var. *typica*; leaves beneath, leaf-rachis, linear-lanceolate stipules, peduncles and bracts pale rusty-velvety. *D. velutina* Benth. Journ. Linn. Soc. IV, Suppl. 43; Bak. in Flor. Brit. Ind. II, 233. *D. stipulata* Wall. Cat. 5868.

Malacca; *Maingay!* Distrib. Burma, Assam.

Var. *Maingayi* Prain; leaves puberulous glaucescent beneath; leaf-rachis, ovate-acuminate stipules, peduncles and bracts very darkly rusty-puberulous.

Malacca; *Maingay* 612! Singapore; *Ridley!* Distrib. Tenasserim (*Griffith* 1798); Malay Archipelago.

The only pods of true *D. velutina* at Calcutta are still unripe; the description of the fruit is therefore taken from Mr. Baker's account: to Mr. Bentham the fruit was unknown.

Of var. *Maingayi* which, as a note made in Herb. Kew indicates, is at Kew treated as a "less hairy variety" of *D. velutina*, the writer has seen no fruit. Not improbably it may be found ultimately necessary to treat it as a distinct species to be known as *D. Maingayi*.

6. Dalbergia tamarindifolia Roxb. Hort. Beng. 53. A shrubby climber, 15–40 feet high with densely pubescent young branches. *Leaves* 5–6 in. long, leaflets 25–41, thinly pubescent on both surfaces rather paler beneath, crowded, trapezoid-oblong, ·6–·75 in. long, ·3 in. wide, moderately firm, caducous; rachis densely puberulous 4·5–5·5 in. long, petiolules very short; stipules lanceolate densely puberulous ·2 in. long. *Flowers* with the leaves, in congested sessile axillary panicles with corymbose branches ·5–2 in. long, ·5–1 in. wide, peduncles, branches and pedicels densely puberulous, bracts rather large ovate and bracteoles persistent puberulous; pedicels as long as calyx with solitary bracteole at base and two rather large ovate close under calyx, the lower fourth of which they embrace. *Calyx* campanulate, glabrescent (in Malayan specimens), pale greenish-yellow, ·15 in. long, teeth short obtuse. *Corolla* white ·35 in. long, claws of petals as long as calyx-tube. *Stamens* usually 9, rarely 10, monadelphous. *Ovary* glabrous; ovules 2–3. *Pod* thin greenish, drying bright-brown, glabrous, long-stalked, strap-shaped, subacute; 1–3-seeded; not veined nor thickened opposite the seeds, 1·5–3 in. long, ·4–·5 wide. Roxb. Flor. Ind. III, 233 (in part only); Wight, Icones, t. 242 (excluding fig. of fruit); Wall. Cat. 5870; Benth. in Journ. Linn. Soc. IV, Suppl. 44; Miq. Flor. Ind. Bat. I, 131; Bak. in Flor. Brit. Ind. II, 234. *D. rufa* Grah. in Wall. Cat. 5864.

D. multijuga Grah. in Wall. Cat. 5865. *D. livida* Wall Cat. 5866. *D. Blumei* Hassk. Pl. Jav. Rar. 400.

Andamans; very common everywhere in the main group; Barren Island, *Prain!* Langkawi; *Curtis* 2625! Perak; *Scortechini* 68! *Wray* 2387! *Kunstler* 3346! 5963! 6481! 8667! Penang; *Wallich* 5665! Malacca; *Maingay* 602! *Derry* 1167! Distrib. Himalayas from Nepal eastward; Indo-China; Malay Archipelago.

All the Perak and Malacca specimens agree exactly with *D. multijuga* Grah., and that in turn does not differ even as a variety from *D. rufa* Grah., with the type of which Curtis' Langkawi specimens and the Andaman form exactly coincide. These two forms differ from the Upper Burma and Himalayan plant in having fewer-fld., laxer panicles, with a glabrescent instead of a downy calyx. The pods are, however, identical in both. It has been usual to quote Roxburgh without qualification as the authority for this species, in spite of the fact that he has described as belonging to it, the fruit that belongs to *D. Millettii*. And it has been also usual to cite *Derris pinnata* Lour. as this plant, overlooking the fact that *Derris pinnata* has glabrous leaflets and, presumably, only monospermous pods. The writer has not seen Loureiro's original specimens; his description of *D. pinnata*, however, certainly applies more aptly to *D. Millettii* than it does to *D. tamarindifolia*, which moreover does not appear to have such a root as Loureiro describes. In any case until specimens can be produced, *D. pinnata* should be treated as indeterminable.

7. Dalbergia pseudo-sissoo Miq. Flor. Ind. Bat. I, 128. A shrubby climber 15–25 feet long with twining, glabrous branches. *Leaves* glabrous medium-green, 6 in. long, leaflets firm 1–5, oblong slightly narrowed from beyond the middle to the cuneate or rounded base, widely rounded and abruptly cuspidate at apex, 2–4 in. long 1–2 in. wide, rachis 2–3 in., petiolules ·25 in. long. *Flowers* in lax axillary panicles with subcorymbose branches, 2·5–3·5 in. long and almost as broad, the branches finely grey-downy; pedicels ·15 in. long with slender subulate bracteoles under the calyx. *Calyx* campanulate ·2 in. long, externally puberulous, teeth widely triangular obtuse much shorter than the tube. *Corolla* ·35 in. long, petals creamy-white with pink tips their claws as long as the calyx. *Stamens* 9 monadelphous. *Ovary* long-stalked, densely pubescent 1-, or often 2-ovuled, style slender incurved. *Pod* brownish, strap-shaped, obtuse, 3–4 in. long, ·5–·65 in. wide, seed solitary. *D. Championii* Thw. Enum Pl. Zeyl. 95; Benth. in Journ. Linn. Soc. IV, Suppl. 39; Bak. in Flor. Brit. Ind. II, 231. *D. Sissoo* Miq. Flor Ind. Bat. I, 128 not of Roxb.

Perak; Larut, *Kunstler* 3177! 3340! 3579! 4964! 6565! *Scortechini* 1348! *Wray* 2098! 2965! Penang; Government Hill, *Curtis!* Singapore; Bukit Mandai and elsewhere, *Hullett! Ridley!* Distrib. Ceylon; Malay Islands.

The doubt that has hung over the identity of this species has at length been

cleared up through the kindness of Dr. J. V. Suringar. Both Mr. Bentham and Mr. Baker have suggested that it may be the same as *D. pseudo-sissoo* Miq. and in response to a request made by Dr. King that some Malayan specimens from Calcutta, which are undoubtedly conspecific with the Ceylon plant, might be compared with the Miquelian types at Leiden, Dr. Suringar has not only made the necessary comparisons but has sent to Calcutta examples of some of the authentic specimens and very careful drawings of others. These leave no doubt whatever as to the identity of the two plants named *D. pseudo-sissoo* and *D. Championii*. One curious feature has been noticed in this examination by Dr. Suringar and by the writer. In Ceylon (as Mr. Bentham found) and in Penang the ovaries appear to be always 1-ovuled; in Perak, Singapore and Borneo they are oftener 2-ovuled than 1-ovuled in the proportion of 7 to 3; in Java they are nearly always 2-ovuled, nine ovaries having 2 ovules for one ovary with 1 ovule. A still more interesting discovery made by Dr. Suringar is that *D. Sissoo* Miq. is not *D. Sissoo*. Roxb. (this no one who considers what the native habitat of *D. Sissoo* is, will be surprised to learn), but that it is (what was hardly to be expected) Dr. Miquel's own *D. pseudo-sissoo*. Dr. Suringar, in confirmation of his discovery, has sent to Calcutta an authentic specimen of *D. Sissoo* Miq. in Herb. Leiden (not of Roxb.). This then explains the "unfortunate selection" of name that Mr. Bentham very justly comments upon. Dr. Suringar, sharing Mr. Bentham's feeling, suggests that in view of this extraordinary confusion it would be better to drop Miquel's name altogether; and the writer would very gladly have adopted the suggestion and continued to use Dr. Thwaites' name *D. Championii*, had the dictates of common-sense been of any weight in modern nomenclature. But unfortunately there is now no doubt that the plant named *D. pseudo-sissoo* by Miquel is the same as that named *D. Championii* by Thwaites; it cannot be gainsaid that so far as it goes, the description of *D. pseudo-sissoo* applies to the species; and it is clear that the name *D. pseudo-sissoo* has nine years' priority over the name *D. Championii*. This being so, Miquel's name may just as well be given precedence now, seeing that one or other of the bibliographers who pose as botanists would make the alteration so soon as this note appears, in spite of the fact that Miquel did not recognise his own species when he saw it.

8. Dalbergia Hullettii Prain. A small tree with blackish rugose rusty-puberulous thickish branchlets, without leaves at time of flowering. *Flowers* in short, clustered racemes, 1–1·5 in. long, springing from tufts of triangular rusty-pubescent small bracts in axils of old leaves; lowest pedicels longer than the rest, slender, ·3 in. long, rusty-pubescent as are the peduncles; bracteoles at base of pedicels solitary ovate-lanceolate ·1 in. long persistent, the pair below calyx subulate very small. *Calyx* campanulate, densely rusty-tomentose ·15 in. long, teeth half as long as tube, acute. *Corolla* ·3 in. long, claws of petals as long as calyx-tube. *Stamens* 9, rarely 10, monadelphous. *Ovary* with densely pubescent stalk; ovule solitary. *Pod* unknown.

Singapore; *Hullett* 626!

A very distinct species, only once reported. It is nearest to a Bornean tree apparently as yet undescribed (*Haviland* n. 2894); the only difference between the flowers of the two is that in the Bornean plant the ovary is densely woolly; in this the ovary is quite glabrous though its stalk is pubescent. The Bornean plant has

leaves with solitary or trifoliolate leaflets; when trifoliolate the lateral leaflets are subopposite. It thus approaches most nearly to *D. pseudo-sissoo* which also has flowers similar to those of *D. Hullettii* and of Haviland's species from Borneo.

§ 3. SELENOLOBIUM. *Pod* thickened throughout upper suture, recurved at least while young.

9. DALBERGIA TORTA Grah. in Wall. Cat. 5873. An unarmed littoral climber with twining glabrescent branches often twisted into spiral hooks. *Leaves* 3 in. long, leaflets 5 (very rarely 7 or 3), obovate-oblong obtuse sometimes emarginate, dark-green and glabrous above paler and sparingly adpressed-puberulous beneath, ·6–·8 in. long, ·4–·6 in. wide; rachis 2 in. long glabrous as are the petiolules ·1 in. long. *Flowers* in sessile congested axillary panicles, 1–2 in. long, with very slightly puberulous branches, bracts small ovate-lanceolate persistent; pedicels very short with a small ovate-lanceolate bracteole at the base and with two larger ovate bracteoles under the calyx embracing lower third of its tube. *Calyx* glabrescent, wide-campanulate, ·15 in. long, teeth short, wide-triangular, obtuse. *Corolla* white, ·25 in. long, claws of petals as long as calyx-tube. *Stamens* 10 monadelphous. *Pod* brown flat glabrous, ·9 in. long, ·5 in. wide, upper suture recurved, rather thick-walled throughout, 1-seeded; stalk as long as calyx. *D. monosperma* Dalz. in Hook. Journ. Bot. II, 36; Benth. in Journ. Linn. Soc. IV, Suppl. 48; Miq. Flor. Ind. Bat. I, 132; Bak. in Flor. Brit. Ind. II, 237.

ANDAMANS: very common on all the coasts of the main group; Narcondam, *Prain!* PENANG; *Wallich* 5873! *Curtis* 220! LANGKAWI; *Curtis* 2868! PERAK; coast at Matong, *Scortechini* 1099! *Wray* 2502! MALACCA; at Tanjong Kling, *Ridley* 3312! SINGAPORE; growing in salt water, *Kunstler* 66! Kranji, *Ridley* 5576! *T. Anderson! Kurz!* DISTRIB. Western coasts of India; Sundribuns; Burma; Borneo; New Guinea; China.

A purely littoral species. The citation of *Wall. Cat.* 5879 by Dr. Miquel and Mr. Baker for this species is due to their having copied the statement from Mr. Bentham. By an uncorrected printer's error Mr. Bentham is made in the description to quote this number, though in the notice of localities the number 5873 is correctly given.

10. DALBERGIA MENOEIDES Prain. An unarmed climber with glabrous, twining, hooked branches. *Leaves* 5 in. long, leaflets 3, ovate lanceolate tapering to both ends, dark-green and glabrous above, paler and sparsely adpressed-puberulous beneath, 3–3·5 in. long, 1–1·5 in. wide; rachis 1·5 in. long, glabrous, petiolules ·08 in. puberulous. *Flowers* very few, sessile, clustered at tips of short puberulous axillary peduncles ·15–·25 in. long, each with two ovate bracteoles embracing lower fourth of calyx-tube. *Calyx* campanulate, externally sparingly

puberulous ·15 in. long, teeth short subequal obtuse. *Corolla* ·35 in. long, claws of petals as long as calyx-tube. *Stamens* 10 monadelphous. *Ovary* glabrous, ovule solitary. *Pod* greenish, semilunar, flat, glabrous, firm, reticulated throughout, upper suture recurved, 1·5 in. long, ·75 in. wide; 1-seeded; tip acute, stalk rather longer than calyx.

Perak; Krian, *Scortechini* 1392!

A very distinct species with leaflets somewhat resembling those of *D. pseudo-sissoo*.

11. Dalbergia Kunstleri Prain. An extensive climber 40–150 feet long with stem 3–6 in. in diam. and pubescent young branches. *Leaves* 10–12 in. long, leaflets 7–9, the lateral ones subopposed, dark-green quite glabrous above, dark-grey when young densely pubescent when old sparsely puberulous beneath, rigidly coriaceous, elliptic-acuminate, 4–6 in. long, 2 in. wide, with very prominent midrib and 8–9 pairs of spreading lateral veins beneath, secondary venation also distinct, rachis 8 in. long, petiolules ·3 in. long at first densely pubescent ultimately glabrescent. *Flowers* in axillary panicles 4–6 in. long with spreading rusty-puberulous branches, bracts and bracteoles deciduous, pedicels under ·1 in. *Calyx* ·15 in., teeth lanceolate except the upper, the lowest twice as long as the tube. *Corolla* dark-blue, ·35 in. long, standard orbicular emarginate. *Stamens* monadelphous. *Ovary* pubescent. *Pod* finely puberulous, rigid, much thickened throughout, 1–2-seeded, 1·5–2·5 in. long, ·9 in. wide, ·3 in. thick, short-stalked, dark-brown to almost black when ripe, with grey lines alongside the sutures.

Perak; Goping, *Kunstler* 4736! Kinta, *Kunstler* 7067!

A very fine species nearest to *D. reniformis*; it differs in being a climber whereas that species is a tree; in having blue flowers whereas that species has them white; in having larger and thicker leaves and larger pods. The pod is quite indehiscent but as the seed matures the epicarp cracks alongside both sutures so that, when quite ripe, the pod, as Kunstler remarks in a field note, shows a "grey seam" due to the exposure of the mesocarp along two lines parallel to each suture. Sometimes the pod consists of but one reniform segment with a solitary seed; usually however there are two segments though the seed inside the distal segment rarely developes; when this happens the epicarp does not give way, and there is then no "grey seam" along the suture.

12. Dalbergia parviflora Roxb. Hort. Beng. 98. A strong climber 30–80 feet long with glabrous branches. *Leaves* 6–8 in. long, leaflets 5–9, ovate-lanceolate with obtuse slightly emarginate tips, light-green quite glabrous on both surfaces, finely reticulately veined beneath, 2·3·5 in. long ·75–1·5 in. wide; rachis 2–3 in. and petiolules ·15 in. long, glabrous. *Flowers* very small in axillary and terminal panicles of congested dichotomous cymes with puberulous branches; bracts rounded ciliate deciduous; bracteoles at base of very short pedicels rounded persistent,

the pair at base of calyx oblong ciliate embracing lower half of tube. *Calyx* ·08 in., campanulate, teeth obtuse upper two connate, lower three subequal all as long as tube. *Corolla* white, ·15 in. long, claws of petals short. *Stamens* 10, monadelphous. *Ovary* glabrous. *Pod* turgid 1–3-seeded; ·75–2 in. long, ·6 in. wide, when young falcate along upper, when ripe convex along both sutures, when 2- or 3-seeded torulose between the seeds. Flor. Ind. III, 225; Miq. Flor. Ind. Bat. I, 132; Benth. Journ. Linn. Soc. IV, Suppl. 33. *D. Cumingiana* Benth. Pl. Jungh. 255; Journ. Linn. Soc. IV, Suppl. 32; Miq. Flor. Ind. Bat. I, 129. *D. Zollingeriana* Miq. Flor. Ind. Bat. I, 130. *Drepanocarpus Cumingii* Kurz, Journ. As. Soc. Beng. XLV, pt. 2. 282.

Andamans; *Helfer* 1808! Dindings; *Curtis!* Pahang; *Ridley* 1374! 2639! Perak; Matang Jambu, *Wray* 2525! Goping, *Kunstler* 1423! 5973! 6151! *Scortechini*! Distrib. Malay Archipelago.

Regarding this plant Mr. Hemsley has noted:—"This agrees with Kew specimens of *D. reniformis* Roxb." This species, however, is a climber whereas *D. reniformis* is a tree; Roxburgh's *D. reniformis* has moreover much larger flowers and, as in *D. Kunstleri*, the fruits of *D. reniformis* remain falcate along the upper suture even when ripe.

That this is *D. parviflora* Roxb. hardly admits of a doubt. Mr. Bentham and Mr. Baker have, indeed, suggested that *D. parviflora* may be the same as *D. Junghuhnii*; in spite of the very great authority of these authors this suggestion must be abandoned as untenable. The number and, still more, shape of the leaflets make the identification impossible; moreover, Roxburgh's account of the pod shows that his species *must* be, as Miquel admits, a *Selenolobium* and not as Bentham and Baker suppose, a *Sissoa*. Roxburgh's description is meagre in the extreme; but since *D. Cumingiana* provides a species that exhibits *all* the characters of *D. parviflora* and as no other Malayan species of *Dalbergia* hitherto found does so, it seems imperative to use Roxburgh's name for the species.

A more interesting question regarding this plant is, however, its supposed identity with Rumphius' *Lacca lignum* (*Herb. Amboin.* V. 17. t. 13). So far as Calcutta specimens go the only authority for the belief is the existence of a specimen from Halmaheira (*Teysmann* n. 5668) on which Mr. Teysmann has written "Kayoe lakka" and another from Tarabangie, Lampongs, Sumatra (*Hort. Bogor* n. 4441) also collected by Mr. Teysmann and also marked "Kayoe lakka." It is remarkable that our other Sumatra specimens, collected on the R. Rawas by Dr. H. O. Forbes (*Forbes* n. 3216), have no note to this effect, and just as remarkable that collectors so careful as Mr. Ridley, Fr. Scortechini, Herr Kunstler and Mr. Wray, who have sent us numerous specimens of the same species, should have made no note regarding it. Their silence renders the matter doubtful, and appears to afford good ground for Dr. Kuntze's refusal (*Rev. Gen. Plant.* 1, 158) to accept the identification proposed by Teysmann and adopted by Hasskarl (*Neue Schluessel zu Rumph.* p. 90). As Kuntze justly remarks, the meagre account of the flower given by Rumphius does not fit the present species since Ramphius says it has two petals, and though the general habit agrees that alone hardly suffices for identification. The calyx of the only open flower in the figure quite accords with the calyx

of our plant and the fruit also quite agrees. But the uppermost branchlets are shown as curved and twisted like those of *D. torta* while those lower down are figured as passing into spines like those of *D. spinosa*, two species that, though they belong to the same section of *Dalbergia*, are nevertheless very different from *D. parviflora*. None of our very numerous specimens show either hooks or spines, nor have any of the field-notes that accompany the specimens a reference to spines on the stem.

In the Herbarium of the Penang Forest Department, kindly lent by Mr. Curtis, there is however a specimen from Lumot in the Dindings, to which the native name "Kayu Laha" is attached along with the further note, "climber; wood valuable, used as incense." This specimen, from a widely remote locality, thus bears a note made without reference to the controversy that has arisen regarding *Kayoe lakka* but that entirely confirms the notes of Mr. Teysmann, who was, it may be remarked, one of the most careful collectors that has ever worked in Malaya. The existence of this specimen therefore re-opens the whole question, which may be commended to Malayan field-botanists as one worthy of attention and solution. To judge from Rumphius' account there were, in his time, three if not four species included under the name *Caju Lacca* and of one, at least, of these he says that it had *no* spines, only thickened nodes instead. It seems quite certain that *D. parviflora* must have been one of the four. But whether his figure is meant to represent it or has been made to include some of the characters of the others as well, can only be known when all four are completely understood.

31. Pterocarpus Linn.

Erect trees. *Leaves* with alternate coriaceous exstipellate leaflets. *Flowers* yellowish, in copious panicled racemes; bracts and bracteoles minute, caducous; pedicels distinctly articulated at the apex. *Calyx* turbinate, curved before expansion, the teeth short. *Petals* exserted, with long claws; standard and wings crisped; keel obtuse, the petals scarcely or not at all coherent. *Staminal* sheath slit both above and below, or above only; the upper stamen often nearly or quite free; anthers versatile. *Ovary* stalked, 2-ovuled; style incurved, stigma terminal. *Pod* orbicular, rarely other than 1-seeded, with a broad rigid wing, the point turned down to opposite the base or near it. Species about 15; cosmopolitan in the Tropics.

Leaflets finely veined throughout, pedicels slender longer than the calyx, beak of pod distinctly raised beyond the outer base ... ... 1. *P. indicus.*

Leaflets with 5–7 pairs of distinctly raised veins beneath, pedicels stoutish shorter than the calyx, beak of pod hardly raised beyond the outer base ... ... 2. *P. dalbergioides.*

1. Pterocarpus indicus Willd. Sp. Pl. III, 904. A tree 30–40 feet high with widely spreading branches drooping at the end. *Leaves* 8–10 in. long, leaflets 5–9 moderately firm, 2–4 in. long 1·5–2 in. wide, the terminal rather larger than the others, the rachis usually faintly prolonged, all ovate with rounded rarely deltoid base and rounded

abruptly acuminate apex, glabrous on both surfaces, dark-green, margins entire but distinctly undulate, uniformly finely veined throughout, stipules lanceolate ·5 in. long early caducous, petiolules ·25 in., glabrous as is the leaf-rachis. *Flowers* in copious terminal and axillary panicles, rachis and pedicels glabrescent, pedicels ·3 in. long, very slender, with 2 linear caducous bracteoles ·1 in. long, half as long as bud, at apex. *Calyx* ·25 in. long, finely brown-silky, teeth rounded the two uppermost exceeding the others. *Corolla* yellow, ·6 in. long, standard ·5 in. across. *Pod* orbicular, with stalk ·3 in. long, 1·75–2·25 in. in diameter, uniformly sparsely adpressed-pubescent with silky hairs, rather distinctly anastomotically 2–3-veined opposite the seed, the style usually a considerable distance (65°–100°) above the base, pointing outwards at right angles to the stalk. Roxb. Hort. Beng. 53; DC. Prodr. II, 419; Roxb. Flor. Ind. III, 238; Benth. in Journ. Linn. Soc. IV, Suppl. 77 (in part only); Miq. Flor. Ind. Bat. I, 135; Bak. in Flor. Brit. Ind. II, 238 (in part only). *P. Draco* Lamk. Ill. t. 602, f. 2, *b* (not *a*). *P. dalbergioides* Wall. Cat. 5843 (letter G only) not of Roxb. *P. Zollingeri* Miq. Flor. Ind. Bat. I, 136. *P. obtusatus* Miq. Flor. Ind. Bat. I, 136. *P. saxatilis* Bl. MSS. in Hort. Bogor. *Lingoum saxatile* Rumph. Herb. Amboin. II, t. 70.

Penang; *Wallich* 5843 G! Malacca; *Griffith! Maingay* 550! Perak; *Kunstler* 1513! 8713! *Scortechini* 503! *Wray* 2003! 2280! Distrib. Northwards throughout Tenasserim to Martaban; southwards to Sumatra and Java.

A fine tree often confused with the next species from which it is, however, very distinct in foliage and somewhat different in habit.

2. Pterocarpus dalbergioides Roxb. Hort. Beng. 53. A tree 60–80 feet high with ascending branches, spreading at the end. *Leaves* 8–10 in. long, leaflets 5–9, firm, 2–4 in. long 1–1·5 in. wide the terminal rather larger than the others, ovate-lanceolate with deltoid rarely rounded base and gradually narrowing to apex, glabrous on both surfaces, pale-green, margins entire hardly undulate, with 5–7 pairs of distinctly raised veins beneath, stipules lanceolate ·5 in. long, early caducous, petiolules ·15 in. long glabrous as is the leaf-rachis. *Flowers* in copious terminal and axillary panicles, rachis and pedicels finely brown-pubescent, pedicels ·2 in. long stoutish with 2 very shortly ovate caducous bracteoles under ·05 in. long, less than ¼ as long as bud, at apex. *Calyx* ·25 in. long, densely brown silky, teeth rounded the two uppermost exceeding the others. *Corolla* yellow ·4 in. long, standard ·35 in. across. *Pod* orbicular, with stalk ·6 in. long, 2–2·25 in. in diameter, uniformly very finely puberulous and not veined opposite the seed, the style usually a short distance (10°–50°) above the base, pointing slightly downwards. DC. Prodr. II, 418: Roxb. Flor. Ind. III, 236; W. & A. Prodr. 267

Wall. Cat. 5843 (excluding G and, according to W. & A., also excluding D). *P. indicus* Benth. in Journ. Linn. Soc. IV, Suppl. 77, in part; Bedd. Fl. Sylvat. t. 23; Bak. in Flor. Brit. Ind. II, 238 in part, not of Willd.

ANDAMANS; common.

This tree is usually treated as a form of the preceding species, and it has been the fashion to say that the two are not distinguishable by 'botanical' characters. As they grow it would be very hard to mistake them, and when have been carefully examined it becomes difficult to realize that, even in the herbarium, they should ever have been confounded.

32. ARACHIS Linn.

Annual herbs. *Leaves* abruptly pinnate, leaflets few; stipules elongated adnate to the petiole. *Calyx* long-tubular simulating a pedicel, 2-lipped; the upper lip 4-toothed the lower long slender. *Corolla* resupinate. *Stamens* (sometimes only 9) united in a tube inserted with the petals on calyx limb; staminal tube grooved on vexillary side but not split; anthers dimorphic alternately on short filaments versatile and on longer subbasifixed. *Ovary* at first short-stalked, at base of calyx-tube, the stalk soon elongating; style filiform, bearded above; stigma minute. *Pod* long-stalked ovate-oblong, obtuse at both ends, gibbous, torulose, reticulated, coriaceous, indehiscent, 2–4-seeded. *Seeds* fleshy, oily. Species 7; six in Brazil, 1 widely cultivated in the tropics.

ARACHIS HYPOGÆA Linn. Sp. Pl. 741. An annual diffuse herb, stems grooved and angled 6–20 in. high, often much branched near base; stems and branches clothed with longish spreading hairs. *Leaf-rachis* pubescent 2–4 in. long; leaflets exstipellate in 2 opposite pairs, ovate-oblong obtuse with rounded base, 1–1·5 in. long, ·6–1 in. wide, green and glabrous above, pale and sparsely clothed with spreading hairs beneath; stipules narrow lanceolate 1 in. long, ·15 in. wide, upper half free. *Flowers* 2–7, in leaf-axils along the stem. *Calyx*-lips ·25 in. long, the lower linear the upper ·15 in. wide. *Corolla* ·4 in. long, pale-yellow or white; standard suborbicular, glabrous, keel beaked. *Pod* carried underground by the elongating pedicel, where it ripens; 1–1·25 in. long, ·5 in. across; 2–3-seeded. DC. Prodr. II, 474; Miq. Flor. Ind. Bat. I, 218.

SINGAPORE; cultivated, *Anderson!* PENANG; cultivated, *Curtis!*

The "Ground-Nut," commonly cultivated in India and Malaya, probably originally introduced into the old world from Brazil.

33. ZORNIA Gmel.

Annuals, with large geminate coriaceous bracts and dotted leaflets in 1–2 opposite pairs. *Flowers* in lax racemes. *Calyx* minute; upper

teeth short, connate; lowest shorter than the two middle ones. *Corolla* much exserted; standard broad; keel incurved, acute. *Stamens* monadelphous; anthers dimorphous. *Ovary* sessile, many-ovuled; style filiform, incurved, stigma minute capitate. *Pod* of several small round flattened finely muricated 1-seeded indehiscent joints. Species 10, all but two American.

Zornia diphylla Pers. Synops. II, 318. A diffuse annual with slender zigzag wiry branches reaching 11–15 in. in length, glabrous or sparingly puberulous. *Leaf-rachis* ·25 in. long, puberulous, channelled above; leaflets in one terminal pair, oblong or lanceolate (lanceolate in Malayan specimens), ·5 in. long, ·12 in. wide, glabrous, conspicuously dotted; stipules lanceolate with a long spur. *Racemes* laxly 3–12-fld., 1–3 in. long; bracts also dotted, ovate-acute, almost concealing flowers and fruits. *Calyx* minute. *Corolla* slightly exserted. *Pods* 1–6-jointed; joints ·08 in. long, pubescent, and irregularly sprinkled with harsh prickles. Benth. in Mart. Flor. Bras. XV, 80, t. 21, 22; Bak. in Flor. Brit. Ind. II, 147. *Zornia angustifolia* Smith in Rees Cyclop. n. 1; DC. Prodr. II, 316; Wall. Cat. 5660; Miq. Flor. Ind. Bat. I, 278. *Z. dictyocarpa* DC. Prodr. II, 327. *Z. gibbosa* Span. Linnæa XV, 191. *Z. graminea* Span. Linnæa XV, 192. *Hedysarum diphyllum* Linn. Sp. Pl. 747; Roxb. Flor. Ind. III, 353.

Singapore; Changi, *Ridley* 4672! Distrib. Cosmopolitan in the tropics.

34. Smithia Ait.

Herbs or undershrubs. *Leaflets* many small sensitive, opposite, leaf-rachis ending in a bristle; stipules scariose with large auricles. *Flowers* racemose or axillary. *Calyx* deeply 2-lipped, the lips usually entire. *Corolla* exserted; standard orbicular; keel incurved obtuse. *Stamens* in two bundles of 5 each; anthers uniform. *Ovary* linear, many-ovuled; style incurved, filiform, stigma minute capitate. *Pod* of many or few small flattened or turgid joints, folded together inside the calyx. Species 20–30, throughout tropics of the Eastern Hemisphere.

Smithia sensitiva Ait. Hort. Kew. ed. I, III, 496. A diffuse spreading annual with slender glabrous much branched stems 1–3 feet long, only ·12 in. thick at base. *Leaf-rachis* ·5–1 in. long sparsely beset with long whitish bristles; leaflets 3–10 pairs, ·25–·4 in. long, oblong obtuse, sparsely bristly on the almost straight margins and on the midrib beneath. *Racemes* simple 1–6-fld., in axils of upper leaves on peduncles ·3 in. long, pedicels slender bracteolate ·15 in. long or less, ascending; bracteoles small ovate-acute scarious. *Calyx* ·25–·3 in. long, lips subequal, entire, acute, with a few scattered subadpressed pale-yellow

bristles. *Corolla* yellow, glabrous, ·4 in. long. *Pod* 4–6-jointed; faces densely papillose. DC. Prodr. II, 325; Roxb. Hort. Beng, 56; Flor. Ind. III, 342; Salisb. Paradis. t. 92; Miq. Flor. Ind. Bat. I, 272; Bak. in Flor. Brit. Ind. 148. *S. abyssinica* Hochst. in. Schimp. Pl. Abyssin.

Andamans; a common weed throughout the settlement at Port Blair. Nicobars; Kamorta, *Kurz!* Distrib. Africa; S.-E. Asia.

Not seen from the other provinces; probably a recent introduction from India. From Java comes a very closely allied plant (*S. javanica* Miq.) which differs mainly in having no bristles on the calyx; this may be no more than a form of the Indian and African *S. sensitiva*: all the specimens reported are, however, very uniform.

35. Ormocarpum Beauv.

Shrubs. *Leaves* with odd-pinnate exstipellate leaflets and persistent striated stipules and bracts. *Flowers* in lax racemes. *Calyx*-tube campanulate; 2 upper teeth deltoid; 3 lower lanceolate. *Standard* broad; keel much incurved, not at all beaked. *Stamens* in two bundles of 5 each; anthers uniform. *Ovary* linear, few-ovuled; style filiform, inflexed, stigma minute terminal. *Pod* of a few indehiscent turgid linear or oblong joints, the lower seedless, the faces rugose, naked or muricated with weak-gland-tipped prikles. Species 6, spread all round the world in the tropics.

Ormocarpum glabrum Teysm. & Binnend. Nat. Tijd. Ned. Ind. XXVII, 56. A small tree 12–14 feet high, with smooth angular branches; epidermis desquamating. *Leaves* 6 in. long, leaflets 1 in. long, ·4 in. wide, terminal and 8–9 alternate lateral elliptic obtuse mucronate, glabrous, glaucescent beneath; rachis subtrigonous, glabrous, thickened at base; stipules subulate erect. *Racemes* corymbose, on short peduncles ·12 in. long; individual flowers on slender pedicels ·5 in. long, 2-bracteolate above the middle. *Calyx* ·25 in. long, green, campanulate, unequally 5-toothed, glabrous externally; teeth oblong, acute. *Corolla* much exserted, yellow, purple-veined; standard suborbicular retuse. *Ovary* long-stipitate, glabrous. *Pod* 6–7-jointed, ultimately becoming blackish, 5–6 in. long; individual joints ·75–1 in. long, externally marked with 6–8 longitudinal more or less parallel ridges.

Andamans; very common in thickets near Port Blair; no doubt introduced. Distrib. Malay Archipelago.

This has the general habit of the common Indian *O. sennoides*, of which it is perhaps only a cultivated form; its pods, however, are much longer and are never muricated. The original description, it should be noted, was made from specimens cultivated at Buitenzorg.

36. Æschynomene Linn.

Erect herbs or undershrubs. *Leaves* with very numerous close

sensitive odd-pinnate small linear leaflets. *Flowers* in sparse racemes. *Calyx* deeply 2-lipped, the lips faintly toothed. *Corolla* fugacious; standard orbicular; keel not beaked. *Stamens* in two bundles of 5 each; anthers uniform. *Ovary* stalked, linear, many-ovuled; style filiform, incurved, stigma terminal. *Pod* linear, with a stalk longer than the calyx, and 4–8 flattened 1-seeded separating joints. Species about 30, spread everywhere in the tropics.

Stems woody, slender, much-branched; calyx and corolla small glabrous; pods narrow, smooth ... ... 1. *Æ. indica.*
Stems pith-like, stout, little-branched; calyx and large corolla hispid; pods broad, warted ... ... 2. *Æ. aspera.*

1. ÆSCHYNOMENE INDICA Linn. Sp. Pl. 713. A slender, much branched annual undershrub, stems 1–3 feet high under ·15 in. in diam. at base; everywhere glabrous, pale-green; branches slender twiggy terete. *Leaf-rachis* 2–3 in. long; leaflets close, terminal and in 20–30 opposite pairs, linear, obtuse, 1-nerved, ·2 in. long; stipules lanceolate, ·3 in. long, membranous, deciduous, with a large auricle. *Racemes* axillary 1–4-fld.; peduncles 1 in. and pedicels ·3 in., usually viscid; bracteoles small subulate glandular. *Calyx* ·2 in., glabrous, teeth unequal the two upper subconnate, persistent, withering. *Corolla* pale-yellow, tinged with pink or orange, ·45 in. long, glabrous, fugacious, standard orbicular emarginate. *Stigma* capitate. *Pod* 1–1·5 in. long, straight or at times slightly curved, upper suture even, lower indented between the 8–10 separating smooth or faintly papillose joints ·12–·15 in. broad. DC. Prodr. II, 320; Miq. Flor. Ind. Bat. I, 274; Bak. in Flor. Brit. Ind. II, 151. *Æ. pumila* Linn. Sp. Pl. ed. II, 1061; DC. Prodr. II, 321. *Æ. aspera* Wall. Cat. 5666 not of Linn. *Æ. diffusa* Willd. Sp. Pl. III, 1164; DC. Prodr. II. 321; Wall. Cat. 5565. *Æ. viscidula* Willd. Enum. 776. *Æ. Roxburghii* Spreng. Syst. III, 322. *Smithia aspera* Roxb. Hort. Beng. 56; Flor. Ind. III, 343. *Hedysarum Neli-Tali* Roxb. Hort. Beng. 57; Flor. Ind. III, 365.

ANDAMANS; Port Mouat, plentiful. PROV. WELLESLEY; *Ridley* 8009! DISTRIB. Tropics generally.

2. ÆSCHYNOMENE ASPERA Linn. Sp. Pl. 713. A tall erect swamp-shrub reaching 10–12 feet in height, stems 3 in. or more in diam., externally glabrous, internally full of soft white pith; branches few or none. *Leaf-rachis* 3–6 in. long; leaflets terminal and in 30–50 opposite pairs, linear, obtuse, 1-nerved, ·5 in. long; stipules lanceolate ·5 in. long, auricled, deciduous. *Racemes* axillary corymbosely 2–4-fld.; peduncles 1 in. and pedicels ·4 in. clothed with spreading bristles; bracteoles small ovate deciduous. *Calyx* ·4 in., hispidly hairy, unequally 5-toothed, the two upper teeth subconnate. *Corolla* ·75 in. yellow, fugacious, standard orbicular. *Pod* 2–2·5 in. long, ·3 in. across, often indented on

both the echinulate sutures, always along the lower, between the 4–8 separating joints which are usually echinulate on the face, rarely smooth. DC. Prodr. II, 320; Miq. Flor. Ind. Bat. I, 275; Bak. in Flor. Brit. Ind. II, 152. *Æ. indica* Wall. Cat. 5667 not of Linn. *Æ. trachyloba* Miq. Flor. Ind. Bat. I, 276. *Æ. indica* VAR. *aspera* Hassk. Pl. Jav. Rar. 340. *Hedysarum lagenarium* Roxb. Hort. Beng. 57; Flor. Ind. III, 365.

MALACCA; *Griffith!* DISTRIB. Tropical S.-E. Asia and Tropical Africa.

This is the well-known "Sola" plant, the pith of which is used in making sun-hats, fishermen's floats and other articles where great lightness is desirable. Doubtless it is an introduced plant in Malacca.

37. PHYLACIUM Benn.

Climbing herbs. *Leaves* 3-foliolate; stipules persistent small linear or lanceolate, leaflets stipellate. *Flowers* in axillary racemes shortly pedicelled, 2-bracteolate near the calyx, completely enveloped, as ultimately is the legume, in a large boat-shaped membranous accrescent bract. *Calyx* tubular, sub-2-labiate, 4-toothed. *Standard* ovate, apex retuse base 2-auriculate; wings oblong, long-spurred, spurs incurved clasped by the auricles of the standard; keel straight obtuse shortly spurred. *Stamens* diadelphous, posterior filament adnate to base of standard-claw. *Ovary* short-stalked, its base surrounded by a shallow disc; ovule solitary; style inflexed. *Pod* short-stalked ovate-rotund, acute. Species 2, the present and another which is Indo-Chinese.

PHYLACIUM BRACTEOSUM Benn. Pl. Jav. Rar. 159 t. 33. A slender climber 20–30 feet long, young parts and leaves beneath sparingly adpressed-hirsute. *Leaves* pinnately 3-foliolate; leaflets ovate-oblong base rounded apex obtuse, thinly herbaceous, green on both surfaces, glabrous above, sparingly hirsute beneath, 2–3 in. long, 1·5 in. wide; petioles glabrescent 1·5 in. long, stipules and stipels linear, persistent. *Racemes* axillary 2–10 together, 1·5–2 in. long, shorter than the leaves, flowers fasciculate few. *Bracts* pale-green, 1–1·5 in. long, externally glabrous, sparing hirsute within. *Calyx* ·15 in. long, externally sparingly hirsute, upper lip entire ovate, lower 3-lobed, lobes lanceolate the central rather the larger, none overlapping. *Corolla* ·3 in. long, white with a pink tinge, glabrous. *Pod* ·25 in. long, compressed, sparing hirsute, reticulate. Benth. Pl. Jungh. I, 231; Miq. Flor. Ind. Bat. I, 228.

PERAK; near Gunong Pondo, in open jungle, 200–300 feet elev., *Kunstler* 8367! DISTRIB. Sumatra and Java to the Philippines.

38. URARIA Desv.

Suffruticose perennials. *Leaves* stipellate, with 1 to 9 leaflets. *Flowers* very numerous, minute, racemose. *Calyx*-tube very short; two

upper teeth short; three lower usually elongated, setaceous. *Standard* broad; wings adhering to the obtuse keel. *Stamens* diadelphous; anthers uniform. *Ovary* sessile or short-stalked, few-ovuled; style inflexed filiform, stigma terminal. *Pod* of 2–6 small turgid 1-seeded indehiscent joints, often placed face to face. Species 15, S.-E. Asiatic.

Stems erect, heads long cylindric; upper leaves 5–9-foliolate, leaflets much longer than broad:—

Leaflets narrowly lanceolate, clouded above, pedicels clothed with short bristles, joints of pod polished glabrous ... 1. *U. picta.*

Leaflets oblong, green above, pedicels clothed with long bristles, joints of pod dull puberulous ... 2. *U. crinita.*

Stems trailing heads short oblong; leaves 1-foliolate and 3-foliolate intermixed, leaflets not much longer than broad ... 3. *U. lagopoides.*

1. Uraria picta Desv. Journ. Bot. I, 123 t. 5 f. 19. An erect little-branched suffruticose perennial 3–6 feet high, with stout finely downy stems ·5 in. or more in diam. at base. *Leaves* 10–12 in. long, rachis finely downy; leaflets terminal and in 2–4 opposite pairs, linear-lanceolate, rigidly subcoriaceous, glabrous clouded with white above, finely reticulate veined and minutely pubescent beneath, 4–8 in. long ·3–6 in. wide; petiole 2–2·5 in. long, stipules lanceolate long-acuminate from a broad base ·5 in. long with parallel veins, stipels subulate ·2 in. long; the lowest leaves simple or 3-foliolate, round or oblong. *Racemes* in dense cylindric heads 6–12 in. long, ·65–·75 in. broad; bracts brown scariose deciduous, upper lanceolate lower ovate-acuminate; pedicels ·25–·35 in. long, covered with short bristles, abruptly incurved at the tip after flowering. *Calyx* ·2 in. long. *Corolla* purple, exserted, ·3 in. long. *Pod* glabrous, pale lead-coloured, joints 3–6, smooth polished, ·13 in. long ·1 in. wide, compressed. DC. Prodr. II, 324; Wall. Cat. 5674; Miq. Flor. Ind. Bat. I, 267; Bak. in Flor. Brit. Ind. II, 155. *U. linearis* Hassk. Pl. Jav. Rar. 349. *Hedysarum pictum* Jacq. Ic. t. 567; Roxb. Hort. Beng. 57. *Doodia picta* Roxb. Flor. Ind. III, 368.

Perak; *Scortechini!* Prov. Wellesley; *Ridley* 6958! Nicobars; Kamorta, *Kurz!* Distrib. India; Indo-China; Malay Islands.

2. Uraria crinita Desv. Journ. Bot. I, 123. An erect little-branched perennial 3–8 feet high, with stout finely downy stems ·75 in. or more in diam. at base. *Leaves* 8–15 in. long, rachis sparingly puberulous, leaflets terminal and in 2–3 opposite pairs, ovate-oblong acute, subcoriaceous, glabrous, green above, finely reticulate-veined and minutely tomentose beneath, 3–4 in. long, 1–1·5 in. wide, base rounded; petiole 3–4 in. long, stipules lanceolate acuminate ·6 in. long, puberulous; stipels lanceolate ·15 in. long; the lowest leaves simple or trifoliolate, ovate or subcordate. *Racemes* in dense cylindric heads 8–18 in. long, 1–1·5 in. broad; bracts scariose deciduous ovate-acuminate, ciliate;

pedicels .45–.65 in. long, covered with long spreading bristles, abruptly incurved at the tip after flowering *Calyx* .2 in. long, teeth sparingly plumose. *Corolla* pale-purple, .3 in. long. *Pod* puberulous, joints 4–6, black, dull, .13 in. long, .1 in. wide, compressed. DC. Prodr. II, 324; Wall. Cat. 5675; Miq. Flor. Ind. Bat. I, 268; Bak. in Flor. Brit. Ind. II, 155. *U. comosa* DC. Prodr. II, 324. *U. picta* Wight, Ic t. 411, not of Desv. *Hedysarum crinitum* Linn. Mant. I, 102; Burm. Flor. Ind. 169 t. 56; Roxb. Hort. Beng. 57. *Doodia crinita* Roxb. Flor. Ind. III, 369.

Pahang; Renchong, etc. *Ridley!* Perak; Thaipeng, *Scortechini* 71! Sunga Ryah, *Kunstler* 1011! Malacca; *Maingay* 527! Singapore; *Hullett* 49! *Ridley* 8110! Distrib. India, Indo-China, China, Malay Islands.

3. Uraria lagopoides DC. Prodr. II, 324. A tufted woody perennial with slender trailing pubescent much branched stems 1–3 feet long. *Leaves* 1·5–2 in., rachis pubescent; leaflets solitary, or a terminal and one pair of opposite leaflets, oblong rhomboid or rounded, base rounded truncate or at times cordate, thickly membranous, green glabrous above, finely reticulate-veined, pubescent beneath, 1–2 in. long .75–1 in. wide; lateral pair of leaflets when present always much smaller than terminal; petiole .5–.75 in.; stipules lanceolate .2 in.; stipels subulate small. *Racemes* in short dense simple oblong heads, 1–2·5 in. long, .8 in. wide; bracts subpersistent distinctly ciliated, .3 in. long; pedicels densely crinite, .15 in. long. *Calyx* .12 in., lower teeth setaceous, densely plumose. *Corolla* pale-purple, .2 in. long. *Pods* glabrous, joints thick, reticulate, .15 in. long, .08 in. wide, compressed. Miq. Flor. Ind. Bat. I, 268; Bak. in Flor. Brit. Ind. 156. *U. retusa* Wall. Cat. 5680. *Hedysarum lagopodioides* Linn. Sp. Pl. 1198. *H. lagopoides* Burm. Fl. Ind. 68, t. 53, f. 2. *Lespedeza lagopoides* Pers. Synops. II, 308. *Doodia lagopodioides* Roxb. Flor. Ind. III, 366.

Pahang; *Ridley* 2594! Perak; *Scortechini* 13! Prov. Wellesley; *Ridley* 8010! Andamans; *King's Collectors!* Distrib. India; Indo-China; China; Malay Islands.

39. Lourea Neck.

Herbs. *Leaves* membranous, stipellate, 1–3-foliolate. *Flowers* in terminal simple or panicled racemes. *Calyx* membranous, accrescent, the lanceolate teeth as long as the campanulate tube. *Corolla* equalling or exceeding the calyx; standard broad; keel obtuse. *Stamens* diadelphous; anthers uniform. *Ovary* few-ovuled; style filiform, inflexed, stigma capitate. *Pod* of about 4 small distinct 1-seeded smooth veined joints, included in the calyx. Species 4; all originally East Indian.

Lourea Vespertilionis Desv. Journ. Bot. I. 122, t. 5 f. 18. An erect slender herb, sparingly subfastigiately branched; branches towards their tips finely downy with hooked hairs. *Leaf-rachis* ·5–1 in., leaflets usually 1 terminal, rarely 3; rigidly subcoriaceous, green usually clouded with white, the terminal one 2–3 in. broad, ·3–·5 in. long with two linear or lanceolate spreading or slightly ascending 2–3-nerved halves, apex of each lobe broadly emarginate bristle-tipped; lateral leaflets, when present, much smaller, obliquely obversely deltoid. *Racemes* simple or slightly panicled; 3–6 in. long; pedicels pubescent, shorter than calyx, the lower geminate. *Calyx* membranous campanulate; in fruit ·25–·35 in. long, sparsely pubescent with spreading hairs; teeth as long as tube, wide-triangular with a strong central nerve and widely reticulate-veined, as is the tube, with slightly weaker secondary nerves. *Corolla* not longer than calyx. *Pod* included, 4–5-jointed. DC. Prodr. II, 323; Wall. Cat. 5671; Miq. Flor. Ind. Bat. I, 264; Bak. in Flor. Brit. Ind. II, 154. *Hedysarum Vespertilionis* Linn. fil. Suppl. 331; Roxb. Hort. Beng. 57; Flor. Ind. III, 352.

Malayan Peninsula; exact locality not given, *Sir W. Norris!* Distrib. Now cosmopolitan in the tropics, but often only planted.

40. Alysicarpus Neck.

Diffuse annuals or biennials. *Leaves* simple, rarely 3-foliolate, stipellate, subcoriaceous. *Flowers* in copious axillary racemes. *Calyx* glumaceous; teeth deep, often imbricated, the two upper often connate. *Corolla* not exserted; standard broad; keel obtuse, adhering to the wings. *Stamens* diadelphous; anthers uniform. *Ovary* nearly or quite sessile, many-ovuled; style incurved, stigma capitate. *Pod* terete or turgid, composed of several indehiscent 1-seeded joints. Species about 15; weeds, everywhere in the tropics of the old world.

Alysicarpus vaginalis DC.; Miq. Flor. Ind. Bat. I, 231. A robust ascending herb, stems 1–3 feet long (var. *typica*); or a dwarf diffuse herb with very slender stems and branches spreading 8–12 in. (var. *nummularifolia*); the branchlets slightly downy. *Leaves* always 1-foliolate, petioles ·3 in. long, slender, glabrous, stipules subscarious parallel-veined ovate-acute half as long as petioles; leaflets glabrous cordate at base, lowest lanceolate 1·5–2 in. long, ·5 in. broad acute, with upper oblong obtuse 1–1·5 in. long and 1 in. wide (in one series of forms); or lowest oblong ·75 in. long subacute, the upper ·5 in. long ovate-obtuse all ·3 in. wide (in a second series of forms). *Racemes* 8–12-fld. lax-fld. 1–3 in. long (var. *typica*) or congested under 1 in. long (var. *nummularifolia*); pedicels shorter than calyx. *Calyx* ·12 in. glabrescent, teeth linear-setaceous longer than tube. *Corolla* pale-yellow tinged with

pink, small, included. *Pod* terete, reticulate-veined, ·5–·75 in. long, ·08 in. wide; joints 6–8, half as long again as broad; faintly pubescent, slightly thickened at the ends. Bak. in Flor. Brit. Ind. II, 158.

Var. *typica*. Stems stouter ascending, lower leaves usually lanceolate and upper oblong, occasionally lower leaves oblong and upper ovate, racemes lax. DC. Prodr. II, 353; W. & A. Prodr. 233. *A. diversifolius* Wall. Cat. 5772. *A. Harnieri* Schweinf. Rel. Kotsch. 24 t. 19. *Hedysarum vaginale* Linn. Sp. Pl. 746; Roxb. Hort. Beng. 56; Flor. Ind. III, 345.

Pangkore; *Scortechini* 1461! Malacca; on Pulo Besai, *Maingay* 516! Singapore; Changi, *Ridley* 1080!

Var. *nummularifolia* Miq. *loc. cit.*; Bak. *loc. cit.* Stems slender diffusely spreading, lower leaves always oblong, upper ovate, racemes dense. *A. nummularifolius* DC. Prodr. II, 353; Wall. Cat. 5767; W. & A. Prodr. 133. *A. varius* Wall. Cat. 5768. *Hedysarum nummularifolium* Linn. Sp. Pl. 746. *H. varium* Roth. Nov. Sp. 354. *H. cylindricum* Poir. Encyc. Meth. Suppl. V, 400. *Hegetschweilera pulchella* Regel, Bot. Zeit. I, 47.

Andamans; Gt. Coco Isd. *Prain!* Port Blair, *King!* Perak; *Scortechini! Ridley* 8008! Penang; Water-fall, *Curtis* 1892! 1893! Malacca; *King! Hervey!* Singapore; on Pulo Obin, *Kunstler* 4!

The writer has followed Miquel and Baker in uniting these two plants which Linnæus, De Candolle, Wallich and Wight have endeavoured to keep distinct. The difficulty that has arisen in distinguishing them, has been due to the fact that *A. vaginalis*, though always diagnosed as having lower leaves lanceolate and upper leaves oblong, in reality very often has the lower oblong and the upper ovate as in *A. nummularifolius*. The true distinguishing characters are the spreading habit and condensed racemes of the variety, the ascending stems and lax racemes of the typical plant. The description and the varietal diagnoses now given may, it is hoped, prevent a recurrence of the difficulty that has hitherto been experienced in differentiating the two.

41. Desmodium Desv.

Herbs or shrubs. *Leaves* 1- or 3-foliolate, stipellate. *Flowers* small usually in copious often dense racemes. *Calyx* campanulate; teeth longer or shorter than the tube the two upper often subconnate. *Corolla* exserted; standard broad; wings more or less adherent to the usually obtuse keel. Upper *stamen* entirely or partially free from the other united 9. *Ovary* sessile or stipitate, few- or many-ovuled; style incurved, stigma minute capitate. *Pod* usually composed of several 1-seeded indehiscent joints, the faces compressed, the upper suture rarely finally splitting open, the joints usually separating. Species about 150; cosmopolitan in tropical and subtropical countries, a few in temperate N. America and temperate S. Africa.

Pod distinctly divided into several separating one-seeded joints:—

Leaves 3-foliolate:—

Small trailing herbs with 1–3 axillary flowers (1. *Sagotia*):—

Pedicels hardly exceeding the petioles; leaflets obovate-cuneate, truncate or emarginate ... 1. *D. triflorum.*

Pedicels distinctly longer than petioles; leaflets oblong rounded at apex ... ... 2. *D. heterophyllum.*

Undershrubs or shrubs with woody branches:—

Bracts large, 2-foliolate, persistent (2. *Phyllodium*).. 3. *D. pulchellum.*

Bracts small, simple, deciduous:—

Flowers in dense short-peduncled axillary umbels (3. *Dendrolobium*):—

Leaflets smooth, veins beneath indistinct; pods glabrous ... ... 4. *D. umbellatum.*

Leaflets rugose, reticulate-veined beneath; pods strigose ... ... 5. *D. rugosum.*

Flowers in more or less elongated racemes:—

Lowest joint of pod distinctly stalked, *constrictions between joints reaching from lower almost to upper suture* (4*a*. *Eudesmodium* § *Podocarpium*) .. .. 6. *D laxum.*

Lowest joint of pod sessile:—

Joints of pod not manifestly longer than broad:—

Joints of pod indehiscent, leaflets large acuminate (4*b*. *Eudesmodium* § *Dollinera*).. 7. *D. megaphyllum.*

Joints of pod opening along lower suture, leaflets small (4*c*. *Eudesmodium* § *Nicholsonia*):—

Leaflets obovate-cuneate silvery beneath; pedicels always ultimately reflexed; stems prostrate .. .. 8. *D. capitatum.*

Leaflets obovate-cuneate or obovate-acute, not silvery beneath; pedicels erect or ascending; stems erect ... 9. *D. polycarpum.*

Joints of pod 4 times as long as broad (4*d*. *Eudesmodium* § *Scorpiurus*) ... 10. *D. laxiflorum.*

Leaves 1-foliolate:—

Petioles not winged:—

Joints of pod 4 times as long as broad (4*d*. *Eudesmodium* § *Scorpiurus*) ... ... 11. *D ormocarpoides.*

Joints of pod not manifestly longer than broad (4*e* *Eudesmodium* § *Heteroloma*):—

Racemes lax, pods glabrescent ... ... 12. *D. gangeticum.*

Racemes dense, pods densely pubescent ... 13. *D. virgatum.*

Petioles broadly winged (5. *Pteroloma*):—

Pods thin, densely strigose ... ... 14. *D. triquetrum.*

Pods coriaceous, quite glabrous ... ... 15. *D. auriculatum.*
Pods indistinctly jointed, not separating into segments but dehiscing in a continuous line along the ventral suture (6. *Pleurolobium*) ... ... 16. *D. gyroides.*

Subgen. 1. Sagotia Walp. Trailing *herbs*, with small 3-foliolate stipellate leaves. *Flowers* in sparse lax racemes or 1–2 in the axils of the leaves; bracts deciduous and pods distinctly jointed.

1. Desmodium triflorum DC. Prodr. II, 334. A small trailing herb with very slender diffusely branching stems 6–18 in. long; branches sparsely hirsute with fine spreading hairs. *Leaves* ·5 in. long, 3-foliolate; petiole ·2 in. long; leaflets membranous obovate-cuneate, apex truncate or emarginate, terminal ·25 in. long ·2 in across, lateral ·2 in. long ·15 in. across, glabrous above sparsely adpressed-hirsute beneath; stipels minute subulate, stipules persistent lanceolate ·15 in. long. *Inflorescence* of 1–3-fld. axillary fascicles; pedicels ·25 in., bracteoles minute. *Calyx* pubescent with longish white hairs ·1–·15 in. long; teeth setaceous longer than narrowly campanulate tube. *Corolla* pink or occasionally white ·2 in. long. *Pod* ·4–·6 in. long, ·15 in. wide; joints 3–5, reticulately veined and finely puberulous; upper suture straight, lower distinctly indented between the joints. Wall. Cat. 5734 (except part of F.); Benth. in Mart. Flor. Bras. XV, 95, t. 26; Miq. Flor. Ind. Bat. I, 238; Bak. in Flor. Brit. Ind. II, 173. *D. triflorum* var. *minus* W. & A. Prodr. 229; Wight Ic. t. 292. *D. heterophyllum* Wall. Cat. 5701 C. *Hedysarum triflorum* Linn. Sp. Pl. 749; Roxb. Hort. Beng. 57; Flor. Ind. III, 353. *H. stipulaceum* Burm. Flor. Ind. t. 54, f. 2. *Nicholsonia reptans* Meissn. in Linnaea XXI, 260. *Sagotia triflora* Walp. & Duch. in Linnaea XXIII, 738.

Andamans; Port Blair, *Kurz! Prain!* Great Coco Island (specns. all white-fld.) *Prain!* Malacca; *Maingay* 522! Prov. Wellesley; *King!* Penang; *Wallich* 5734 I! Distrib. Cosmopolitan in the tropics.

An extremely common species in India, not so common in Indo-China; very rare, perhaps only a recently introduced weed, in Malaya.

2. Desmodium heterophyllum DC. Prodr. II, 334. A trailing herb with slender diffusely branching stems 2–2·5 feet long; branches densely hirsute with spreading hairs. *Leaves* 1–1·5 in. long, 3-foliolate, petiole ·5 in. long; leaflets membranous oblong or obovate-oblong apex rounded or subacute, terminal ·5–1 in. long, ·3–·5 in. wide, lateral similar ·25–·5 in. long ·2–·25 in. wide, glabrous above, hairy beneath; stipels minute subulate, stipules persistent lanceolate ·15 in. long. *Inflorescence* of solitary or geminate axillary flowers and, towards ends of branches, of a few axillary lax few-fld. racemes; pedicels ·5–·8 in. long, sparsely pubescent with rusty spreading hairs; bracts ·2 in. long, ovate-lanceolate, deciduous, bracteoles minute. *Calyx* ·15 in. densely hirsute,

teeth setaceous, longer than narrowly campanulate tube. *Corolla* pale-purple, ·25 in. long. *Pod* ·5–·75 in. long, ·18 in. wide; joints 4–5, reticulate, glabrescent except the lower suture, dehiscent; upper suture straight lower distinctly indented between the joints. Wall. Cat. 5701, letters A. B. D.; Miq. Flor. Ind. Bat. I, 238; Bak. in Flor. Brit. Ind. II, 173. *D. cæspitosum* DC. Prodr. II, 333. *D. triflorum* Wall. Cat. 5734, letter F. in part. *D. triflorum* VAR. *majus* W. & A. Prodr. 229; Wight, Ic. t. 291. *Hedysarum heterophyllum* Willd. Sp. Pl. III, 1201. *H. reptans* Roxb. Hort. Beng. 57; Flor. Ind. III, 354. *Dicerma repens* Grah. in Wall. Cat. 5740.

In all the provinces, very common. DISTRIB. Throughout tropical S.-E. Asia.

Though very like the preceding this is quite easily distinguished by its thicker stems, larger and differently shaped leaflets, much longer pedicels and rather broader pods, the joints of which usually dehisce along the lower suture.

The distribution in India and Malaya of these two species, is reversed. In India this is quite a rare plant, *D. triflorum* being common everywhere; in Malaya, on the other hand, *D. triflorum* is very rare while *D. heterophyllum* is extremely common and is apparently the representative of the other.

SUBGEN. 2. PHYLLODIUM Desv. *Shrubs* with woody branches and 3-foliolate leaves. *Flowers* umbellate, the umbels in long continuous rows, each hidden by a pair of persistent bracts.

3. DESMODIUM PULCHELLUM Benth. ex Bak. in Flor. Brit. Ind. II, 162. A small shrub 4–5 feet high with slender terete finely grey-downy branches. *Leaves* 5–6 in. long, 3-foliolate, petiole ·25–·4 in., channelled above, downy; leaflets coriaceous green subrugose above, finely downy beneath, narrow-ovate to ovate-lanceolate subacute, terminal 3–4 in. long 1·5 wide, on petiolules ·6 in. long; lateral pair much smaller, 1·25 in. long, ·75 in. wide, petiolules ·15 in. long; lateral nerves 10–12 pairs, very oblique distinctly raised beneath, secondary reticulate cross-venation visible; stipels subulate as long as petiolules, stipules ·25 in. long subscarious closely parallel-veined, subpersistent. *Inflorescence* axillary or terminal, 3–10 in. long, in racemes of solitary flowers, fascicles, or small subumbellate corymbs, in the axils of 12–40 compound foliar bracts; *bracts* 2-foliolate, their stipules ·2 in. and petiole ·15 in. long, leaflets opposite subobliquely orbicular ·5 in. across, glabrous externally, finely downy internally, on very short stipellate petiolules, their terminal leaflet reduced to a bristle ·2–·25 in. long; fascicles or close-set corymbs 2–6-fld.; pedicels slightly unequal, ·08–·10 in., downy. *Calyx* ·1 in. puberulous, teeth lanceolate shorter than tube. *Corolla* ·25 in. yellow. *Pod* ·2–·3 in. long indented on both sutures slightly puberulous; joints 2, less often solitary, very rarely 3, ·1 in. long, ·12 in. broad. *Hedysarum pulchellum* Linn. Sp. Pl. 747; Roxb. Flor. Ind. III, 361.

Zornia pulchella Pers. Synops. II, 318. *Dicerma pulchellum* DC. Prodr. II, 339; Wall. Cat. 5737; Wight, Ic. t. 418. *Phyllodium pulchellum* Desv. Journ. Bot. III, 123, t. 5, f. 24; Benth. Pl. Jungh. 217; Miq. Flor. Ind. Bat. I, 260.

Malacca; *Griffith.* Pahang; *Ridley* 2596! Johore; *Kunstler* 376! Perak; *Scortechini!*

Subgen. 3. Dendrolobium W. & A. *Shrubs* with woody branches and 3-foliolate leaves. *Flowers* in dense short-peduncled or sessile axillary umbels, bracts minute deciduous.

4. Desmodium umbellatum DC. Prodr. II, 325. A littoral shrub 5–15 feet high with densely downy terete young branches. *Leaves* 5–7 in. long, 3-foliolate, petiole 1 in. long, channelled above, rusty-puberulous; leaflets subcoriaceous, green glabrous above, paler and thinly canescent underneath, ovate-oblong obtuse or rarely acute or subacute, terminal 3–3·5 in. long, 2–2·5 in. wide on a petiolule ·5 in. long, the lateral pair similar but smaller 2–2·5 in. long, 1·25–1·75 in. wide on petiolules ·2 in. long; lateral nerves 6–8 pairs hardly raised beneath; stipels very small, subulate, half as long as petiolules; stipules large ·3 in. long, subscarious, closely parallel-veined, caducous with the unfolding of leaf next above which they cover in bud. *Inflorescence* axillary, with peduncles ·35 in. long, in 6–12-fld. corymbs simulating umbels; pedicels short ·15 in. or less, elongating in fruit to ·25 in., unequal, very close-set. *Calyx* with a broad scarious deciduous bracteole, ·1 in. long ·07 in. wide, at its base, densely silky externally, ·15 in. long, teeth lanceolate, as long as tube. *Corolla* ·5 in. long, white. *Pod* 1·5–2 in. long, joints 4, very rarely 5, ·3 in. long, ·25 in. wide, sparsely silky when young, glabrous when ripe, thick and coriaceous almost turgid. W. & A. Prodr. 224; Wall. Cat. 5687; Bak. in Flor. Brit. Ind. II, 161. *Dendrolobium umbellatum* Benth. Pl. Jungh. 218; Miq. Flor. Ind. Bat. I, 262. *Hedysarum umbellatum* Linn. Sp. Pl. 747. *H. arboreum* Roxb. Flor. Ind. III, 360.

In all the provinces, common on the coasts. Distrib. On all coasts from the Mascarene Islands to Polynesia.

A curious variety of this species, with branches, leaves beneath, and ripe pods softly silky, is var. *hirsutum* DC. It is known only from specimens cultivated in Hort. Calcutta (*Wall. Cat.* n. 5687/D) and in Hort. Bogor.—the Buitenzorg specimens being marked "*E horto Calcuttensi recepta.*" The original habitat of this variety is unknown.

D. umbellatum has been said to occur in Upper Burma; this is a mistake caused by Dr. Wallich having issued (as 5687/β) a totally different species under the same name. No one has ever sent specimens of *D. umbellatum* to Calcutta except from sea-coasts and the shores of tidal rivers.

5. Desmodium rugosum Prain. A large gregarious shrub with

rusty-puberulous angular young branches. *Leaves* 5–7 in. long, 3-foliolate, petiole 1 in. long, channelled above, rusty-puberulous; leaflets coriaceous rugose, puberulous on the midrib and nerves above, densely rusty-puberulous beneath on the midrib lateral nerves and secondary veins; obovate-acute, terminal 4 in. long 2·5 in. wide, on a petiolule ·5 in. long; lateral pair oblong-acute base obliquely rounded, 3·5 in. long 1·75–2 in. wide, on petiolules ·15 in. long; lateral nerves 10–12 pairs very prominent beneath as is the close reticulate secondary venation; stipels subulate, ·12 in., nearly as long as petiolules; stipules subscarious caducous. *Inflorescence* axillary, with peduncles ·25 in. long, in 3–6-fld. corymbs simulating umbels but with the rachis produced for ·3 in. or more in the centre and marked by numerous close-set scars left by fallen pedicels; pedicels that persist ·2 in. long, elongating slightly in fruit. *Calyx* with a broad scarious deciduous bracteole ·1 in. long at its base, pubescent externally, ·2 in. long, teeth longer than tube. *Corolla* ·5 in. long, white. *Pod* 1·5 in. long, joints 4, ·3 in. long ·25 in. wide, densely adpressed-pubescent with coarse rusty hairs, thick, coriaceous, almost turgid.

Kedah; Langkawi, *Curtis* 2550! Distrib. Tenasserim.

Very nearly related to the preceding species but with quite different foliage and pods. Very nearly related also to *D. Wallichii* (*D. umbellatum* Wall. Cat. n. 5687 *letter* B only) from Upper Burma, but with larger pods, and coarser, more rugose acute leaves than in that species; indeed, *D. Wallichii* with the inflorescence of *D. rugosum* has foliage more resembling that of *D. umbellatum*. The stipules of *D. Wallichii* do not fall immediately after the unfolding of the leaf next above, as in the case of *D. umbellatum* and *D. rugosum*.

Desmodium (Dendrolobium) *Cephalotes* Wall. is stated by Dr. Miquel to occur in Java. No Malayan specimens of the species, which is very common throughout India and Indo-China, have yet reached Calcutta. Its presence, however, would not be surprising and the species should be looked for by collectors in the Malay Peninsula.

Subgen. 4. Eudesmodium. Erect *herbs* or *undershrubs* with large 1–3-foliolate leaves. *Flowers* often 2 or several from a node in long racemes simple or panicled, bracts deciduous and pods distinctly jointed.

§ Podocarpium Bth. Joints of pod indehiscent, longer than broad, the lowest one distinctly stalked, constrictions reaching from lower nearly to straight upper suture.

6. Desmodium laxum DC. Prodr. II, 336. A bush 2–4 feet high with angular erect finely-puberulous branches. *Leaves* 5–8 in. long, 3-foliolate, petiole 1–2·5 in., channelled above, finely sparsely puberulous; leaflets membranous, green and glabrous above, paler and sparsely hirsute on the nerves beneath, terminal narrow ovate, 4–6 in. long 1·5–2 in. wide, narrowed gradually to apex, cuneate at base on a petiolule ·75 in.

long, lateral nerves 3 pairs the lowest much stronger than the rest and very oblique; side leaflets similar but smaller, 3–4 in. long 1–1·5 in. wide, with slightly oblique bases; stipels subulate ·2 in. long; stipules linear-lanceolate ·5 in. long, persistent. *Inflorescence* in rather narrow terminal and axillary racemes, the former sometimes paniculate, 12–20 in. long, composed of as many distant solitary flowers or few-fld. fascicles, bracts minute linear; pedicels puberulous slender ·2 in., ultimately spreading ·4 in. long. *Calyx* very small ·08 in. long, tubular, slightly pubescent, teeth deltoid very short. *Corolla* pink, ·25 in. long. *Pod* 1–3 in. long, the lowest joint on a stalk ·3 in. long, joints few indehiscent ·5 in. long, ·2 in. wide, the constrictions nearly reaching the upper suture, cut obliquely from opposite the point to the base. *D. Gardneri* Bth. Pl. Jungh. 226; Miq. Flor. Ind. Bat. I, 255; Bak. in Flor. Brit. Ind. II, 165. *D. podocarpum* Miq. Ann. Mus. Lugd. Bat. III, 46 not of DC.

Perak; on Ulu Batang Padang, *Wray* 1608! Distrib. India; Himalayas; Indo-China; China; Malay Archipelago.

§ Dollinera Endl. Joints of pod indehiscent, hardly longer than broad, upper suture straight or slightly indented; calyx teeth not exceeding tube.

7. Desmodium megaphyllum Zoll. Nat. en Geneesk. Arch. III, 58. A straggling shrub 8 feet high with slightly grooved, blackish branches, with a sparse short tomentum. *Leaves* 7–9 in. long, 3-foliolate, petiole 2–2·5 in., channelled above, sparsely tomentose; leaflets subcoriaceous, green sparsely puberulous above, grey thickly softly woolly beneath; rhomboid ovate-acuminate terminal cuneate at base, 4–6 in. long, 2·5–3·5 in. wide, on petiolule 1–1·5 in. long; lateral pair similar but smaller 3–4 in. long, 1·5–2·5 in. wide with obliquely rounded base; lateral nerves 5–6 pairs very oblique; stipels linear ·25 in. long; stipules subscarious ·15 in. long, lanceolate. *Inflorescence* longer than the leaves, in axillary and terminal racemes, the latter sometimes panicled, 8–10 in. long, of 25–30 few-fld. fascicles; pedicels slender ·4 in. long, bracts ·5 in. long, subscarious, lanceolate, bracteoles minute subulate. *Calyx* campanulate ·15 in. long, teeth triangular as long as tube. *Corolla* pale-violet, ·3 in. long. *Pod* dull-crimson, 2–2·25 in., 6–8-jointed, joints ·25 in. long ·2 in. wide, indehiscent, slightly puberulous, finely reticulate-veined, slightly indented on the lower suture. Miq. Flor. Ind. Bat. I, 245, excluding synonyms.

Perak; upper part of Batang Padang Valley, at 2,000 feet, *Wray* 1441! Distrib. Java, Tenasserim.

§ Nicholsonia DC. Joints of pod dehiscent along lower suture, not longer than broad; upper suture straight, lower slightly indented.

8. Desmodium capitatum DC. Prodr. II, 336. A prostrate under-

shrub with elongated woody rounded branches, hoary-tomentose towards their tips, sometimes reaching 6 feet in length. *Leaves* 2–2·5 in. long, 3-foliolate, petiole ·6 in. long slightly grooved and glabrescent above, adpressed-tomentose beneath; leaflets subcoriaceous, green glabrescent above, densely white-silky pubescent beneath; obovate-cuneate apex rounded, terminal 1·25 in. long, 1 in. across, lateral similar but smaller ·75 in. long, ·5 in. across, lateral nerves about 8 pairs slightly visible beneath; stipels subulate ·1 in. long, stipules linear ·25 in. long. *Inflorescence* of dense axillary and terminal subsessile racemes 1–2 in. long; pedicels ·2–·25 in., abruptly reflexed in fruit; bracts small ovate-cuspidate ciliate, bracteoles minute. *Calyx* ·1 in., glabrescent, teeth setaceous longer than tube. *Corolla* purplish-red, ·2 in. long. *Pods* faintly puberulous, ·5–·75 in. long ·15 in. wide; joints 6–8, dehiscent along lower indented suture. Miq. Flor. Ind. Bat. I, 241; Bak. in Flor. Brit. Ind. II, 170. *D. obovatum* Wall. Cat. 5722 B. *D. polycarpum* W. & A. Prodr. 227, in part. *Hedysarum capitatum* Burm. Fl. Ind. 167, t. 64, f. 1. *H. conicum* Poir. Encyc. Meth. VI, 419. *Pseudarthria capitata* Hassk. Pl. Jav. Rar. 390.

Perak; Durian, S. Batang, *Kunstler* 361! Thaipeng, *Scortechini!* Pahang; Palan Tawa, *Ridley* 2598*a*!

9. Desmodium polycarpum DC. Prodr. II, 334. An erect or suberect undershrub or shrub 2–5 feet high with woody angular slender branches shortly tomentose towards their tips. *Leaves* 2–4 in. long, 3-foliolate, petiole ·6–1 in. long, slightly grooved glabrous above, sparsely adpressed-pubescent beneath; leaflets subcoriaceous, pale-green glabrous above, thinly adpressed-hirsute beneath, usually obovate-cuneate apex round, sometimes ovate-acute (*D. ovalifolium* Wall.), 1·25–3 in. long 1–1·5 in. across, lateral similar but smaller, ·75–1·25 in. long ·5–·75 in. across, lateral nerves about 6 pairs indistinct; stipels subulate ·2 in. long, stipules linear ·3 in. long. *Inflorescence* of dense axillary and terminal subsessile racemes 1–4 in. long; pedicels ·2 in. long ascending; bracts ovate-cuspidate ciliate ·25 in. long, bracteoles minute. *Calyx* ·1 in., glabrescent, teeth setaceous longer than tube. *Corolla* pinkish-purple, ·2 in. long. *Pods* usually faintly or (*D. ovalifolium*) densely ciliate, ·5–·75 in. long. ·15 in. wide; joints 6–8, dehiscent along lower indented suture. W. & A. Prodr. 227; Wight Ic. t. 406; Miq. Flor. Ind. Bat. I, 242; Bak. in Flor. Brit. Ind. II, 171. *D. angulatum* Wall. Cat. 5727 in part, not of DC. *D. siliquosum* DC. Prodr. II, 336. *D. heterocarpum* DC. Prodr. II, 337. *D. retusum* G. Don, Gen. Syst. II, 297. *D. gyroides* Hassk. Pl. Jav. Rar. 362, not of DC. *D. Buergeri* Miq. Ann. Mus. Lugd. Bat. III, 45. *D. nervosum* Vogel, Pl. Meyen. 28. *D. patens* Wight Ic. t. 407. *Hedysarum polycarpum* Lamk. Ill. t. 628.

H. siliquosum Burm. Fl. Ind. 169, t. 55, fig. 2. *H. heterocarpon* Linn Sp. Pl. 747. *H. purpureum* Roxb. Hort. Beng. 57; Fl. Ind. III, 358. *H. retusum* Don Prodr. 243. *H. patens* Roxb. Fl. Ind. III, 362.

Var. *typica;* leaves obovate-cuneate rounded at apex; pods faintly puberulous.

In all the provinces, extremely common. Distrib. East Africa, India, Malaya, Indo-China, China, Polynesia.

Var. *ovalifolia;* leaves ovate-acute base rounded or truncate; leaflets beneath sometimes softly silky; pods pubescent with spreading hairs. *D. ovalifolium* Wall. Cat. n. 5730.

Penang; *Wallich!* Perak; Goping, *Kunstler* 1007! Distrib. Sumatra (*Forbes* n. 1256!)

There are several more or less distinct forms of *D. polycarpum* most of which are readily recognisable, though all are connected with each other and with typical *D. polycarpum* by means of many intermediates. The form here defined as var. *ovalifolia* has no intermediates, however, and so far as material hitherto collected goes, might even be treated as a separate species. But its habit and its flowers are so exactly those of *D. polycarpum* that it seems better to consider the differences of leaves and fruit as merely varietal.

§ Scorpiurus Bth. Joints of pod indehiscent much longer than broad constricted along both sutures.

10. Desmodium laxiflorum DC. Prodr. II, 335. An erect undershrub 2–5 feet high with woody slender obtusely angled stems, at first densely clothed with short hairs at length glabrescent. *Leaves* 6–20 in. long, 3-foliolate, petiole 1·5–2·5 in., pubescent with adpressed hairs, grooved above; leaflets membranous or subcoriaceous, green and glabrous above, sparsely adpressed-hirsute beneath, terminal ovate-acute base rounded or cuneate, 4–6 in. long 1·5–3 in. across with petiolule 1 in. long, lateral nerves prominent beneath 7–10 pairs; lateral leaflets similar but smaller 1·5–2·5 in. long, 1·–1·5 in. wide, base obliquely rounded, petiolule very short; stipels subulate ·2 in. long; stipules ovate long-acuminate, ·3 in. long. *Inflorescence* in axillary and terminal racemes 6–10 in. long, of 12–20 distant solitary flowers or few-fld. fascicles; bracts and bracteoles minute linear or setaceous; rachis puberulous with adpressed hairs as are the ultimately patent pedicels ·2–·25 in. long. *Calyx* ·1 in., pubescent, tube campanulate, teeth lanceolate as long as tube. *Corolla* white, ·2 in. long. *Pod* 1–1·75 in. long, pendulous, ·1 in. wide, joints ·3 in. long, indehiscent, hardly constricted at the sutures and not ribbed, closely beset with short hooked hairs. Miq. Flor. Ind. Bat I, 251; Bak. in Flor. Brit. Ind. II, 164. *D. bicolor* Wall. Cat. 5719. *D. elongatum* Wall. Cat. 5715. *D. leptostachyum* Wall. Cat. 5697 B. *D. sulcatum* Wall. Cat. 5736. *D. recurvatum* Grah. in Wall. Cat. 5717; W. & A. Prodr. 226; Wight Ic. t. 374. *D. diffu-*

sum DC. Prodr. II, 335, non 336. *Hedysarum recurvatum* Roxb. Hort. Beng. 57; Fl. Ind. III, 358; Wight, Ic. t. 409. *H. diffusum* Roxb. Fl. Ind. III, 357, not of Willd. *H. Roxburghii* Spreng. Syst. App. 292. *H. Rottleri* Spreng. Syst. III, 320.

Andamans; Great Coco, *Prain!* Nicobars; Kondil, *Kurz!* Distrib. Throughout India, Indo-China and Malaya.

11. Desmodium ormocarpoides DC. Prodr. II, 327. An erect undershrub 2–5 feet high with woody slender obtusely angled stems, at first densely clothed with short hairs at length glabrescent. *Leaves* 5–7 in. long, 1-foliolate, petiole ·75 in. long, pubescent with spreading hairs, channelled above; leaflet subcoriaceous, green and glabrous above, sparsely pubescent to closely silky beneath, ovate-acute, base rounded or truncate, 4–6 in. long 1·5–2·25 in. wide, lateral nerves 6–8 pairs visible beneath; stipels subulate, ·2 in. long; stipules ovate long-acuminate scarious, ·3 in. long, subpersistent. *Inflorescence* in terminal or rarely axillary racemes 6–10 in. long, of 12–20 distant solitary flowers or few-fld. fascicles; bracts and bracteoles minute linear or setaceous; rachis puberulous with rusty tomentum as are the ultimately patent pedicels ·25–·35 in. long. *Calyx* ·1 in. pubescent, tube campanulate, teeth short deltoid. *Corolla* white, ·2 in. long. *Pod* 3–4 in. long, pendulous, ·15 in. wide; joints 6–8, ·6 in. long, indehiscent, constricted at both sutures, longitudinally ribbed, closely beset with short hooked hairs. Miq. Flor. Ind. Bat. I, 249; Bak. in Flor. Brit. Ind. II, 164. *Hedysarum adhaerens* Poir. in Lamk. Encyc. Meth. V, 15 not of Vahl. *H. ormocarpoides* Desv. ex DC. Prodr. II, 327. Rumph. Herb. Amboin. VI, t. 66.

Var. *velutina*; leaves softly silky beneath. *D. zonatum* Miq. Flor. Ind. Bat. I, 250.

Andamans; common in the interior of the Islands. Selangor; *Ridley* 7295! Pahang; Kwala Tembeling, *Ridley* 2605! Distrib. Java.

The typical form of this species has leaves very sparsely hairy beneath; it occurs in Java (*fide* De Candolle), and is common in India from Ceylon and the Pulney Mts. northwards to Assam.

§ Heterolsma Bth. Joints of pod indehiscent, hardly longer than broad; upper suture straight or slightly indented; calyx-teeth exceeding tube.

12. Desmodium gangeticum DC. Prodr. II, 327. A slender undershrub 1–4 feet high with woody obtusely angled glabrescent stems and angled adpressed-puberulous branches. *Leaves* 4–6 in. long, 1-foliolate, petiole ·75 in. long channelled and with a few adpressed hairs above; membranous or rarely subcoriaceous, green and glabrous above, a little paler adpressed-puberulous beneath; ovate-acute, base rounded or truncate, 3–5·5 in. long 1–2 in. wide, lateral nerves 8–9 pairs slightly

visible on both surfaces, cross-nervation slightly visible beneath; stipels subulate ·2 in. long; stipules linear subpersistent ·25 in. long. *Inflorescence* in copious ascending terminal and axillary racemes 6–12 in. long, of 30–40 rather close-set few-fld. fascicles; bracts and bracteoles minute setaceous; rachis adpressed-puberulous as are the fastigiate pedicels ·2–·25 in. *Calyx* finely pubescent, ·08 in., teeth lanceolate longer than campanulate tube. *Corolla* white, ·15 in. long. *Pod* subfalcate, ·5–·75 in. long, ·1 in. across, 6–8-jointed, indented on upper suture, joints indehiscent slightly longer than broad, minutely puberulous with hooked hairs. Wall. Cat. 5689; Miq. Flor. Ind. Bat. I, 247; W. & A. Prodr. 225; Wight, Ic. 271; Bak. in Flor. Brit. Ind. II, 168. *D. latifolium* Wight, Ic. t. 272 not t. 270. *Hedysarum gangeticum* Linn. Sp. Pl. 746; Roxb. Flor. Ind. III, 349. *H. collinum* Roxb. Flor. Ind. III, 349.

Penang; Pinara Bukit, *Curtis* 2771! Nicobars; Teressa, etc., *Jelinek* 233! *King's Collectors!*

13. Desmodium virgatum Zoll. Nat. en Geneesk. Arch. III, 58. A slender undershrub 1–4 feet high with angled adpressed-pubescent stems and branches. *Leaves* 4–6 in. long, 1-foliolate, petiole ·25 in. long channelled above, densely rusty-tomentose; membranous or subcoriaceous, pale-green glabrous above, adpressed-puberulous beneath; ovate-acute, base rounded or truncate, margin slightly sinuate, 3–5 in. long 1–2 in. wide, lateral nerves 8–9 pairs slightly visible on both surfaces; stipels subulate ·2 in. long; stipules short triangular, ·15 in. long. *Inflorescence* in copious ascending terminal and axillary racemes 3–8 in. long, of 20–30 close-set few-fld. fascicles; bracts and bracteoles minute setaceous, rachis densely rusty-tomentose; pedicels very short, ·08 in., glabrescent. *Calyx* glabrescent, ·08 in., teeth lanceolate longer than campanulate tube. *Corolla* pale-pink, ·2 in. long. *Pod* subfalcate, ·5–·75 in. long, ·1 in. across, 6–8-jointed, indented or upper suture, joints indehiscent as long as broad, densely clothed with short hooked hairs. Zoll., Flora (1847) 697. *D. latifolium* var. *virgatum* Miq. Flor. Ind. Bat. I, 247. *D. gangeticum* var. *acuminatum* Miq. Flor. Ind. Bat. I, 248. *D. latifolium* Bak. in Flor. Brit. Ind. II, 168, in part, hardly of DC.

Perak; Batu Kuran, *Scortechini* 1594! Distrib. Chittagong, Burma, Java.

This has the habit and foliage of *D. gangeticum*, but in flowers and especially in fruits, it more resembles *D. latifolium* to which indeed Miquel and Baker have referred it.

Subgen. 5. Pteroloma Desv. *Shrubs* with 1-foliolate leaves and winged petioles. *Flowers* racemose, bracts minute and keel acute.

14. Desmodium triquetrum DC. Prodr. II, 326. A shrub with

grooved triangular glabrescent branches. *Leaves* 5–6 in. long, 1-foliolate; petiole 1 in. long ·3 in. wide, with broad leafy reticulate-veined wings; blade 4–5 in. long ·75–1 in. wide, narrowly oblong-lanceolate with rounded or subcordate base and acute apex, green and glabrous on both surfaces, lateral nerves 15–20 pairs and secondary cross reticulate venation distinct on both surfaces especially beneath; stipules very large, ·5–·75 in. long ·2 in. wide, subscarious, closely parallel-veined persistent, stipels small adnate to upper margin of petiolar wing. *Inflorescence* in narrow axillary and terminal racemes 6–10 in. long, of solitary or fascicled flowers in the axils of 20–40 simple scarious bracts resembling foliar stipules with similar but much smaller stipulets at their base; pedicels ascending ·2–·3 in. long. *Calyx* ·15 in. long, very sparsely hairy, bracteolate at base, bracteoles narrow scarious linear; tube campanulate, teeth unequal, upper deltoid lower linear. *Corolla* purple, ·3 in. long. *Pod* 1–2 in. long, joints 6–8, thin, ·2 in. long, ·25 in. wide, densely persistently strigose with subadpressed greyish-brown hairs. Bak. in Flor. Brit. Ind. II, 163 in part only, the synonyms *D. alatum*, *D. auriculatum* and *D. pseudo-triquetrum* excluded. *Hedysarum triquetrum* Linn. Sp. Pl. 746. *H. alatum* Roxb. Flor. Ind. III, 348. *Pteroloma triquetrum* Benth. Pl. Jungh. 220; Miq. Flor. Ind. Bat. I, 258 excluding the synonyms *Desmodium pseudo-triquetrum* and *D. alatum*.

Andamans; common in the interior of the Islands. Perak; *Kunstler* 1074! *Scortechini!* Distrib. India and Indo-China.

This species is very easily recognised by its hairy pods. Some difficulty is at times found in separating flowering specimens of this from flowering specimens of the next species; the two are however quite distinct. Equally distinct are two other species, *D. alatum* and *D. pseudo-triquetrum*, quite justly differentiated by De Candolle but merged in *D. triquetrum* by Miquel, who has been followed in the *Flora of Brit. Ind.*

15. Desmodium auriculatum DC. Prodr. II, 326. A littoral shrub with grooved triangular glabrescent branches. *Leaves* 4–5 in. long, 1-foliolate, petiole 1 in. long ·3 in. wide, with broad leafy reticulate-veined wings; blade 3–4 in. long 1–1·5 in. wide, oblong or ovate-acute with truncate or cordate base and acute apex, green and glabrous on both surfaces, lateral nerves 10–12 pairs and secondary cross reticulate venation distinct on both surfaces, especially beneath; stipules large ·5 in. long ·2 in. wide, subscarious, closely parallel-veined, persistent, stipels adnate to tip of petiolar wing. *Inflorescence* in axillary and terminal racemes 5–8 in. long, of solitary or fascicled flowers in the axils of 12–20 simple scarious bracts; pedicels ascending, ·3 in. long. *Calyx* ·15 in. long, sparsely hairy, base bracteolate; tube campanulate shorter than the unequal teeth. *Corolla* purple, ·3 in. long. *Pod* 1–2 in. long,

joints 6–8 stoutish coriaceous, ·25 in. long ·3 in. wide, quite glabrous, polished. *D. triquetrum* Bak. in Flor. Brit. Ind. II, 163 in part, not of DC. *Pteroloma auriculatum* Miq. Flor. Ind. Bat. I, 258.

Andamans; coasts of Great Coco, *Prain!* of South Andaman, *Playfair! Kurz! Prain!* Distrib. Indo-China; Malay Archipelago.

Though common in Tenasserim where it has been collected by Wallich (n. 5788 M!) and Helfer (n. 1648!) as well as in Mergui where it has been obtained by Griffith (n. 568!) and Proudlock (n. 14!), this is not present in Calcutta from any locality within the Straits Settlements. It is rather more closely related to *Desmodium alatum*, which has broader pods, than to the preceding species, but it is equally distinct from both. It appears to be an almost exclusively littoral form; there are however two inland gatherings at Calcutta, both from Silhet and both collected by Mr. Clarke (n. 14352! and n. 42702!).

It should be noted that *Hedysarum alatum* Roxb. is not the species described by De Candolle as *Desmodium alatum*; Roxburgh's *H. alatum* is exactly equivalent to Linnaeus' *H. triquetrum*. Roxburgh's *H. triquetrum* on the other hand is not Linnæus' plant but is *Desmodium pseudo-triquetrum* DC., a species confined to Northern India, the lower Himalayan slopes, and the mountains of Assam. *D. alatum* DC., the plant with broad pods described in the *Prodromus*, occurs in Khasia, Cachar and Chittagong without appearing in India proper or in Burma and the Malay Peninsula; it recurs, however, in Java. The present species, *D. auriculatum*, has not been found in Java but is met with again in Timor.

Subgen. 6. Pleurolobium DC. Erect *undershrubs*, with large leaves. *Flowers* racemose; *pods* indistinctly jointed, dehiscing in a continuous line along the ventral suture.

16. Desmodium gyroides DC. Prodr. II, 316. A shrub about 10 feet high with terete sparsely pubescent branches. *Leaves* 2·5–3 in. long 3- or often only 1-foliolate, petiole ·75 in. long, slender glabrescent; leaflets membranous, oblong or ovate-oblong obtuse, pale-green glabrous above, very thinly adpressed-pubescent beneath, 1·75–2 in. long, 1–1·25 in. wide, lateral nerves 6–8 pairs visible beneath; lateral leaflets if present similar but much smaller, ·5 in. long, ·4 in. wide. *Inflorescence* in dense axillary and terminal at first strobilate racemes, with large imbricating scarious soon deciduous ovate-acute bracts, ·25 in. long ·2 in. wide, pedicels finely-pubescent at length patent, ·25 in. long. *Calyx* ·1 in., wide-campanulate, teeth triangular half as long as tube. *Corolla* ·35 in. long, ·2 in. across, purple. *Pod* 1–1·5 in. long, ·2 in. wide, falcate; joints 6–10, dehiscing along the lower slightly indented suture but not separating from each other, copiously pubescent with a felted rusty tomentum. Wall. Cat. 5728; W. & A. Prodr. 227; Miq. Flor. Ind. Bat. I, 243; Bak. in Flor. Brit. Ind. II, 175. *D. pseudogyroides* Miq. Flor. Ind. Bat. I, 244. *Hedysarum gyroides* Roxb. Hort. Beng. 57. *Codariocalyx gyroides* Hassk. Flor. (1842) Beiblatt. II, 49. *C. conicus* Hassk. in Walp. Rep. I, 744. *Pseudarthria polycarpa* Hassk. Pl. Jav. Rar. 393.

Perak; Kinta river, *Kunstler* 765! Distrib. India, Indo-China, Malaya.

42. Sophora Linn.

Trees or shrubs. *Leaves* odd-pinnate. *Flowers* showy, yellow or white or violet-purple, racemed or panicled. *Calyx* oblique subgibbous broadly campanulate; teeth deltoid very short. *Corolla* much exserted, standard broad; petals equal in length all with long claws; keel obtuse. *Stamens* free or only obscurely connate at the very base; anthers uniform versatile. *Ovary* stalked, many-ovuled; style incurved, stigma capitate. *Pod* moniliform, sublignose or membranous usually indehiscent, the joints turgid and usually terete. Species about 25; widespread in tropical and subtropical regions, a few temperate or alpine.

The above definition applies to the section *Eusophora*, to which the only Malayan species belongs.

Sophora tomentosa Linn. Sp. Pl. 373. An evergreen littoral shrub or small tree sometimes reaching 20 feet in height, with all parts at first softly and shortly tomentose. *Leaves* 6–12 in. long, leaflets 10–17 terminal and in subopposite pairs or often along proximal half of rachis distinctly alternate, elliptic to oval-obtuse 1–1·5 in. long, ·5–·75 in. wide, thinly coriaceous, with age glabrescent above, persistently softly pubescent beneath, petiolules very short densely pubescent as is the rachis. *Flowers* in terminal racemes 6 in. long on softly tomentose pedicels, ·3 in. long, with deciduous subulate basal bracteoles, ·15 in. long. *Calyx* obliquely truncate, ·35 in. long, obsoletely toothed, externally softly pubescent. *Corolla* yellow, glabrous, ·65 in. long; standard orbicular veined. *Stamens* almost free to the base, the vexillary filament quite free, the filaments of the other 9 very shortly connate round base of pubescent 10–12-ovuled ovary. *Pod* moniliform 6–8-seeded, 4–6 in. long, the oblong hoary joints separated by stipes as long as themselves. DC. Prodr. II, 95; Wall. Cat. 5333; Roxb. Flor. Ind. II, 316; W. & A. Prodr. 179; Miq. Flor. Ind. Bat. I, 124; Bak. in Flor. Brit. Ind. II, 249. *S. glabra* Hassk. Cat. Hort. Bog. 285; Miq. Flor. Ind. Bat. I, 125 (*fide* Baker).

Kedah; Langkawi, *Curtis!* Dindings; on coast, *Scortechini! Curtis!* Perak; Larut, *Ridley!* Pulo Condor; on the coast, *Finlayson!* Andamans; very common on all the coasts. Distrib. On most tropical seacoasts.

43. Ormosia Jacks.

Erect trees or, one species, climbing. *Leaves* odd-pinnate. *Flowers* usually in dense terminal racemes. *Calyx* campanulate, deeply 5-cleft,

the two upper teeth usually distinctly subconnate into an upper lip. *Corolla* slightly exserted, petals subequal in length, all short-clawed; standard orbicular sometimes emarginate; keel petals free, and wings oblong, obtuse. *Stamens* free or only faintly subconnate at the very base, much incurved and exserted when the flower expands; anthers oblong, versatile. *Ovary* subsessile; style long, filiform, circinate at the tip with an oblique stigma on the inner face. *Pod* thickly fleshy or woody, or thinly woody, turgid 2-valved continuous within, the sutures without wings. *Seeds* bright red, with or without arillus. Species about 25, cosmopolitan in the tropics.

Climber; (leaves quite glabrous beneath) ... ... 1. *O. scandens.*
Trees:—
Seeds large with a black adnate basal aril; (leaves minutely sparsely pubescent underneath):—
Panicles fastigiate, flowers white, pedicels stout; pods 3 in. wide, seed 1 in. long ... ... 2. *O. macrodisca.*
Panicles lax, flowers yellow, pedicels slender; pods 1·25 in. wide, seed ·75 in. long ... ... 3. *O. gracilis.*
Seeds small without any aril:—
Leaves quite glabrous beneath; (pod ·6 in. broad, ·4 in. thick, valves thinly woody) ... ... 4. *O. nitida.*
Leaves pubescent beneath:—
Leaflets distinctly petiolulate; pedicels shorter than calyx; pod with thinly woody valves ·6 in. broad, ·4 in. thick:—
Leaflets (9–13) small (not exceeding 2·5 in.) shortly acuminate (dark green thinly pubescent beneath) .. 5. *O. parviflora.*
Leaflets larger (4 in. long) acute or subobtuse:—
Leaflets thinly pubescent beneath, pale-green, 7–9; branches thin; panicles lax, bracts small; pubescence grey .. .. 6. *O. sumatrana.*
Leaflets densely pubescent beneath, dark-green, 11–13; branches very thick; panicles fastigiate, bracts conspicuous; pubescence rusty ... 7. *O. microsperma.*
Leaflets sessile; pedicels almost equalling calyx; pod with thickly woody valves 1·35 in. wide, 1 in. thick ... 8. *O. venosa.*

1. Ormosia scandens Prain. A large climber over 100 feet long with stem 6–8 in. in diam.; branches glabrous. *Leaves* 12–15 in. long; leaflets 5–7, ovate-oblong or the terminal slightly obovate, coriaceous, bright-green, quite glabrous on both surfaces, apex shortly acuminate, base rounded, 6–9 in. long, 2·5–3 in. across; secondary nerves 13–18, fine ultimate reticulations rather distinct beneath. *Racemes* in ample terminal panicles, 12 in. long 6 in. across, with pale-tawny shortly puberulous rachis and branches, pedicels ·2 in long, pale-tawny silky, shorter than the calyx, with a minute deciduous basal and 2 subulate

apical persistent bracteoles, ·08 in. long, close under calyx. *Calyx* ·25 in. long, finely grey-silky, three lower teeth deltoid as long as calyx-tube, two upper subconnate into a shortly bifid upper lip. *Corolla* ·35 in. long, white with a reddish tinge, standard ·25 in. across. *Stamens* quite free, incurved, exserted. *Ovary* with line of hairs along upper suture, elsewhere glabrous, ovate; style slightly contorted; ovules 3. *Pod* unknown.

Perak; Larut, *Kunstler* 3560!

A very distinct species differing from the rest in its scandent habit. Mr. Kunstler speaks of it as rare.

2. Ormosia macrodisca Bak. in Flor. Brit. Ind. II, 253. A large tree with very thick grey glabrous branches. *Leaves* 8–10 in. long, leaflets 7–9, oblong, very thick and rigid in texture, pale grey-green on both surfaces, quite glabrous above, with a very sparse adpressed pubescence of short hairs beneath, apex acute, base broadly rounded to cuneate, 3–5 in. long, 1·25–2 in. broad, secondary veins 7–9 pairs, faintly prominent beneath. *Racemes* crowded in terminal fastigiate panicles, 6 in. long, 3 in wide, with brown-silky puberulous rachis and branches, pedicels ·1–·15 in., brown-silky, shorter than calyx, with a minute basal and 2 minute apical persistent bracteoles close under calyx. *Calyx* ·3 in. long, finely brown-silky, three lower teeth two-thirds, two upper teeth one-third as long as tube, all teeth oblong-obtuse. *Corolla* ·5 in. long, white; standard ·4 in. across. *Stamens* quite free, incurved, exserted. *Ovary* glabrous, obliquely oblong, ovules 3. *Pod* hard thick irregularly orbicular, 3 in. across ·75 in. thick, at first flattened, at length turgid opposite the usually solitary seed. *Seed* oblong, 1 in. long, ·7 in. wide, bright scarlet, with an adnate, black, pitted aril, ·2 in. deep, embracing its base.

Malacca; *Maingay* 600! Singapore; *Ridley* 2103!

3. Ormosia gracilis Prain. A slender tree with very thin pale-brown glabrous branches. *Leaves* 5–8 in. long, leaflets 7–9, ovate-lanceolate, chartaceous, pale grey-green on both surfaces, quite glabrous above, with a very sparse adpressed pubescence of short hairs beneath, apex caudate-acuminate, base cuneate, 2·5–3 in. long, 1 in. across, secondary veins 8–9 pairs, very faint beneath not visible above. *Racemes* in lax terminal panicles, 5 in. across, with slender branches 6 in. long, faintly adpressed grey-silky as is the rachis, pedicels grey-silky, ·15 in. long, very slender, rather shorter than calyx, with lanceolate basal bract, ·08 in. long, and 2 very minute triangular apical bracteoles at base of calyx. *Calyx* ·25 in. long, finely silky, pale-green, teeth ovate-lanceolate, longer than calyx-tube except the two upper. *Corolla* pale-yellow, ·35 in. long; standard ·25 in. across. *Stamens* quite free, much

incurved, exserted. *Ovary* puberulous, ovate-lanceolate; ovules 2. *Pod* hard, thick, irregularly oblong-ovate, with a short stalk and slightly excentric acute point, 1·5 in. long, 1·25 in. wide, externally covered with a pale blueish bloom; inside white. *Seed* usually solitary, oblong, ·75 in. long, ·6 in. wide, somewhat compressed, bright scarlet, with an adnate, black, smooth aril, ·15 in. deep, embracing its base.

PERAK; Larut, *Scortechini* 324! *Kunstler* 4234! *Wray* 2979!

A very fine species; near to *O. macrodisca*, but with a smaller pod and seed as well as with smaller leaflets; the seed too has the black arillar portion unpitted. It resembles *O. glauca* as to leaves though its leaflets are not quite so large; it has however larger seeds than *O. glauca* has, and the seeds have a black hilum; the seeds of *O. glauca* are all scarlet.

4. ORMOSIA NITIDA Prain. A tree 30–50 feet high, stem 2 feet in circumference, with stout rusty-brown glabrescent branches. *Leaves* 5–7 in. long, leaflets 7, obovate or elliptic, base rounded, apex broadly rounded and abruptly shortly cuspidate, very rigidly coriaceous, dark glossy-green quite glabrous on both surfaces, terminal 2·5–4 in. long, 1·3–2 in. wide, rather exceeding the others, secondary nerves very slender, 12–15 pairs. *Racemes* in fastigiate terminal panicles, 6–8 in. long, 5–6 in. across, rachis and branches faintly puberulous, pedicels puberulous, ·15 in. long, shorter than calyx, bracts and bracteoles deciduous. *Calyx* ·2 in. long, rather densely tawny-silky, teeth deltoid, the 3 lower as long as tube the two upper subconnate into a 2-fid upper lip. *Corolla* unknown. *Pod* irregularly oblong, 1 in. long ·75 in. across, the valves thinly woody, rigid, quite glabrous and black externally, brown and not suberous within, with a short stalk equalling the calyx-tube. *Seed* oval, usually if not always solitary, cinnabar-red, ·35 in. long ·3 in. wide, without arillus.

PERAK; Goping, in open jungle, local, *Kunstler* 6082!

This very distinct species has unfortunately only been reported in fruit. Its pods are very like those of *O. microsperma* or *O. parvifolia* but appear to have been glabrous from the beginning. They differ, moreover, very markedly in being shortly stipitate; the leaflets too, are of different shape and firmer texture, besides being quite glabrous on both surfaces.

5. ORMOSIA PARVIFOLIA Bak. in Flor. Brit. Ind. II, 253. A fairly large tree with slender persistently brown-velvety branches. *Leaves* 6–8 in. long, leaflets 9–13, oblong, coriaceous, green, glossy above, thinly hairy beneath, apex shortly acuminate, base rounded, the terminal rather larger than the others, 2–2·5 in. long, ·6–·7 in. wide, secondary nerves fine and hardly raised beneath, 8–9 pairs. *Racemes* in fastigiate terminal panicles with rather short branches, 3–4 in. long, 2·5 in. wide, with densely brown-velvety rachis and branches, pedicels brown-velvety, very short, each with an ovate-lanceolate basal bract and with 2 ovate

bracteoles under the calyx. *Calyx* ·2 in. long, densely brown-silky, the teeth triangular, the three lower as long as the calyx-tube the two upper rather shorter. *Corolla* apparently white, ·35 in. long, standard ·25 in. across. *Stamens* quite free, incurved, exserted. *Ovary* ovate, densely silky, ovules 3. *Pod* orbicular, 1-seeded, or oblong and lineate between the seeds if 2–3-seeded, shortly stipitate, valves thin, rigid, at first densely silky soon glabrescent and black externally, reddish-brown inside. *Seeds* ovoid, ·3 in. long, ·25 in. wide, cinnabar-red, without arillus. *Macrotropis bancana* Miq. Flor. Ind. Bat. Suppl. 295.

Malacca; *Griffith* 1765! *Maingay* 614! *Goodenough* 1443! Singapore; *Ridley* 5929! 8096! Pahang; *Ridley* 1267! 5013! Distrib. Banka (*Teysmann* 3405!); Borneo (*Haviland* 57!)

There is an authentic example of *Macrotropis? bancana* Miq. at Calcutta; it belongs undoubtedly to this species.

6. Ormosia sumatrana Prain. A large tree with tomentose rather slender ultimately glabrescent branches. *Leaves* 8–10 in. long, leaflets 7–9 (very rarely 5), ovate or ovate-elliptic or obovate, obtusely apiculate or subacuminate, base rounded, coriaceous, pale-green, glabrous somewhat glossy above, hirsute but at length glabrescent beneath as are the rachis and petiolules, 2–4 in. long 1–1·75 in. wide, the terminal exceeding the others, nerves 8–10 pairs, spreading rather prominent beneath. *Racemes* in lax terminal panicles, 6–8 in. long and almost as wide, with pubescent rachis and branches; pedicels ·1 in. long, shorter than the calyx, bracts ·1 in. long, oblong, very deciduous as are the similar bracteoles at base of pedicels, the two bracteoles under the calyx sub-persistent, lanceolate, ·08 in. long. *Calyx* ·2 in., externally tawny-pubescent, three lower teeth ovate-lanceolate shorter than tube, the two upper subconnate in a 2-lobed upper lip. *Corolla* pinkish-white with lilac-purple markings, ·35 in. long, standard orbicular emarginate, ·3 in. wide. *Stamens* quite exserted, incurved. *Ovary* densely puberulous, almost always 3-ovuled. *Pod* irregularly orbicular if 1-seeded, 1 in. across, oblong and 1·7 in. long if 2-seeded, lineate between the seeds, the valves thinly woody, rigid, black and glabrescent externally. *Seed* ovoid ·4 in. long, ·35 in. wide, cinnabar-red without arillus. *Macrotropis sumatrana* Miq. For. Ind. Bat. Suppl. 294.

Malacca; Brisu, *Holmberg* 735! Distrib. Sumatra (*Teysmann* 3618! *Forbes* 2592! 2648!)

Though very closely related to the next species, this is nevertheless easily distinguished by its different leaves and tomentum, its lax panicles, its smaller flowers, and its larger seeds.

The Malacca plant here referred to *O. sumatrana* has been only once collected; it has inflorescence and flowers exactly as in *O. sumatrana* but it has not yet been sent in fruit. While therefore we know that it differs from *O. microsperma* and from *O. venosa* it is not absolutely certain that it exactly agrees with *O. sumatrana*.

7. Ormosia microsperma Bak. in Flor. Brit. Ind. II, 253. A tree 40 to 60 feet high with thick, densely brown-velvety branches. *Leaves* 8–10 in. long, leaflets 11–13, oblong or obovate, acute or subobtuse, base broadly rounded, rigidly coriaceous, dark-green, glabrous rather glossy above, densely persistently shortly brown-pubescent beneath as are the rachis and petiolules, 2·5–4 in. long 1·5–2 in. wide, secondary nerves 7–9 pairs, slightly raised beneath. *Racemes* in ample terminal fastigiate panicles, 8 in. long, 6 in. across, with densely velvety rachis and branches; pedicels ·07–·12 in. long, much shorter than the calyx, bracts ovate-lanceolate, densely velvety, persistent, ·25 in. long, bracteoles at base of pedicels similar but smaller (·12 in. long), two bracteoles close under calyx ·1 in. long, oblong. *Calyx* ·25 in. long, externally densely velvety, 3 lower teeth as long as calyx 2 upper rather shorter. *Corolla* white, ·45 in. long, standard ·35 in. wide. *Stamens* quite free, exserted, incurved. *Ovary* densely velvety, 3–4-ovuled. *Pod* ·6 in. across, irregularly orbicular if 1-seeded, oblong and 1–1·2 in. long if 2-seeded, lineate between the seeds, the valves thinly woody, rigid, glabrescent or persistently velvety. *Seed* ovoid ·3 in. long, ·25 in. wide, cinnabar-red, without arillus.

Var. *typica;* pedicels very short, pods when ripe glabrescent. *O. coarctata* Kurz, Journ. As. Soc. Beng. XLII, 2. 71 hardly of Jackson.

Malacca; *Griffith* 1759! *Maingay* 532! *Derry* 1090! Perak; near Ulu Selangor, *Kunstler* 8767!

Var. *Ridleyi;* pedicels distinct, pods more persistently pubescent.

Singapore; Selitar, *Ridley*, 5574!

The specimens collected by Dr. Griffith have been named by Mr. Bentham "*Ormosia coarctata?* Jacks." and those collected by Dr. Maingay have been definitely issued as *Ormosia coarctata;* Mr. Kurz too, has accepted this determination. Mr. Baker however finds that the identification of Griffith's and Maingay's Malacca plant with *O. coarctata* Jackson (*Trans. Linn. Soc.* X, t. 25; a plant from Guiana) cannot be sustained.

Ormosia microsperma is nearly related to *O. sumatrana* (*Macrotropis sumatrana* Miq.) and is also closely related to *Chænolobium septemjugum* Miq. and *C. decemjugum* Miq. (*Flor. Ind. Bat. Suppl.* 302). Mr. Kurz reduces the genus *Chænolobium* to *Ormosia* (*Journ. As. Soc. Beng.* XLII, 2. 71); in this he is certainly right. He, however, further considers that both plants are but forms of the same species and that moreover they are both referable to *O. microsperma.* So far as the material that was at Kurz' disposal goes this appears to the writer to be a premature conclusion, and it seems better for the present to keep Miquel's plants specifically apart.

Mr. Ridley's plant from Singapore differs very considerably from the Perak and Malacca one. The pods are described as hairy in the field note; they are so in the specimens themselves, but those at Calcutta are not quite ripe. If the pods prove to be quite *persistently* velvety it will probably be necessary to treat the plant as a distinct species to be named *O. Ridleyi.*

8. Ormosia venosa Bak. in Flor. Brit. Ind. II, 254. A tall tree, with branches densely persistently velvety-pubescent. *Leaves* 4–6 in. long, leaflets 7, obovate-oblong, obtuse or subobtuse, base cuneate nearly sessile on the rachis, rigidly coriaceous, greyish-green glabrous but dull above, densely persistently tomentose beneath, 3–4 in. long 1·5–2 in. across, terminal exceeding the rest, secondary nerves 10–12, distinctly raised beneath, rachis densely velvety. *Racemes* terminal crowded, with rather slender branches, 3–4 in. long and about as wide, rachis and branches densely velvety; pedicels ·2 in. long, nearly equalling the calyx, bracts ·15 in. long, lanceolate, persistent, bracteoles at base of pedicels ·1 in. long, 2 bracteoles under calyx minute but subpersistent. *Calyx* ·25 in. long, densely velvety, teeth triangular, three lower as long as tube, two upper subconnate. *Corolla* ·35 in. long, apparently white, standard ·3 in. across. *Stamens* incurved, exserted. *Ovary* velvety. *Pod* obtuse or subacute, orbicular or oblong, obtuse or subacute, 1·5 in. long, 1·35 in. across, ·1 in. thick, the valves very thickly woody, black and glabrous externally. *Seeds* usually solitary, ovoid, ·5 in. long, ·4 in. wide, crimson-red, without arillus.

Malacca; *Maingay* 533!

A very distinct species.

Suborder II. Cæsalpinieæ.

Trees or shrubs, very rarely herbs. *Leaves* pinnate or 2-pinnate leaflets 1–∞-paired, rarely simple or 1-foliolate, stipels usually 0, if present very minute. *Inflorescence* racemose, rarely cymose, very rarely spicate; axillary, lateral, or in terminal panicles. *Flowers* irregular or very rarely regular, 5-, less often 4-merous. *Sepals* 5, or 4 from fusion of the upper two, divided to the summit of the disc that lines the short or long calyx-tube, imbricate or rarely valvate, or very rarely united in a toothed or lobed limb. *Petals* 5, or fewer by abortion, the upper innermost in bud, the others variously imbricate. *Stamens* 10, or fewer by abortion, very rarely indefinite, free or rarely some or all more or less connate; anthers various. *Ovary* free or united by its stipe to the disc-bearing calyx-tube. *Seeds* various, albumen copious, scanty, or 0. *Radicle* straight or slightly oblique, hidden between cotyledons, or shortly exserted.

Leaves simply pinnate or (*Bauhinia*) 1-foliolate:—

Anthers basifixed:—

Leaves even-pinnate; (petals 5) ... ... 44. Cassia.

Leaves odd-pinnate; leaflets alternate:—

Petals 5; stamens 5; pod flat, winged throughout its circumference, indehiscent ... ... 45. Koompassia.

Petals 2 or 0; stamens 2; pod turgid subglobose, wingless, dehiscent ... ... 46. DIALIUM.

Anthers versatile:—

Corolla complete, *i.e.*, with 5 petals; sepals 5; (stamens free):—

Seeds with albumen; leaves 1-foliolate 2-lobed, rarely entire, rarely by fission 2-foliolate ... ... 47. BAUHINIA.

Seeds without albumen; leaves even-pinnate, 2–3-(rarely 1-) jugate ... ... 48. CYNOMETRA.

Corolla incomplete, *i.e.*, with fewer than 5 petals; sepals 4:—

Petals present; sepals green; (leaflets even-pinnate):—

Petals 3; stamens 3 monadelphous ... ... 49. TAMARINDUS.

Petal solitary:—

Calyx-lobes subvalvate; stamens monadelphous 9, all or only 2 perfect, *funiculus of seed thick arillate* ... ... 50. SINDORA.

Calyx-lobes much imbricated; stamens free 3 ... 51. AFZELIA.

Petals 0; sepals coloured:—

Leaflets even-pinnate; stamens 3–8 ... ... 52. SARACA.

Leaflets alternate; stamens 8–10 ... ... 53. CRUDIA.

Leaves 2-pinnate; (anthers versatile):—

Calyx segments subequal; *stigma peltate* ... ... 54. PELTOPHORUM.

Calyx segments manifestly unequal, the lowest lobe cucullate larger than the rest:—

Pod wingless ... ... 55. CÆSALPINIA.

Pod winged:—

Wing extending all along the upper suture ... 56. MEZONEURON.

Wing apical, (pod samaroid) ... ... 57. PTEROLOBIUM.

44. CASSIA Linn.

Erect shrubs or trees, rarely herbs. *Leaves* simple, abruptly pinnate. *Flowers* usually large and showy, in axillary racemes and terminal panicles. *Calyx*-tube very short; sepals broad or narrow, imbricated. *Petals* 5, imbricated, subequal, usually broad. *Stamens* normally 10, but rarely all perfect, 3–5 being often reduced to staminodia or altogether absent; anthers mostly but not invariably basifixed, dehiscing by terminal pores or with the slit more or less continued longitudinally. *Ovary* sessile or stalked, many-ovuled; style incurved, stigma terminal. *Pod* very variable, terete or flat, usually septate, the albuminous seeds flattened, sometimes parallel with the valves, sometimes with the septa, dry, dehiscent or indehiscent. Species 340, spread everywhere in the tropics, a few extra-tropical.

Trees shrubs or stout herbs with large leaflets and with obtuse sepals :—

Stamens 10, all fertile :—

Lowest 2-3 stamens larger than the rest, pods terete indehiscent (§ *Fistula*) :—

Flowers pink, in dense corymbs, bracts large persistent :—

Leaflets acute, corymbs from old nodes below leaves, sepals green, petals acute ... ... 1. *C. nodosa.*

Leaflets obtuse, corymbs among leaves, sepals brown to purple, petals obtuse ... ... 2. *C. javanica.*

Flowers yellow, in lax racemes, bracts small deciduous ... ... 3. *C. Fistula.*

Lowest stamens not exceeding the rest, pods flat, dehiscent (§ *Psilorhegma*) ... ... 4. *C. glauca.*

Stamens 7 only fertile ; the 3 upper reduced to staminodes (§ *Senna*); pods dehiscent, usually more or less compressed) :—

Leaves with glands on the common rachis :—

Glands between the bases of two opposed leaflets; leaflets obtuse, pods with oblique dissepiments ; seeds rhombohedral :—

Glands between each of the two lower pairs of leaflets ; pedicels short, pods subquadrate ... 5. *C. Tora.*

Gland between lowest pair of leaflets only ; pedicels long, pods subterete ... ... 6. *C. obtusifolia.*

Glands far below leaflets and near base of petiole ; leaflets acute, pods with transverse dissepiments ; seeds ovate, compressed :—

Calyx, leaves and pods densely tomentose ; flowers in subsessile axillary pairs ... 7. *C. hirsuta.*

Calyx, leaves and pods glabrous ; flowers in axillary corymbs :—

Leaflets 3–5 pairs ; pods flattened ... 8. *C. occidentalis.*

Leaflets 8–12 pairs ; pods turgid ... 9. *C. Sophera.*

Leaves with rachis channelled above, barred transversely between the leaflets but without glands :—

Shrubs with flowers in strobilate subspicate racemes ; pods winged along the valves ; leaflets reaching 6 in. ... ... 10. *C. alata.*

Trees with flowers in panicles of corymbs ; pods not winged ; leaflets not exceeding 2·5 in. :—

Stipules large persistent ; pod thin-valved flexible, with narrow sutures ... ... 11. *C. timoriensis.*

Stipules small deciduous ; pod with coriaceous rigid valves, sutures thickened ... ... 12. *C. siamea.*

Slender herbs or undershrubs with very small leaflets and with acute sepals (§ *Chamaecrista*) :—

Leaflets linear minute (·15 in. long) ; pedicels 1 in.

bracteolate above middle; pod 20–25-seeded; stamens all fertile alternately short and long ... ... 13. *C. mimosoides.*
Leaflets oblong (·4 in. long, ·15 in. wide); pedicels ·3 in. bracteolate below middle; pod 8–16-seeded; stamens unequal 1–3 upper often sterile ... ... 14. *C. Leschenaultiana.*

§ 1. Fistula DC *Sepals* obtuse, stamens all antheriferous, the 2–3 lowest larger than the rest and with longer filaments. *Pods* indehiscent, stipitate, very long, terete with thin brittle ligneous dissepiments between the numerous seeds which are embedded in suberous wad-like discs between the partitions.

1. Cassia nodosa Ham. in Roxb. Hort. Beng. 31. A tree 40–50 feet high, stem 10–15 inches across, branches spreading, branchlets black glabrous except for the slightly downy tips. *Leaves* equally pinnate 9–10 in. long; leaflets chartaceous 6–12 pairs, opposite, oblong, base rounded, apex shortly acuminate, 2–2·5 in. long, 1–1·25 in. wide, bright green, glabrous and shining above, dull and slightly pubescent, especially on the nerves, beneath; lateral nerves spreading 12–16 pairs, slender but visible beneath, petiolules ·15 in. long, puberulous as is the leaf-rachis. *Flowers* in corymbs 2–3 in. long, from old nodes along the branches, peduncles solitary or 2–4 together, puberulous simple very rarely branched, 1 in. long, bracts ovate-lanceolate persistent, puberulous, ·25 in. long, pedicels puberulous the lower 1·5 in. long. *Calyx* 5-partite to the base, lobes subequal green, ovate-obtuse, hoary. *Petals* 5, subequal, carnation to white with a flush of pink, ·6–·7 in. long, ·25 in. wide ovate-acute, distinctly clawed. *Stamens* 10, all antheriferiferous, the 3 lowest with longer nodose filaments and larger anthers than the others. *Pod* terete, rather distinctly annulated, ·5 in. in diam., 1·5–2 feet long, glossy black with thin brittle ligneous transverse dissepiments between the 60–90 seeds each of which is embedded in a suberous disc ·5 in. across ·2 in. thick. *Seeds* broadly ovate smooth slightly shining, ·35 in. long, ·3 in across, ·2 in. thick, testa pale warm-brown. Wall. Cat. 5351; Roxb. Flor. Ind. III, 336; Wight, Ic. t. 410; Bak. in Flor. Brit. Ind. II, 261.

Andamans; *King's Collectors!* Malacca; *Griffith! Maingay* 596! Bukit Tampin, *Goodenough* 1912! Brisu, *Derry* 537! Sadanan Reserve, *Derry* 588! Selandan, *Goodenough* 125! Penang; Waterfall, *Curtis* 1576! Perak; Chanderiang, *Kunstler* 5722! near Ulu Kerling, *Kunstler* 8732! Goping, *Kunstler* 4364! *Scortechini* 1934! Pahang; Makang, *Ridley* 1359! Distrib. Indo-China, from Sylhet and Chittagong southwards and eastwards; Sumatra (*Forbes* 1748! 2669!); Borneo (*Haviland!*)

The Malay names given for this are *Siboosok* (*Goodenough* 1912); *Buzok-buzok* (*Derry* 537); and *S'busu* (*Goodenough* 125; *Derry* 588). This name it shares with

C. javanica. It seems that this species does not occur in Java, where *C. javanica* is its representative.

2. Cassia javanica Linn. Sp. Pl. 379. A tree 30–40 feet high, branches spreading; branchlets black glabrous except for the slightly downy tips. *Leaves* equally pinnate 9–15 in. long; leaflets chartaceous 8–20 pairs, opposite, oblong, base rounded, apex obtuse, 1·5–2 in. long, ·75–·9 in. wide, bright-green, glabrescent and slightly shining above, dull and uniformly puberulous beneath, lateral nerves rather oblique 10–12 pairs, slender but visible beneath, petiolules ·15 in. long, puberulous as is the leaf-rachis. *Flowers* in corymbs 6–10 in. long, terminal and from leaf-axils, sometimes paniculately branched, peduncles solitary, often with 1–2 small foliage leaves with 2–4 pairs of leaflets, puberulous, 4–6 in. long, bracts ovate-lanceolate ·4–·5 in. long, persistent, puberulous, pedicels puberulous the lowest 1·5 in. long. *Calyx* 5-partite to the base, lobes subequal crimson to purple-brown, ovate-obtuse, hoary. *Petals* 5 subequal, rose-pink, ·8–1 in. long, ·35 in. wide, broadly spathulate obtuse, distinctly clawed. *Stamens* 10 all antheriferous, the 3 lowest with nodose larger filaments and larger anthers. *Pod* terete, not very distinctly annulated, ·75 in. in diam., 1·25–1·5 feet long, glossy black, with thin brittle ligneous transverse dissepiments between the 50–75 seeds each of which is embedded in a suberous disc ·75 in. across ·2 in. thick. *Seeds* broadly ovate, smooth slightly shining, ·35 in. long, ·3 in. across, ·2 in. thick, testa pale warm-brown. DC. Prodr. II, 490; Wall. Cat. 5309; Benth. Pl. Jungh. 259; Miq. Flor. Ind. Bat. I, 90; Bak. in Flor. Brit. Ind. II, 267; Koord. & Val. Bijdr. II, 8. *C. Bacillus* Gaertn. Fruct. I, 313; Roxb. Hort. Beng. 31; Flor. Ind. II, 337; Wight, Ic. 252. Rumph. Herb. Amboin. II, 82, t. 22.

Perak; Thaipeng, *Wray* 4020! Distrib. Sumatra (*Forbes* 1275!); Java.

Mr. Wray is the only collector who has sent this very distinct species to Calcutta from the Malay Peninsula. The Malay name of this Mr. Wray gives as *Sibusu*, a circumstance that causes no surprise when it is considered how very closely related this species and *C. nodosa* undoubtedly are.

3. Cassia Fistula Linn. Sp. Pl. 377. A tree 20–40 feet high with spreading branches and glabrous branchlets. *Leaves* equally pinnate 8–16 in. long; leaflets coriaceous 4–6 pairs, developing successively, opposite, ovate, tapering from below the middle to a narrow point, base wide-cuneate, 2–6 in. long, 1·5–3·5 in. wide, bright-green, glabrous shining above, dull and paler beneath when young clothed with a close but very caducous silvery pubescence; lateral nerves obliquely spreading 10–20 pairs, slender but visible above somewhat prominent beneath, petiolules ·2 in. long stoutish, glabrous as is the leaf-rachis. *Flowers* in

long lax racemes 12–20 in. long, bracts minute caducous, pedicels glabrous 1·5–2 in. long. *Calyx* 5-partite to the base, segments broadly spathulate ·25 in. long, finely puberulous. *Petals* 5 subequal, obovate shortly clawed, ·8–1 in. long, ·6–·7 in. wide. *Stamens* 10 all antheriferous, the 3 lowest with larger and thicker but not nodose filaments, and with larger anthers. *Pod* terete, ·9–1 in. thick, not at all annulated, 1–2 feet long, dull black with thin brittle ligneous transverse dissepiments between the 50–90 seeds each of which is embedded in a suberous disc ·8–·9 in. across, ·2 in. thick. *Seeds* broadly ovate smooth shining, ·35 in. long, ·3 in. across, ·2 in. thick, testa pale warm-brown. DC. Prodr. II, 488; Roxb. Hort. Beng. 31; Fl. Ind. II, 333; Wall. Cat. 5302; W. & A. Prodr. 285; Miq. Flor. Ind. Bat. I, 89; Bak. in Flor. Brit. Ind. II, 261; Koord. & Val. Bijdr. II, 11. *C. rhombifolia* Roxb. Hort. Beng. 31; Flor. Ind. II, 334; Wight Ic. t. 269.

MALACCA; *fide* Baker in *Flor. Brit. Ind.* ANDAMANS; planted, common.

This is the well-known *Amaltás* or "Indian Laburnum" undoubtedly a native of India but, not in the writer's opinion, entitled to be considered an indigenous tree in Malaya; indeed none of the Malayan botanists have sent specimens to Calcutta. Mr. Baker however alludes to specimens at Kew from Malacca; possibly it is planted in the other provinces also. In the Andamans it only occurs as a planted tree.

§ 2. PSILORHEGMA Vogel. *Sepals* obtuse, stamens all antheriferous, anthers all subequal. *Pods* compressed, dehiscent, the dissepiments between the seeds membranous.

4. CASSIA GLAUCA Lamk Encyc. Meth. I, 647. A small tree 15–20 feet high with glabrous terete branches; stem 4–6 in. in diam. *Leaves* equally pinnate 6–9 in. long; leaflets 4–6 pairs opposite, membranous or subcoriaceous, pale-green glabrous above, very glaucous and sparsely adpressed-puberulous or glabrous beneath, ovate-acute, base cuneate, 2–4 in. long, 1–2 in. wide, lateral nerves 10–12 pairs indistinct, petiolules ·15 in. long, puberulous as is the rachis which is faintly channelled above and furnished with long conical glands between each of the 2–3 lowest pairs of leaflets; stipules falcate narrowly lanceolate ·35 in. long, caducous. *Flowers* in axillary corymbs 4 in. long, 2·5 in. across, the pedúncles 2 in. long; lower pedicels 1·25 in. long, spreading, solitary in the axils of small elliptic caducous bracts glabrous as are the peduncles. *Calyx* 5-partite to the base, segments very unequal, pale-yellow, glabrous, all orbicular, the outer ·2, the others ·3 in. across. *Petals* 5 subequal, spreading, broadly ovate-obtuse shortly clawed, 1 in. long, ·75 in. across, pale-primose with faint greenish-yellow veins. *Stamens* 10 subequal. *Pod* straight flat very thin, dehiscent, linear, tapering to both ends, flexible, dull, slightly compressed between the seeds, valves thinly coriaceous, 6–8 in. long, ·5–·7 in. wide, with a stalk

·5–6 in. long. *Seeds* biseriate, 20–30, oval, ·25 in. long, ·15 in. wide, very thin, testa dark-brown shining. DC. Prodr. II, 495; Wall. Cat. 5312; W. & A. Prodr. 289; Bedd. Flor. Sylvat. 91; Miq. Flor. Ind. Bat. I, 96; Bak. in Flor. Brit. Ind. II, 265. *C. surattensis* Burm. Flor. Ind. 97. *C. arborescens* Vahl. Symb. III, 56; Roxb. Hort. Beng. 31. *Senna arborescens* Roxb. Flor. Ind. II, 345.

Penang; *Kunstler* 1473! *Curtis*! Malacca; cultivated, *Maingay* 595! Perak; Simpang, *Wray* 2051! Distrib. S.-E. Asia generally, but often, perhaps usually cultivated.

§ 3. Senna Bth. & Hk. f. *Sepals* obtuse, perfect stamens 7, the 3 uppermost reduced to staminodes, the remainder subequal or the lowest 2–3 with longer filaments and larger anthers than the rest. *Pods* compressed, rarely subterete, usually dehiscent, the dissepiments between the seeds membranous.

5. Cassia Tora Linn. Sp. Pl. 376. An annual fœtid herb or undershrub 2–3 feet high. *Leaves* equally pinnate, distinctly petioled, 3–4 in. long; leaflets 3 pairs opposite, membranous, glaucous, obovate-oblong, uppermost leaflets 2 in. long 1 in. wide, lowest pair 1–1·25 in. long ·75 in. wide, apex equally acute, base slightly obliquely rounded, glabrous or puberulous on both surfaces, lateral nerves 8–10 pairs, oblique straight rather pronounced beneath, petiolules ·1 in. long, puberulous as is the rachis which is deeply grooved above and furnished with a long conical gland between each of the two lowest pairs of leaflets; stipules linear ·75 in. long, caducous. *Flowers* usually in subsessile pairs in axils of the leaves the upper crowded, their common peduncle even in fruit not exceeding ·15 in., usually shorter, the pedicels even in fruit not exceeding ·35 in. *Calyx* 5-partite to base, segments green ovate-acute glabrous spreading, ·2 in. long. *Petals* 5 subequal, spreading, pale-yellow, ·3 in. long, ·2 in. wide, oblong-obtuse, the standard retuse. *Stamens* 7 (the 3 upper replaced by staminodes) subequal, anthers brown. *Pod* 6–8 in. long, ·15 in. wide, nearly tetragonous, obliquely septate, the valves puberulous membranous not reticulated, sutures broad. *Seeds* 25–30, rhombohedral, long axis in direction of pod, ·15 in. long, ·1 in. thick, brown, shining. Linn. Sp. Pl. ed. II. 538 (excl. syn. *Roy. Lugd.* and excl. var. *β.*); DC. Prodr. II, 493; Roxb. Hort. Beng. 31; Collad. Hist. Cass. 96; Wall. Cat. 5316; W. & A. Prodr. 290 excl. var. *β.*; Miq. Flor. Ind. Bat. I, 90, excl. var. *β.*; Bak. in Flor. Brit. Ind. II, 263 in part only. *C. Tagera* Lamk. Encyc. Meth. I, 643 not of Linn. *C. fœtida* Salisb. Prodr. 326. *C. gallinaria* Collad. Hist. 96. *C. obtusifolia* Linn. Sp. Pl. ed. II, 539 as to all the citations except *Sloane, Hist. Jamaica*, but not as to the plant; Lour. Flor. Coch. Chin. 323; Miq. Flor. Ind. Bat. I, 95 excl.

VAR. β. *Senna Tora* Roxb. Flor. Ind. II, 340. Rumph. Herb. Amboin. V, t. 97, f. 3; Rheede, Hort. Malab. II, t. 53.

ANDAMANS; very common throughout the Settlement. PERAK; Kwala Dipong, *Scortechini* 1750! DISTRIB. A wide-spread weed in S.-E. Asia.

This is sometimes spoken of as cosmopolitan in the tropics and possibly it has now become introduced in the New World. But if so, it is not common there and the writer has never seen an American specimen.

6. CASSIA OBTUSIFOLIA Linn. Sp. Pl. 377. An annual bland herb or undershrub 2–7 feet high. *Leaves* equally pinnate, distinctly petioled 3–4 in. long; leaflets 3 pairs opposite, membranous, green, obovate-oblong, uppermost leaflets 2 in. long, 1 in. wide, lowest pair 1–1·25 in. long, ·75 in. wide, apex broadly equally deltoid, base slightly obliquely rounded, glabrous or puberulous on both surfaces, lateral nerves 8–10 pairs, oblique straight faint on both surfaces, petiolules under ·1 in. puberulous as is the rachis which is deeply grooved above and is furnished with a long conical gland between the lowest pair of leaflets; stipules linear ·75 in. long, caducous. *Flowers* usually in subsessile pairs in axils of the leaves the upper crowded, their common peduncle even in fruit not exceeding ·15 in. usually shorter, the pedicels even in flower 1–1·25 in. long. *Calyx* 5-partite to the base, segments green ovate-acute glabrous, spreading, ·25 in. long. *Petals* 5 subequal, spreading, bright-yellow, ·5 in. long, ·35 in. wide, oblong-obtuse, the standard truncate. *Stamens* 7 (the 3 upper replaced by staminodes) subequal, anthers brown. *Pod* 8–10 in. long, ·2 in. wide, sub-terete, obliquely septate, the valves glabrous, membranous, distinctly transversely reticulated, sutures broad. *Seeds* 30–35, rhombohedral, ·2 in. long, ·15 in. thick, brown shining. Linn. Sp. Pl. ed. II, 539 as to the plant but excl. the ref. to *Dillenius* and to *Rumphius*; DC. Prodr. II, 493; Collad. Hist. Cass. 95. *C. toroides* Roxb. Hort. Beng. 31. *C. humilis* Collad. Hist. Cass. 96. *C. Tora* VAR. β. Linn. Sp. Pl. 376. *C. Tora* VAR. β. W. & A. Prodr. 291 excl. references to *Rheede* and to *Lamarck*; Miq. Flor. Ind. Bat. I, 95. *C. Tora* Bak. in Flor. Ind. Bat. II, 263 in part, not of Linn. *C. obtusifolia* VAR. β. Miq. Flor. Ind. Bat. I, 96, not VAR. α. *Senna toroides* Roxb. Fl. Ind. II, 340.

SINGAPORE; common, *Hullett* 102! *Kunstler* 124! DISTRIB. Native in Tropical America; now introduced and, here and there, fairly common in South-Eastern Asia.

Dr. Roxburgh was at some pains to point out how different this species is from *C. Tora*. The confusion of indentification originated with Linnæus himself and has been perpetuated owing to the fondness that many authors have for books and names as compared with plants and facts.

7. CASSIA HIRSUTA Linn. Sp. Pl. 378. A diffuse tomentose under-

shrub 2–5 feet high usually of annual duration. *Leaves* equally pinnate 4–8 in. long; leaflets 3–6 (rarely 2) pairs, opposite, membranous, green, fœtid, ovate-acuminate with cuneate base, rather densely pilose on both surfaces, 1·5–3·5 in. long, 1–1·5 in. wide, lateral nerves about 6 pairs straight ascending, petiolules very short pilose as is the leaf-rachis which has a single large gland 2 in. above its base; stipules subulate membranous ·35 in. long. *Flowers* usually in subsessile pairs in axils of leaves, the upper crowded, their common peduncle even in fruit not exceeding ·15 in., pedicels in fruit ·5 in. long, erect, rigid, pilose. *Calyx* 5-partite to base, segments pale, ovate-subacute, pilose externally, ·25 in. long. *Petals* 5, subequal, spreading, bright-yellow, ·45 in. long, ·25 in. wide ovate-oblong obtuse. *Stamens* 7 (the 3 upper replaced by staminodes) the 3 lower longer and with larger anthers than the two lateral pairs; anthers brown. *Pod* slightly falcate, 6–8 in. long, ·25 in. wide, subterete, faintly transversely septate, the valves densely villous, papery, very faintly reticulated and faintly depressed between the seeds, sutures broad. *Seeds* 90–120, ovate, small, dull-brown, ·15 in. long, ·1 in. wide, ·07 in. thick. DC. Prodr. II, 497; Bak. in Flor. Brit. Ind. II, 263. *C. tomentosa* Wall. Cat. 5304 not of Linn.

Singapore; very common, *Anderson* 44! *Hullett* 75! *Kunstler* 317! Distrib. An American weed now naturalised in many parts of S.-E. Asia.

8. Cassia occidentalis Linn. Sp. Pl. 377. A diffuse subglabrous undershrub 2–5 feet high usually of annual duration. *Leaves* equally pinnate 6–8 in. long; leaflets 3–5 pairs opposite, membranous, glaucous, fœtid, ovate-oblong with rounded base, tapering to an acuminate tip, glabrous above, glabrous or finely pubescent beneath, 1–3 in. long, ·5–1·25 in. wide; lateral nerves 6–10 pairs spreading, petiolules very short glabrous as is the leaf-rachis which has a single large globose gland at its base. *Flowers* in axillary short-pedunculed few-fld. corymbs arranged in a terminal panicle, bracts white with pink tinge, thin, ovate-acuminate, caducous, ·5 in. long; pedicels ·15–·2 in. long, sparsely puberulous, spreading, in fruit reaching ·5 in. long, ascending, rigid. *Calyx* 5-partite to base, segments white faintly tinged with pink, glabrous, membranous, obtuse, ·3 in. long. *Petals* 5 subequal, yellow very faintly veined with orange, ·5 in. long, ·3 in. wide, ovate-obtuse. *Stamens* 7, (the 3 upper replaced by staminodes) the 3 lower longer and with larger anthers than the two lateral pairs; anthers brown. *Pod* slightly falcate, compressed, transversely septate, sutures rigid, valves depressed between the 20–30 seeds, 4–5 in. long, ·35 in. wide, ·2 in. thick. *Seeds* broadly ovate, small, pale-brown, ·2 in. long, ·15 in. across, ·1 in. thick. DC. Prodr. II, 497; Roxb. Hort. Beng. 31; Bot. Reg. t. 83; W. & A. Prodr. 290; Miq.

Flor. Ind. Bat. I, 94; Bak. in Flor. Brit. Ind. II, 262. *C. fœtida* Pers. Synops. I, 457. *C. Sophera* Wall. Cat. 5317 L. not of Linn. *Senna occidentalis* Roxb. Flor. Ind. II, 343.

In all the PROVINCES, a very common weed of waste places. DISTRIB. Cosmopolitan in the tropics but in all probability derived originally from America and only introduced in the Old World.

Mr. Baker describes the flowers as pale lilac; this they appear never to be in South-Eastern Asia.

9. CASSIA SOPHERA Linn. Sp. Pl. 379. A diffuse sub-glabrous shrub 8–10 feet high, annual or subperennial. *Leaves* equally pinnate 8–10 in. long; leaflets 8–12 pairs opposite, membranous, glaucous, lanceolate with cuneate base, apex acuminate, glabrous, 2–3 in. long ·5–·75 in. wide; lateral veins 10–12 pairs spreading; petiolules very short glabrous as is the leaf-rachis which has a single large conical gland ·2–·25 in. above its base. *Flowers* in axillary distinctly peduncled few-fld. corymbs, bracts green ovate-acute minute caducous, ·15 in. long, pedicels ·25 in. long sparsely puberulous spreading; in fruit reaching ·5 in. long ascending rigid. *Calyx* 5-partite to base, segments green glabrous firmly membranous obtuse ·25 in long. *Petals* 5 subequal, yellow, hardly at all veined, ·5 in. long, ·3 in. wide, ovate-obtuse. *Stamens* 7 (the 3 upper replaced by staminodes) the 3 lower longer and with larger anthers than the two lateral pairs, (sometimes one of these also reduced to a staminode). *Pod* slightly falcate, turgid, transversely septate, sutures slender, valves not depressed between the 30–40 small seeds, 3–4 in. long, ·35 in. wide, ·2 in. thick. *Seeds* broadly ovate rather dark-brown, ·24 in. long, ·15 in. across, ·1 in. thick. DC. Prodr. II, 492; Roxb. Hort. Beng. 31; Wall. Cat. 5317 partly; W. & A. Prodr. 287; Miq. Flor. Ind. Bat. I, 92; Bak. in Flor. Brit. Ind. II, 262. *C. esculenta* Roxb. Hort. Beng. 31. *C. chinensis* Jacq. Ic. t. 73. *C. frutescens* Mill. Dict. n. 2. *C. coromandeliana* Jacq. Fragm. 67, t. 100. *Senna Sophera* Roxb. Fl. Ind. II, 347. *S. esculenta* Roxb. Fl. Ind. II, 346. Rumph. Herb. Amboin. V, 283, t. 97, f. 1.

ANDAMANS; much less common than *C. occidentalis*. PENANG; *fide* Baker. DISTRIB. Originally American, now cosmopolitan in the tropics.

This species has not been sent by any Malayan botanist to the Calcutta Herbarium. Its presence in Penang is however mentioned by Mr. Baker; the collector's name is not given. It was not Dr. Wallich; Wallich's Malayan "*C. Sophera*" (Cat. 5317 L.) is all *C. occidentalis*. It is strange that though this species appears to have been earlier of introduction to—at all events to have been longer known—in S.-E. Asia, it is now, though almost equally wide-spread, much less "common" than the more recently introduced *C. occidentalis*.

10. CASSIA ALATA Linn. Sp. Pl. 378. A shrub 5–8 feet high with very thick finely downy branches; stem often 4–5 in. thick, scarred

with cicatrices of fallen leaves and marked by the persistent rather rigid stipules. *Leaves* equally pinnate 1–2 feet long; leaflets 8–14 pairs opposite, rigidly chartaceous, green, linear-oblong to oblong, obtuse or emarginate, apiculate, base obliquely rounded or truncate, glabrous on both surfaces or sometimes obscurely downy beneath, gradually increasing in size from base upwards, 2–6 in. long, 1–2·5 in. wide, lateral nerves 10–15 pairs ascending curved towards extremities, distinct above and very prominent beneath, secondary venation beneath distinct; petiolules very short glabrous as is the leaf-rachis, which is deeply channelled above with firm yellow borders and with transverse ridges occasionally slightly apiculate in the middle between each pair of leaflets, but with no true gland; stipules ·25 in. long, auriculate, rigid, pointed, persistent. *Flowers* in peduncled subspicate racemes, 6–18 in. long, at first enveloped in large membranous strobilate yellow caducous bracts ·75 in. long, ·6 in. wide, ovate, subacute or obtuse; pedicels ·15 in. (in fruit ·25 in.) long, very finely puberulous as is the thick rachis. *Calyx* 5-partite to base, segments spathulate obtuse, 1 in. long, ·6 in. wide, yellow, membranous, glabrous. *Petals* 5 subequal, bright yellow veined with orange, ovate-orbicular shortly clawed, 1·25 in. long, ·75 in. wide. *Stamens* 7 (the 3 upper reduced to staminodes) the 3 lowest with long filaments and two of these with very large anthers; the two lateral pairs with short filaments and small anthers. *Pod* straight rigid divaricately spreading glabrous dehiscent, 6 in. long ·8 in. wide, sutures narrow, valves with a crenulated chartaceous wing ·35 in. wide running from end to end. *Seeds* 50–60 flattened, triangular, the sides straight with acute point at hilum, the base somewhat rounded, ·25 in. long, ·2 in. wide, ·1 in. thick, testa smooth shining brown. DC. Prodr. II, 492; Roxb. Hort. Beng. 31; Wall. Cat. 5301; W. & A. Prodr. 287; Wight, Ic. t. 253; Miq. Flor. Ind. Bat. I, 93; Bak. in Flor. Brit. Ind. II, 264. *C. bracteata* Linn. f. Suppl. 232; DC. Prodr. II, 492. *C. herpetica* Jacq. Obs. II, 24, t. 45, f. 2. *Senna alata* Roxb. Flor. Ind. II, 349.

Andamans; common, *King! Prain!* Perak; *Scortechini!* Malacca; *Griffith!* Distrib. Cosmopolitan in the tropics.

11. Cassia timoriensis DC. Prodr. II, 499. A shrub or small tree 6–30 feet high, with virgate pubescent branches. *Leaves* equally pinnate, 1–1·5 feet long; leaflets 16–24 pairs, opposite, membranous, pale-green, glabrescent to densely pubescent above, sparsely pubescent to softly densely tomentose beneath, lanceolate-oblong with a fine point at the rounded apex and with obliquely rounded base, 1–1·75 in. long, ·35–·65 in. wide, lateral nerves 8–10 pairs inconspicuous, petiolules ·07 in. long, pubescent as is the rachis which is channelled above and trans-

versely barred between the leaflets; stipules lanceolate to auriculate foliaceous persistent, usually larger in the region of the inflorescence, ·25 in. long. *Flowers* in a large erect terminal panicle extending into the axils of the upper leaves, 1–1·25 feet long, 6 in. across, composed of alternate corymbs 2–3 in. long, 1·5 in. across; lower pedicels 1 in. long, solitary in axils of small deciduous bracts, rusty- or yellow-pubescent as are the branches and main-rachis. *Calyx* 5-partite to base, segments distinctly unequal, oblong-obtuse, densely pubescent outside, the larger ·3 in. the smaller ·2 in. long. *Petals* 5 oblong, ·6 in. long, ·3 in. wide, bright-yellow faintly veined with orange. *Stamens* 7 (the 3 upper reduced to staminodes) the 3 lower with longer filaments but not much larger anthers than the two lateral pairs. *Pod* straight, flat, very thin, dehiscent, linear, slightly tapering to both ends, glossy and flexible, valves thinly coriaceous, 5–6 in. long, ·5 in. wide, with a stalk ·3 in. long. *Seeds* biseriate, 16–20, oval-obtuse ·25 in. long, ·2 in. across, very thin, testa dark brown, shining, with a dull paler vertical central patch.

Var. *typica*; leaflets glabrescent above, sparsely pubescent beneath, stipules of the upper leaves narrower. *C. timoriensis* Miq. Flor. Ind. Bat. I, 99; Bak. in Flor. Brit. Ind. II, 265; Koord. & Val. Bijdr. II, 13.

Kedah; Coah Langkawi, *Curtis* 2094! Distrib. India; Indo-China; Malay Archipelago.

Var. *xanthocoma* Miq.; leaflets pubescent above, densely golden-tomentose beneath, stipules of the upper leaves very broad. *C. palmata* Wall. Cat. 5306 A. *C. xanthocoma* Miq. Analect. Ind. I, 10. *C. timoriensis* var. *xanthocoma* Miq. Flor. Ind. Bat. I, 99. *C. timoriensis* var. *chrysocoma* Koord. & Val. Bijdr. II, 14.

Perak; Kwala Dipong, growing near limestone, *Kunstler* 8255! *Scortechini* 1751! Goping, *Kunstler* 689! Ulu Bubong, *Kunstler* 10087! Distrib. Tenasserim, Malay Archipelago.

The two varieties are very easily distinguished but they do not differ at all in essentials. The Bornean specimens of *C. xanthocoma* first received by Miquel were without fruit; on seeing pods that author himself very justly reduced his species, as a variety, to *C. timoriensis*.

12. Cassia siamea Lamk Encyc. Meth. I, 648. A tree 30–50 feet high with smooth bark and spreading branches; stem 12–18 in. in diam. *Leaves* equally pinnate, 6–12 in. long; leaflets 4–16 pairs, opposite, subcoriaceous, rather dark-green shining above, dull and paler beneath, oblong-obtuse or retuse minutely mucronate, base rounded, 1·25–2·5 in. long, ·5–·9 in. wide, lateral nerves 10–12 pairs obscure above fine but distinct beneath, petiolules distinct ·1 in. long, glabrous as is the rachis which is channelled and is transversely barred between the leaflets above but is without glands; stipules minute subulate caducous.

Flowers in large erect terminal panicles extending into the axils of the upper leaves, 8–16 in. long, 6–8 in. across, composed of alternate crowded corymbs 3–4 in. long, 2 in. across; lower pedicels 1 in. long solitary in axils of small lanceolate bracts ·2 in. long, grey-pubescent as are the branches and main rachis. *Calyx* 5-partite to base, segments distinctly unequal, ovate-obtuse, greenish-yellow, downy externally, the larger ·35 in. the smaller ·2 in. long. *Petals* 5 suborbicular, ·75 in. long, ·6 in. wide, except the upper obcordate ·6 in. long, ·5 in. wide, all rather pale uniform-yellow. *Stamens* 7 (the 3 upper reduced to staminodes) the 3 lower with much larger anthers and longer filaments than the 2 lateral pairs. *Pod* nearly straight, flat, thin, slightly swollen opposite the seeds, sutures faintly thickened, valves thickly coriaceous, sparsely puberulous, 6–9 in. long, ·5 in. wide, with a distinct stalk ·5 in. long. *Seeds* biseriate 20–30, oval, ·3 in. long, ·25 in. across, very thin, testa dark-brown, shining. Bak. in Flor. Brit. Ind. II, 264. *C florida* Vahl. Symb. III, 57; DC. Prodr. II, 499; W. & A. Prodr. 288; Bedd. Fl. Sylv. t. 179; Miq. Flor. Ind. Bat. I, 98. *C. sumatrana* Roxb. Hort. Beng. 31; DC. Prodr. II, 506; Wall. Cat. 5305. *Senna sumatrana* Roxb. Flor. Ind. II, 347.

Perak; near Ulu Selangor, *Kunstler* 8668! Blanja, *Wray* 147! Malacca; Brisu, *Holmberg* 869! Pahang; Pulo Rumpit, *Ridley* 2648! Distrib. India, Indo-China, Malay Archipelago.

Mr. Wray gives the local name of this in Perak as *Pako Nennong* and notes that the wood is strong and tough. Mr. Holmberg gives the name in Malacca as *Judl.*

§ 4. Chamæcrista DC. *Sepals* narrow; stamens 5 or 10 all perfect equal, or with the uppermost one smaller than the others and sometimes replaced by a staminode. *Pod* dehiscent small strap-shaped, flat, the seeds compressed parallel with the more or less oblique valves.

13. Cassia mimosoides Linn. Sp. Pl. 379. A low diffuse perennial, suberect or spreading, simple or much branched, glabrous or pubescent, sometimes suffrutescent 2–3 feet high; stem terete. *Leaves* 3–4 in. long, equally pinnate; leaflets 40–60 pairs, linear with a distinct oblique mucro, ·1–·15 in. long, glabrous on both surfaces, rachis puberulous with a small sessile gland on the petiole below the lowest pair of leaflets, stipules finely subulate, straight, ·2 in. long. *Flowers* axillary, solitary or 2–3 together, pedicels unequal, ultimately 1 in. long, bracteolate above the middle; buds pointed narrow. *Calyx* 5-partite to base, segments unequal linear-lanceolate to oblong-acute, ·25–·3 in. long. *Petals* 5 subequal, elliptic or orbicular, shortly clawed, obtuse, ·35 in. long. *Stamens* 10 perfect, alternately longer and shorter. *Pod* 2 in. long, ·2 in. across, linear, flattish. *Seeds* 20–25, obliquely rhomboid, compressed, testa dark-brown, shining. DC. Prodr. II, 503;

Miq. Flor. Ind. Bat. I, 101; Bak. in Flor. Brit. Ind. II, 266. *C. augustissima* Lamk. Encyc. Meth. I, 650; DC. Prodr. II, 505; W. & A. Prodr. 292. *C. sensitiva* Roxb. Hort. Beng. 32. *C. tenella* Roxb. Hort. Beng. 31. *Senna sensitiva* Roxb. Flor. Ind. II, 353. *S. tenella* Roxb. Flor. Ind. II, 354.

Prov. Wellesley; Tasek Selangor, *Ridley* 6995! Penang; Government Hill, *Curtis* 2507! Distrib. Throughout South-Eastern Asia.

14. Cassia Leschenaultiana DC. Mem. Soc. Hist. Nat. Gen. II, 2, 132. A suberect perennial, rather softly pubescent, 2–3 feet high, stems terete. *Leaves* equally pinnate 1–2 in. long, leaflets 16–24 pairs, narrowly oblong with a distinct oblique mucro and 4–6 strong very oblique secondary nerves, glabrous or puberulous, ·4–·6 in. long, ·1–·15 in. across; rachis pubescent, with a large sessile gland on the petiole below the lowest pair of leaflets, stipules lanceolate straight ·35 in. long. *Flowers* axillary, solitary or 2–3 together, pedicels unequal, ultimately ·25–·35 in. long, bracteolate not far above the base, buds pointed. *Calyx* 5-partite to base, segments unequal linear-lanceolate to oblong-acute, ·35 in. long. *Petals* 5 subequal, elliptic or orbicular, shortly clawed, obtuse, ·4–·6 in. long. *Stamens* 10 or 9 or 7 (all perfect or with the uppermost, or the three uppermost, reduced to staminodes), the 2–3 lowest often rather larger than the lateral ones. *Pod* 1–1·5 in. long, ·2 in. across, linear, flattish. *Seeds* 8–16, obliquely rhomboid, compressed, testa brown shining. DC. Prodr. II, 504. *C. Wallichiana* DC. Prodr. II, 505; W. & A. Prodr. 292. *C. mimosoides* var. *Wallichiana* Bak. in Flor. Brit. Ind. II, 266.

Penang; Government Hill, *Curtis* 829! Singapore; *Hullett* 663! Distrib. India; Himalayas; Indo-China.

This is reduced to *C. mimosoides* by Mr. Baker but it seems better in the meantime to keep the two plants apart. They are certainly, as Mr. Baker indicates, very closely related, but they do not much resemble each other and are not easily confounded.

45. Koompassia Maingay.

Very tall erect trees. *Leaves* odd-pinnate with alternate leaflets. *Flowers* copious small, obscure, in ample terminal panicles; bracts small deciduous. *Calyx*-tube very short conical, or none; sepals 5, lanceolate, subequal, very slightly imbricated. *Petals* 5 subequal, their margins not meeting. *Stamens* 5, filaments short or very short, anthers equal basifixed, dehiscing by two apical pores. *Ovary* sessile, subglobose or slightly elongated, 1-ovuled; style short acute, stigma small, terminal. *Pod* oblong, compressed, winged throughout its circumference, narrowed and somewhat twisted at the base, indehiscent. *Seed* solitary situated

near the middle of the pod; compressed, exalbuminous; cotyledons leafy, radicle short straight. Species 4, Malayan.

Leaflets green beneath; panicles rusty-pubescent; petals exceeding sepals and stamens; anthers short broad; ovary subglobose, rusty-pubescent	1. *K. malaccensis.*
Leaflets glaucescent beneath, much smaller; panicles grey, puberulous; petals much shorter than sepals and stamens; anthers long narrow; ovary compressed, very nearly glabrous	2. *K. parvifolia.*

1. KOOMPASSIA MALACCENSIS Maingay ex Benth. in Hook. Icon. Pl. XII, 58. t. 1164. A tree 80–100 feet high, with stem 3–4 feet in diameter; branches closely rusty-pubescent at length glabrescent. *Leaves* alternate odd-pinnate, 5–8 in. long, rachis rusty-pubescent; leaflets 7–9 alternate, ovate-lanceolate or oblong, acuminate, apex obtuse slightly emarginate, base rounded, 2–3 in. long, ·8–1·25 in. wide, coriaceous, dark-green glabrous and shining above, rather paler, dull and sparsely adpressed rusty-puberulous beneath; lateral nerves 10–12 pairs, faintly visible above, distinct beneath and connected by a fine reticulate secondary venation; petiolules rusty-pubescent ·25 in. long. *Panicles* terminal and extending into the axils of the uppermost leaves 5 in. long, 3–4 in. across; branches 2 in. long, pedicels ·2 in. long; all parts densely rusty-pubescent. *Calyx*-tube obsolete; sepals 5 slightly imbricate ovate-acute, ·12 in. long, densely rusty externally. *Petals* 5, oblong, obtuse, white, ·15 in. long, slightly exceeding the sepals, two and a half times as long as stamens. *Stamens* 5, filaments very short glabrous; anthers slightly incurved twice as long as broad, widely triangular. *Ovary* subglobose, densely rusty-pubescent, 1-ovuled; style short. *Pod* oblong, compressed, 4–5 in. long, 1·25–1·5 in. wide, reticulately wide-veined opposite the solitary seed. *Seed* 1·5 in. long, ·65 in. wide, cotyledons foliaceous; cordately 5-nerved at base, nerves conspicuous. Taubert in Engl. Natürlich. Pflanzenfam. III, 3. 156.

PERAK; Larut, *Kunstler* 7692! Thaipeng, *Wray* 2388! near Blangie, *Scortechini* 1712! MALACCA; Merliman, Selandar, Sungei Udang, etc.; *Maingay* 557 (*fide* Bentham); 604! *Derry* 51! *Holmberg* 880! *Goodenough* 1416! SINGAPORE; Selitan, etc.; *Ridley* 4567! 6403! *Cantley* (*fide* Taubert). PENANG; T. Bahang, *Curtis* 432! DINDINGS; Lumot, *Curtis!* DISTRIB. Sumatra (River Rawas, *Forbes!*).

This is the fine tree which the Malays know as *Kumpass*. Another species from Borneo (*K. Beccariana* Taubert,—founded on Beccari n. 2690) is evidently closely related; there are no specimens of the species at Calcutta. The description and drawing of the anthers in the original account of the genus are somewhat inaccurate.

2. KOOMPASSIA PARVIFOLIA Prain. A tree 80–100 feet high, branchlets glabrous or only puberulous at the tips. *Leaves* alternate odd-

pinnate, 3–4 in. long, rachis grey-silky; leaflets 9–11 alternate, elliptic-lanceolate, apex obtuse slightly emarginate, base widely cuneate, 1–1·25 in. long, ·25–·35 in. wide, chartaceous, medium-green, glabrous and shining above, glaucescent and sparsely silky-pubescent beneath; lateral nerves 4–5 pairs, quite invisible above and very faint beneath; petiolules grey-silky, ·2 in. long. *Panicles* terminal, 5 in. long, 2·5–3 in. across, branches 1·5 in. long, pedicels ·15 in. long slightly thickened under the calyx; all parts closely grey-silky. *Calyx*-tube short conical; sepals 5 slightly imbricate, ovate-lanceolate, margins of the inner slightly narrower, recurved, all ·15 in. long and silky-puberulous externally. *Petals* 5, elliptic, white, one-third as long as sepals, half as long as stamens. *Stamens* 5, filaments very short glabrous; anthers distinctly incurved, four to five times as long as broad, narrow-lanceolate. *Ovary* compressed glabrous except for a few hairs at the base, 1-ovuled; style short. *Pod* not seen.

Perak; Goping, *Scortechini* 1996!

This fine tree is known to the Malays as *Tualang*; its timber is largely used for building purposes. In this respect it resembles the preceding species as well as another famous timber-tree from Borneo the *Tapan* (*Koompassia excelsa* Taub. = *Abauria excelsa* Beccari).

From Signor Beccari's description of *Tapan* it is evidently a tree of much more gigantic proportions than the *Tualang*. Its foliage is probably similar for its leaflets are described as being of about the same size; the number of leaflets to a leaf Beccari does not state. But the flowers are very different for in *Tapan* the petals are hardly shorter than the sepals and are about the same length as the stamens, while the anthers are shorter than the filaments; in *Tualang* the petals are very small and the anthers are exceedingly long as compared with the filaments.

46. Dialium Linn.

Erect unarmed trees. *Leaves* odd-pinnate with more or less distinctly alternate leaflets. *Flowers* copious small obscure in ample terminal panicles. *Calyx*-tube very short; free segments lanceolate or ovate lanceolate, subequal, much imbricated, deciduous. *Petals* 0 (in all Malayan species). *Stamens* 2, erect, included; anthers attached near the base, dehiscence longitudinal. *Ovary* sessile, 2-ovuled; style filiform stigma terminal. *Pod* firm, dry, indehiscent, oblong, 1-seeded; endocarp pulpy. *Seed* albuminous, embryo foliaceous, radicle straight. Species about 15, cosmopolitan in the tropics, chiefly however in S.-E. Asia.

Leaves quite glabrous on both surfaces:—

Pods large, (firm), 1·5 in. long, strongly umbonate at apex ... ... 1. *D. Kunstleri.*

Pods smaller, not exceeding 1 in. in length, obtuse or only faintly apiculate:—
Pods fragile not velvety; leaflets thinly coriaceous:—
Pedicels as long as calyx, panicles laxly spreading 2. *D. patens.*
Pedicels shorter than calyx, panicles erect:—
Leaflets lanceolate alternate; seeds subquadrate longitudinally striate ... ... 3. *D. indum.*
Leaflets elliptic opposite; seeds orbicular reticulate ... ... 4. *D. laurinum.*
Pods firm, velvety; leaflets rigidly coriaceous ... 5. *D. Maingayi.*
Leaves more or less pubescent beneath:—
Leaflets large, 5–7:—
Leaflets opposite or nearly so, very faintly puberulous beneath; sepals pubescent within ... ... 6. *D. ambiguum.*
Leaflets conspicuously alternate, thickly covered beneath with golden-brown pubescence; sepals pubescent within ... ... 7. *D. platysepalum.*
Leaflets small, 9–15:—
Leaflets 9–11, conspicuously alternate, thickly covered beneath with golden-brown pubescence; sepals glabrous within ... ... 8. *D. Wallichii.*
Leaflets 13–15, opposite, rusty tomentose beneath; sepals puberulous within ... ... 9. *D. Kingii.*

1. Dialium Kunstleri Prain. A tree 100–130 feet high with spreading branches, stem 2–3 feet thick; branchlets slender, pale, rugose glabrous. *Leaves* alternate, odd-pinnate, 5–6 in. long; leaflets 5, rarely 3, alternate or subopposite, ovate-lanceolate, narrowly acuminate, apex entire, base cuneate, 4–5 in. long, 1·25–1·5 in. wide, coriaceous, rather dark-green shining above, dull and pale-green beneath, glabrous on both surfaces; lateral nerves ascending 5–6 pairs hardly visible above, faint beneath and with there a very faint reticulate intermediate secondary venation; petiolules stout, very short, ·1 in. long, glabrous. *Panicles* terminal and axillary 4 in. long, 3 in. wide; branches 2 in. long, glabrous, pedicels (in fruit) ·2 in. long. *Calyx* and *stamens* not seen. *Pod* subspherical, hardly compressed, obliquely prominently umbonate at the tip, firm, 1·5 in. long, 1·35 in. across; glabrous, very faintly verrucose, black. *Seed* solitary subrotund, smooth, dark-brown, dull, ·6 in. long, ·5 in. wide, ·2 in. thick.

Perak; Goping, 500–800 feet, *Kunstler* 4415!

This very fine species, easily distinguished from all the others by its much larger pods with very pronounced umbonate apex, has been but once reported and then, unfortunately, without flowers. It is perhaps most nearly related to *D. indum* from which, however, besides differing as to fruits it is also distinguished by its thicker and fewer leaflets. No native name has been given for the species.

2. Dialium patens Bak. in Flor. Brit. Ind. II, 270. A tree 60–80 feet high with a rather slender stem 10–20 in. thick; branchlets slender smooth pale-brown glabrous. *Leaves* alternate, odd-pinnate, 5–6 in. long; leaflets 3–5, opposite or subopposite, oblong to elliptic, rather abruptly cuspidately narrowed to an obtuse entire apex, base rounded, 3–5 in. long, 1·5–2·25 in. wide, subcoriaceous, bright-green and shining above, paler and dull beneath, glabrous on both surfaces; lateral nerves 8–10 pairs spreading, fine but distinct on both surfaces as is the reticulate intermediate secondary venation; petiolules stout, glabrous, ·25 in. long. *Panicles* terminal and axillary, 6–8 in. long, 4–5 in. wide, rachis and branches slender and flexuous, glabrous; pedicels glabrous spreading or cernuous, ·2–·25 in. long. *Calyx* ·15 in. long, ovoid-oblong in bud, tube obsolete, segments 5, white and almost petaloid, subequal, much imbricated, ovate-oblong obtuse, finely grey-pubescent on both surfaces, the two upper segments sometimes faintly connate. *Petals* 0. *Stamens* 2, filaments short slender, connective puberulous, anthers oblong basifixed. *Ovary* silky, narrowly-ovate, sessile, tapering upwards to the slender incurved style; ovules 2. *Pod* ovoid, slightly compressed, apex not apiculate, fragile, black, thinly grey-pubescent, ·5 in. long ·35 in. across, ·3 in. thick. *Seed* solitary, nearly regularly oblong in shape with rounded angles, ·3 in. long, ·25 in. across, ·15 in. thick, dark-maroon in colour, only slightly shining, neither striate nor reticulate.

Perak; Larut, at low elevations, *Kunstler* 5551! 5577! Malacca; *Griffith* 1846 (K. D.)! *Maingay* 537! Distrib. Borneo.

"*Maingay* 537" forms, with "*Griffith* 1846," the basis of this species. The description here given of pod and seed is drawn up entirely from an example of "*Maingay* 537." The discrepancy between the description in the *F. B. I.* and the actual fruit of the species the writer is unable to explain.

3. Dialium indum Linn. Mantiss. 24. A tree 60–70 feet high with spreading branches; branchlets slender, rugose, grey-puberulous. *Leaves* alternate, odd-pinnate, 6–8 in. long; leaflets 5–9, alternate or subopposite ovate-oblong to ovate-lanceolate, narrowly acuminate apex entire, base cuneate, 3–4 in. long, 1–1·5 in. wide, chartaceous, dark-green slightly glossy above, dull and rather paler beneath, glabrous on both surfaces; lateral nerves 8–10 pairs, faint above more pronounced beneath and with there a distinct reticulate intermediate secondary venation; petiolules glabrous ·2 in. long. *Panicles* terminal and axillary, 4 in. long, 3 in. wide; branches from ·25–2 in. long, faintly silky-puberulous as are the pedicels ·1 in. long, usually in clusters of 3, with caducous basal bracts. *Calyx* ·15 in. long, obtuse-oblong in bud, tube obsolete, segments 5 subequal much imbricate ovate-oblong obtuse, grey-puberulous on both surfaces. *Petals* 0. *Stamens* 2, opposite the two

upper calyx segments, filaments very short slender, anthers large oblong, basifixed, dehiscing longitudinally. *Ovary* silky, ovate, sessile, tapering upwards somewhat abruptly into a slender incurved style; ovules 2. *Pod* suborbicular, ·9 in. wide, slightly compressed, shortly apiculate, fragile, finely puberulous with minute silky hairs but not velvety. *Seed* solitary, obovate-quadrate, brown, finely longitudinally striate, shining, ·5 in. long, ·4 in. wide, ·15 in. thick. Linn. Mantiss. 511; Benn. Pl. Jav. Rar. 136, t. 30; Miq. Flor. Ind. Bat. I, 79; Koord. & Val. Bijdr. II, 20. *D. javanicum* Burm. Fl. Ind. 12. *Carandje* Bontius, Hist. Ind. Or. 93; Rumph. Herb. Amboin. II, 93, footnote. *Tamarindus monococcus minor, etc.* Plunk. Mantiss. 177; Amalth. 198, t. 144, f. 4.

Pahang; Pijaie, Pahang river, *Ridley* 2607! Penang; Ayer Etam, *Curtis!*

This is the *Kranji* of the Malays in Java according to Bontius, Rumphius, Miquel and Koorders. Mr. Ridley's specimens have no native name and as there is no indication that they are from a planted tree it may be reasonably supposed that the species is indigenous in Pahang. The specimens sent by Mr. Curtis are noted as being from "Ayer Etam in Miller's compound;" this remark, taken in conjunction with the fact that two native names "*Kranji borong* or *Kranji padie*" are given as alternatives, seems to point to the species being an introduced one in Penang. The name *Kranji borong* is sometimes applied in Malacca to the quite dissimilar species *D. platysepalum*.

The fruits are eaten for the sake of the pulp that forms the endocarp of the pod. In the *Indian Forester* for October 1896, it is stated that *Kranji* is one of the valuable timbers of the Straits Settlements. The scientific name cited in the notice is *D. indicum*; there is no species of that name. Perhaps the present species is intended; there is however nothing to show whether the tree referred to be this or some of the other species of *Dialium*.

4. Dialium laurinum Bak. in Flor. Brit. Ind. II, 269. A large tree with slender rugose dark-brown rusty-puberulous branchlets. *Leaves* alternate, odd-pinnate, 7–8 in. long; leaflets 7, rarely 5, subopposite, elliptic rather suddenly narrowed to a broad subobtuse or emarginate apex, base broadly rounded, 4–5 in. long, 1·75–2 in. wide, rigidly coriaceous, dark-green on both surfaces, glossy above, dull beneath, glabrous on both sides, secondary nerves 8–9 pairs oblique but not curved, faint above, rather prominent beneath and with there a distinct reticulate intermediate secondary venation; petiolules stout, glabrous, ·3–·4 in. long. *Panicles* terminal and axillary, 4 in. long, 3 in. wide, branches from ·5 to 2 in. long, rusty-pubescent, pedicels ·1 in long, usually in clusters of 3, silky. *Calyx* ·15 in. long, ovoid-oblong in bud, tube subobsolete, segments 5 subequal much imbricate, oblong-lanceolate, densely grey-velvety on both surfaces. *Petals* 0. *Stamens* 2 opposite the upper calyx-segments, filaments very short, slender; anthers oblong.

Ovary silky, ovate, subsessile, style slender incurved, ovules 2. *Pod* almost orbicular, 1 in. across not apiculate, black, thinly coated with short grey-pubescence, the thin epicarp extremely fragile. *Seed* solitary, almost exactly orbicular, ·5 in. across, ·2 in. thick, reddish-brown, shining and smooth with fine rather wide-meshed reticulations on the surface. Ridley, Trans. Linn. Soc. n. s. III, 294.

Malacca; Ayer Panas, etc.; *Maingay* 539 (K.D.)! *Goodenough* 1321! Singapore; Krangi, *Ridley* 6437! Pahang; Pigang, near Pekan, *Ridley*.

A very distinct species, easily recognised by its almost orbicular seed. Mr. Goodenough notes that this is known in Malacca as *Krangi papan*; he however quotes the same name as applied to a form of *D. platysepalum*. There are no Pahang specimens at Calcutta; the locality is cited from Mr. Ridley's paper on the Pahang flora.

5. Dialium Maingayi Bak. in Flor. Brit. Ind. II, 269. A large tree with spreading branches; branchlets slender lenticelled dark-brown, glabrous. *Leaves* alternate odd-pinnate, 4–5 in. long; leaflets 9, rarely 7, subopposite elliptic-oblong narrowed cuspidately to an obtuse or subacute entire apex, base rounded, 2–2·5 in. long, ·75–1 in. wide, coriaceous, very dark-green shining above, dull and paler green beneath, glabrous on both surfaces; lateral nerves 4–5 pairs not visible above, faint and not raised beneath, scarcely more conspicuous than the very faint intermediate reticulate secondary venation; petiolules slender ·2 in. long, glabrous. *Panicles* terminal, 4–5 in. long, 3 in. wide, branches 2 in. long, erecto-patent rusty-puberulous; pedicels ·15 in. long, 2–3 together, rusty-puberulous. *Calyx* ·25 in. long, ovoid in bud, tube very short campanulate, segments 5, or occasionally only 4, much imbricate, broadly ovate-obtuse, shortly brown-velvety silky on both surfaces. *Petals* 0. *Stamens* 2 opposite the two upper calyx-segments, filaments thick nearly as long as the anther, the connective beset with short brown hairs. *Ovary* black-velvety, ovate, shortly stipitate, style incurved glabrous; ovules 2. *Pod* widely obovoid, apex not apiculate, firm, ·9 in. long, ·8 in. wide, hardly at all compressed, densely persistently deep-olive velvety. *Seed* solitary, obovate-quadrate, finely longitudinally striate, shining, ·45 in. long, ·35 in. wide, ·15 in. thick.

Perak; Goping, *Scortichini* 2052! Upper Perak, 1000 feet, *Wray* 3407! 3767! Penang; Tulloh Bahang, *Curtis* 440! 3031! Malacca; Selandan, *Goodenough* 1533! Singapore; *Maingay* 538 K. D. (Herb. Propr. 1398 A.)!

The seeds of this species are hardly distinguishable except in colour from those of *D. indum*, the fruits and the foliage are however extremely different. Curtis gives *Krangi* as the native name of this species in Penang; in Malacca the tree is said by Goodenough to bear the alternative names *Kranji ambot* and *Kranji*

s'Kellat. The latter epithet is however also applied in Malacca to a form of the very different species *D. platysepalum*. No native name is cited with the Perak specimens or with the Singapore ones.

6. Dialium ambiguum Prain. A tree 40–50 feet high, stem 5–8 in. in diam.; branchlets very verrucosely lenticelled, glabrous, blackish. *Leaves* alternate, odd-pinnate, 8–9 in. long; leaflets 7, opposite or rarely subopposite, oblong, rather abruptly shortly caudate-acuminate apex obtuse entire, base rounded, 4–5 in. long 1·5–1·75 in. wide, very rigidly coriaceous, bright-green, glossy and glabrous above, dull and faintly puberulous under the lens beneath; leaf-rachis glabrous; lateral nerves 9–11 pairs, fine, only visible beneath, forming distinct intra-marginal loops and with a fine intermediate reticulate secondary venation; petiolules glabrous ·2 in. long. *Panicles* terminal and axillary, deltoid, slightly spreading, 5–8 in. long, 4–8 in. wide, branches 2–4 in. long very sparsely puberulous with grey-silky hairs as is the main rachis; pedicels usually in clusters of 3, ·15 in. long. *Calyx* ·15 in. long, ovoid in bud, tube obsolete, segments 5, subequal, much imbricate, broadly triangular subacute, reflexed after flower opens; densely brown-velvety on both surfaces. *Petals* 0. *Stamens* 2, opposite the two upper calyx-segments; filaments thick and fleshy one-third as long as anther. *Ovary* light green-silky, ovate, quite sessile, tapering gradually into the glabrous style; ovules 2. *Pod* and seed unknown.

Perak; Goping, 500–800 feet, *Kunstler* 6142! Malacca; Bukit Sadanen, *Derry* 510 (partly; only the specimens termed "*Kranji*")!

This tree is evidently very closely allied to *D. platysepalum* and may ultimately prove to be but a form of that variable species; if so, however, it is an exceedingly distinct variety, readily recognised owing to the differences in its ovary, in its pubescence, and in the arrangement of its leaflets. No native name is given for the Perak specimens; those from Malacca that appear to belong to the same species are simply termed *Kranji*.

7. Dialium platysepalum Bak. in Flor. Brit. Ind. II, 270. A tree 40–50 feet high; branchlets brown, closely-puberulous, sparsely lenticelled. *Leaves* alternate, odd-pinnate, 5–9 in. long; leaflets 5–7, usually conspicuously alternate, or rarely subopposite, elliptic or oblong to ovate-lanceolate, rather abruptly shortly caudate-acuminate apex obtuse entire, base rounded or cuneate, 3–5 in. long, 1–2 in. wide, very rigidly coriaceous, dark-green glossy and glabrous above, densely shortly yellowish-brown silky beneath; leaf-rachis finely puberulous; lateral nerves 9–11 pairs, fine, only visible beneath, forming distinct intra-marginal loops and with a fine intermediate secondary reticulate venation; petiolules puberulous ·25 in. long. *Panicles* terminal and axillary, deltoid, close or slightly spreading, 5–8 in. long, 4–7 in. wide, branches 2–3 in. long, erecto-patent, finely brown-silky as is the main-

rachis; pedicels usually in clusters of 3, ·15 in. long. *Calyx* ·2 in. long, ovoid in bud, tube rather distinct campanulate, segments 5, subequal, much imbricate, broadly triangular-obtuse, coriaceous, reflexed after flower opens, densely brown-velvety on both surfaces. *Petals* 0. *Stamens* 2, opposite the two upper calyx-segments; filaments thick and fleshy one-third to one-half as long as anther. *Ovary* black-velvety, ovate, shortly stipitate, gradually tapering upwards into the puberulous incurved style; ovules 2. *Pod* obovoid or orbicular, apex not apiculate, firm, spherical or slightly compressed, 1 in. long, ·6–·8 in. across, ·5–·7 in. thick; persistently brown-velvety. *Seed* solitary, orbicular, widely oblong or subrhomboid, pale-brown in fresh, darker in old specimens, finely longitudinally striate, ·45 in. long, ·35 in. wide, ·2 in. thick.

Var. *typica*; leaves usually ovate-lanceolate, cuneate less often rounded at the base; filaments half as long as anthers; pods orbicular very little compressed. *D. platysepalum* var. *typica* Bak. *loc. cit.*

Perak; Larut, *Wray* 4019! Malacca; *Griffith* 1847! *Maingay* 536! Sungei Udang, *Holmberg* 821! Bukit Sadanen, *Derry* 510 (partly; only the specimens termed "*Sepan*")! Merliman, *Derry* 89! Ayer Panas, *Goodenough* 1693! Johore; Machap, *Goodenough* 2000!

Var. *papan*; leaves elliptic, rounded rarely cuneate at the base; filaments only one-third as long as anthers; pods orbicular very distinctly compressed.

Malacca; Ayer Panas, *Holmberg* 814! *Derry* 1225! *Goodenough* 1553!

Var. *burong*; leaves oblong, rounded at base; pods clavately obovoid.

Malacca; Selandan, *Holmberg* 855!

The tree here described as var. *typica* is also the typical variety of *D. platysepalum* as described by Mr. Baker. For reasons given under that plant, the present writer has found it necessary to treat Mr. Baker's var. *Wallichii* as a distinct species.

No native name is given for the specimens of *D. platysepalum* collected by Griffith, Maingay, and Wray. Holmberg gives its Malay name as merely '*Koran*'; Derry for his n. 510 collected in 1890 (which, by the way, is quite different from his n. 510 collected in 1892) gives the name *Sepan*. For his n. 89 however Derry gives the name *Krangi s' Kellat*; the same name is used by Goodenough for his n. 1693. As explained under that species, Goodenough also uses this name, with the name *Krangi ambot* as an alternative one, for *D. Maingayi*; and it is true that though the flowers of *D. Maingayi* are quite different from those of *D. platysepalum*, their fruits are exceedingly alike and fruiting specimens of the two are only to be easily distinguished by the absence of pubescence from the leaves of *D. Maingayi*, the presence of a close golden-brown pubescence on the under-surface of those of *D. platysepalum*. Goodenough gives no native name for the Johore examples, which are quite like those from Perak and Malacca.

Whether the other two "varieties" here described are really separable as such, or whether, perhaps, they may not even prove to be distinct species, it is not, from the material at the writer's disposal, at present possible to decide. But field-botanists in the Peninsula should be able to settle the point satisfactorily for themselves.

VAR. *papan*, so named because each of the three gatherings has been noted as bearing the Malay name *Kranji papan*, differs from the type only in the characters noted. Its facies, owing to its broadly elliptic leaves and its conspicuously compressed pods, is somewhat distinct, and it is rather noteworthy that all three gatherings have received the same native name, a name too that has been applied to no other form.

VAR. *burong*, so named because it has been said by Holmberg to be termed *Kranji burong* by the Malays, has a still more distinctive facies owing to its pods being clavate, and because the pubescence on the under surface of its leaves is of a darker, somewhat brownish tint. Its leaflets too are in shape exactly like those of *D. ambiguum*. Still it does not seem possible to treat it as representing the fruit of *D. ambiguum* because in that tree the leaflets are almost exactly opposite and are very faintly puberulous beneath, in this they are conspicuously alternate and densely pubescent beneath. Its flowers have not been sent. The name *Kranji burong*, it should be noted, is used in Penang as an alternative one with *Kranji padie*, for *D. indum*.

8. DIALIUM WALLICHII Prain. A tree, branchlets brown, closely pubescent, slightly rugose, not lenticelled. *Leaves* alternate 7–8 in. long; leaflets 9–11, very conspicuously alternate, oblong-lanceolate, acuminate, apex acute, base cuneate, 2–2·25 in. long, ·6–·8 in. wide, coriaceous, bright-green glabrous above, densely shortly yellowish-brown-silky beneath; leaf-rachis softly pubescent; lateral nerves about 15 pairs, only visible beneath and there hardly more distinct than the faint intermediate secondary venation; petiolules pubescent ·1 in. long. *Panicles* terminal and axillary, 6–8 in. long, 3–4 in. wide, branches 2–3 in. long, ascending, rather flexuous, softly pubescent as is the main rachis; pedicels ·1 in. long. *Calyx* ·2 in. long, ovoid in bud, tube distinct, segments 5, subequal, much imbricate, broadly triangular-obtuse, thinly coriaceous, reflexed after flower opens, densely greenish-velvety outside, inside white, glabrous. *Petals* 0. *Stamens* 2, opposite upper calyx-segments; filaments very thick less than one-fourth the length of anther, connective uniformly softly pubescent. *Ovary* brown-silky, distinctly stipitate, tapering into the slender, incurved, puberulous style; ovules 2. *Pod* obovoid 1 in. long, ·75 in across, purplish-velvety. *Seed* solitary, subquadrate, indented near the micropyle; ·4 in. long, ·3 in. across, ·15 in. thick, finely longitudinally striate. *D. platysepalum* VAR. *Wallichii* Bak. in Flor. Brit. Ind. II, 270. *Connaracea* Wall. Cat. 8534.

MALACCA; *Maingay* 540! SINGAPORE; *Wallich* 8534! *Ridley* !

This very distinct species agrees with *D. platysepalum*, of which Mr. Baker has

made it a variety, in having the same golden-brown pubescence on the under surface of its leaflets. But the smaller size of these leaflets; the shortness of the petiolules; the great difference in sepals, glabrous within in *D. Wallichii*, velvety within in *D. platysepalum*; and the equally marked differences in the fruit and the seed have led the present writer to treat it as a species apart.

9. Dialium Kingii Prain. A tree with spreading branches 100–150 feet high, stem 3–4 ft. in diameter; branchlets brown closely pubescent, slightly rugose, not lenticelled. *Leaves* alternate 8–9 in. long; leaflets 13–15, opposite except the terminal one, oblong-lanceolate, apex abruptly cuneate or rounded with an obtuse or retuse tip, base cuneate or rounded, 2–2·5 in. long, ·6–·8 in. wide, very rigidly coriaceous, deep-green glabrous and shining above, rusty-pubescent beneath, leaf-rachis glabrous; lateral nerves about 10 pairs rather distinct, secondary intermediate venation faint; petiolules glabrous ·1 in. long. *Panicles* terminal and axillary, deltoid, 6–8 in. long, 8–10 in. across, branches 3–4 in., erecto-patent, densely dark-brown velvety as is the main rachis; pedicels usually in clusters of 3, ·25 in. long. *Calyx* ·25 in. long, ovoid in bud, tube obsolete, segments 5, subequal, much imbricate, broadly ovate-obtuse, reflexed after flower opens; externally densely brown-velvety, inside waxy-white closely pubescent. *Petals* 0. *Stamens* 2 opposite upper calyx-segments, filaments very thick and fleshy, one-third as long as the bright-yellow anther; connective uniformly softly pubescent. *Ovary* densely brown-velvety, sessile, tapering abruptly into the incurved puberulous style; ovules 2. *Pod* irregularly spherical, ·9 in. long, ·75 in. across, velvety-black. *Seed* solitary, subquadrate, warm-brown, faintly longitudinally striate, ·4 in. long, ·5 in. wide, ·2 in. thick.

Perak; Goping district, in hilly localities from 300–1000 feet, *Kunstler* 4627! 8187!

No Malay name has been sent for this tree which is one of the most distinct and is perhaps the finest of the Peninsular species of *Dialium*. Its nearest ally is evidently *D. Wallichii* from which however its opposite leaflets, rusty-pubescent beneath, and its larger flowers at once distinguished it.

47. Bauhinia Linn.

Unarmed erect trees, or climbers with circinate tendrils. *Leaves* simple usually more or less deeply cleft from the tip, rarely entire or fully divided into two leaflets. *Flowers* usually showy sometimes small, in copious simple or panicled often corymbose racemes. *Calyx*-tube with a disc produced to the top, sometimes long and cylindric, sometimes short and turbinate or campanulate, limb entire and spathaceous or cleft into 2 or 5 teeth, very rarely campanulate truncate. *Petals* 5 subequal usually with a distinct claw. *Stamens* 10, or reduced to 5

or 3 or 1, if fewer than 10 with or without sterile filaments; filaments free filiform; anthers versatile dehiscing longitudinally. *Ovary* stalked, many-ovuled; style long or short, stigma small or large and peltate, subterminal or oblique. *Pod* linear or oblong, flat, continuous within, dehiscent or indehiscent. *Seeds* albuminous, funiculus usually broadly triangular. Species 150, spread throughout the tropics.

Fertile stamens 10, (flowers large showy):—
- Leaflets distinct; calyx with a produced tube and a 5-cleft limb (§ LYSIPHYLLUM); a very extensive cirrhose climber ... ... 1. *B. diphylla.*
- Leaflets connate; calyx with a short tube and a spathaceous limb (§ PAULETIA); shrubs:—
  - Lobes of leaves rounded; flowers yellow the upper petal with a central purple blotch; pod puberulous, not ribbed along upper suture ... ... 2. *B. tomentosa.*
  - Lobes of leaves subacute: flowers pure white; pod glabrous ribbed along each side of upper suture ... 3. *B. acuminata.*

Fertile stamens 3:—
- Calyx-tube produced (§ PHANERA):—
  - Buds narrowly clavate, the calyx-tube passing gradually into the limb; tendrils 0; (flowers large showy):—
    - Erect; leaves glabrous above; calyx-limb spathaceous; pods glabrous ... ... 4. *B. purpurea.*
    - Climbing; leaves puberulous above; calyx-limb dividing into equal segments; pods pubescent ... 5. *B. mollissima.*
  - Buds widely clavate, with a rather abrupt transition from tube to limb; tendrils circinate more or less plentiful:—
    - Buds club-shaped—calyx-tube slightly ampullæformly dilated downwards, limb in bud obovate; anthers much longer than broad; (leaves of two connate leaflets with rounded or subacute apices):—
      - Petals glabrous except on midrib and claw externally; (flowers long-pedicelled in pyramidal terminal corymbs):—
        - Stipules persistent; style glabrous ... ... 6. *B. albo-lutea.*
        - Stipules deciduous; style densely pubescent ... 7. *B. semibifida.*
      - Petals uniformly densely pubescent externally:—
        - Petals much longer than calyx-lobes:—
          - Flowers long-pedicelled in pyramidal lateral and terminal corymbs; leaves pubescent, (stipules large persistent orbicular) ... 8. *B. Hullettii.*
          - Flowers short-pedicelled in dense terminal corymbs; leaves glabrous:—
            - Stipules large persistent orbicular ... 9. *B. Griffithiana.*
            - Stipules small deciduous ... ... 10. *B. ferruginea.*
        - Petals not longer than calyx-lobes; (leaves pubescent; corymbs terminal dense, flowers very shortly pedicelled) ... ... 11. *B. Ridleyi.*

Buds clove-shaped—calyx-tube cylindric, limb in bud ovate or orbicular; anthers shortly oblong:—

Leaves of two connate leaflets with rounded apices; (calyx-tube considerably longer than limb) ... 12. *B. glauca.*

Leaves entire or divided at the tip (in young plants of some species casually split to the base) into two narrow acute or acuminate lobes:—

Calyx-tube much longer than the limb; (leaves usually entire, less often divided at the tip, flowers in dense terminal corymbs):—

Leaves 5–7-nerved, adpressed-pubescent beneath; calyx rusty-downy; pod pubescent ... 13. *B. cornifolia.*

Leaves 7–9-nerved, glabrous beneath; calyx sparsely puberulous; pod glabrous ... 14. *B. bidentata.*

Calyx-tube not exceeding the limb:—

Inflorescence lax, the lower flowers not at all deciduous; leaves thick firm:—

Flowers in racemes, the lower pedicels not sensibly longer than those above:—

Racemes long, many-fld; leaves all entire, glabrous beneath ... ... 15. *B. lucida.*

Racemes short, few-fld.; leaves rather deeply bifid, densely pubescent beneath ... 16. *B. Scortechinii.*

Flowers in corymbs, the lower pedicels manifestly longer than those next above:—

Leaves deeply cordate often subpeltate, not much longer than broad, sometimes 2-fid at tip, petiole 1 in. long ... ... 17. *B. Kingii.*

Leaves shallow-cordate, twice as long as broad, all entire, petiole ·5 in. long ... 18. *B. Finlaysoniana.*

Inflorescence dense, most of the lower pedicels deciduous leaving the rachis below as a longish nodose peduncle; leaves thin flexible:—

Leaves entire or rarely slightly emarginate at tip, 5-nerved; calyx glabrous; (pod glabrous) ... ... 19. *B. Wrayi.*

Leaves divided at apex (only a few in region of inflorescence entire), nerves more than 5; calyx-pubescent:—

Leaves as broad as long, nerves 9–11, apical sinus wide deltoid; calyx rusty-pubescent; pod large pubescent ... 20. *B. integrifolia.*

Leaves longer than broad, nerves 7–9, apical sinus narrow; calyx grey-silky; pod small glabrous; *flowers small* ... 21. *B. glabrifolia.*

Calyx-tube very short (§ Lasioneema); (flowers small, in long narrow many-fld. racemes):—

Calyx-limb 5-partite; petals white; pods small glabrous; leaves flexible, divided at apex:—

Pod short, 2-seeded ... ... 22. *B. anguina.*

Pod longer, 3–5-seeded ... ... 23. *B. Curtisii.*
Calyx-limb entire; petals red; pods large densely pubescent (3–5-seeded); leaves rigid, entire ... ... 24. *B. strychnoidea.*

§ 1. Lysiphyllum Benth. Fertile *stamens* 10. *Calyx* with a long tube and 5-cleft limb. *Pod* broad indehiscent. Leaflets distinct.

1. Bauhinia diphylla Ham. in Syme, Embassy 476 c. Ic. (1800). A very extensive glabrous twining species with circinate tendrils, sometimes spreading 200–300 feet or further. *Leaves* cordate at base; leaflets always quite free, each 5–6-nerved, flexible, rounded at both ends, wider below, 3 in. long, 2 in across, pale-green glabrous on both surfaces; petiole glabrous ·75–1·25 in. long, slightly thickened at both ends. *Flowers* very large, in lax terminal racemes 8–12 in. long, pedicels glabrous ascending 1·5–2 in. long, bracts small ovate squamous; buds 2 in. long fusiform. *Calyx* thickly coriaceous, green, glabrous, limb cut to base into 5 lanceolate equal reflexed segments 1·2 in. long, tube ·8 in. long very slightly infundibuliform. *Petals* lanceolate erect, clawed, equal, as long as calyx-lobes, ·4 in. wide, white, faintly veined. *Stamens* 10, all fertile, equal, anthers linear, filaments as long as petals, glabrous. *Ovary* glabrous very long-stalked, style ·5 in. long, somewhat incurved. *Pod* very large, thin and flat, 10–16 in. long, 3 in. wide, stipe 2 in. long, rather finely transversely veined. *Seeds* 30–40 in a row along the middle of the pod, oval, somewhat compressed, ·5 in. long, ·3 in. across, ·2 in. thick, testa pale-brown shining. Wall. Cat. 5784; Bak. in Flor. Brit. Ind. II, 278. *Bauhinia Buchanani* Desv. Ann. Sc. Nat., ser. I, IX, 430. *Phanera diphylla* Benth. Pl. Jungh. 264.

Malacca; *Griffith* (fide *Baker*). Distrib. Burma; S. India.

This species is extremely plentiful in Burma but has never been sent to Calcutta from Malaya. It is inserted on the authority of Mr. Baker in the *Flora of British India* II, 278.

§ 2 Pauletia Cav. Fertile *stamens* 10. *Calyx* with very short tube and spathaceous limb. *Pod* narrow dehiscent. Erect shrubs with large showy flowers and connate leaflets.

2. Bauhinia tomentosa Linn. Sp. Pl. 375. An erect shrub with downy zig-zag rounded branchlets. *Leaves* truncate at base, flexible, rather broader than long, 2–2·5 in. wide, 7–9-nerved, cut three-sevenths down into two rounded obtuse or faintly acute lobes, shining glabrous above, closely pubescent beneath; petiole pubescent, slightly grooved above, thickened at both ends, ·5 in. long. *Flowers* in short-peduncled leaf-opposed 2-fld. (rarely 1- or 3-fld.) peduncles ·4–1·2 in. long, pedicels erect ·2 in. long, 2-bracteolate, bracts linear ·25 in. long; buds narrowly ovate-acute, ·7 in. long, the tip very shortly subulately 5-lobed. *Calyx* green, finely closely pubescent, splitting spathaceously to the base of

the ·5 in.-long limb, tube ·2 in. long, distinctly infundibuliform. *Petals* obovate-spathulate, 1·75 in. long, ·8 in. wide, yellow, the upper with a purple central blotch. *Stamens* 10, all fertile, subequal, anthers linear, filaments hirsute in lower half. *Ovary* distinctly stalked, densely tomentose, style ·5–·7 in. long, straight. *Pod* 4–5 in. long, ·5–·7 in. across, compressed, at length dehiscent, when ripe only faintly puberulous, not ribbed along upper suture; stipe ·2–·25 in. long. *Seeds* 10–16, oblong, flattened, ·25 in. long, ·2 in. across, testa dark-brown shining. Roxb. Hort. Beng. 31; DC. Prodr. II, 514; Roxb. Flor. Ind. II, 323; Wall. Cat. 5790 A—E; Bot. Mag. t. 5560; W. & A. Prodr. 295; Miq. Flor. Ind. Bat. I, 75; Bedd. Flor. Sylv. 92; Bak. in Flor. Brit. Ind. II, 275. *B. speciosa* Roxb. in Wall. Cat. 5791 not of Vogel.

Penang; fide *Baker*. Andamans; *King's Collectors!* Distrib. S.-E.-Asia; Trop. Africa.

There are no Malayan specimens at Calcutta; the plant in the Andamans is, if not cultivated, probably introduced.

3. Bauhinia acuminata Linn. Sp. Pl. 376. A small erect shrub with obscurely downy zig-zag angular branches. *Leaves* slightly cordate, flexible, rather longer than broad, 3–6 in. wide, 9–11-nerved, cut one-third down into two triangular subobtuse or acute lobes, shining glabrous above, glaucescent hairy (sometimes at length glabrescent) beneath; petiole puberulous grooved above, thickened at both ends, 1–1·5 in. long. *Flowers* in leaf-opposed few-fld. corymbs, peduncle ·5 in. long, pedicels erect the lowest ·4 in. long, 2-bracteolate, bracts linear or subulate ·15 in. long; buds lanceolate acuminate 1·5 in. long, the tip very shortly subulately 5-lobed *Calyx* green, glabrous or faintly puberulous, splitting spathaceously to the base of the 1·25 in.-long parallel-veined limb, tube ·25 in. long, very slightly infundibuliform. *Petals* oblong, pure white, glabrous, 1·75 in. long, 1 in. wide. *Stamens* 10, all fertile, subequal, anthers linear, filaments hirsute in lower third. *Ovary* long-stalked glabrous, style ·5 in. long, curved. *Pod* 4–5 in. long, ·6–·7 in. broad, firm, glabrous, compressed, at length dehiscent, strongly ribbed along each side of the upper suture, stipe ·5 in. long. *Seeds* 10–15, ovate, flattened, ·3 in. long, ·2 in. wide. DC. Prodr. II, 513; Roxb. Hort. Beng. 31; Flor. Ind. II, 324; Wall Cat. 5794; W. & A. Prodr. 295; Miq. Flor. Ind. Bat. I, 74; Bak. in Flor. Brit. Ind. II, 276. *B. candida* Ait. Hort. Kew. II, 49; DC. Prodr. II, 513 not of Roxb. *B. purpurea* Wall. Cat. 5797 (D only) not of Linn.

Andamans; very common, *King's Collectors!* Perak; *Kunstler* 413! 2386! 8283! *Scortechini* 1812! Malacca; *Hervey!* etc. Distrib. China, India, Indo-China, Malay Archipelago.

§ 3. Phanera Lour. Fertile *stamens* usually 3, sometimes 4–5.

Calyx-tube usually more or less produced; limb 5 cleft or, very rarely, spathaceous. Erect or scandent; flowers variable in size.

4. Bauhinea purpurea Linn. Sp. Pl. 375. An erect tree 20–30 feet high, with moderately stout glabrescent branches and without tendrils. *Leaves* roundish, base shallowly cordate, apex divided one-third to one-half down, sinus wideish, lobes rounded obtuse or subacute; rigidly subcoriaceous, 4–6 in. long and broad, medium green, glabrous above, paler and glabrous or faintly puberulous beneath; nerves 9–11; petiole 1·5 in. glabrous; stipules small membranous, triangular, ·1 in. long, deciduous. *Flowers* in terminal and axillary short-peduncled few-fld. corymbs, 2–4 in. long; lower pedicels ·25–·5 in. long, puberulous as is the rachis, bracts minute deltoid, deciduous; buds clavate 1·5 in. long, tapering uniformly from the blunt apex to the base. *Calyx* tawny-downy, limb ·9 in. long, splitting into 2 coriaceous valves slightly divided at the apex into 5 short teeth, tube slightly dilated upwards ·6 in. long. *Petals* 5, oblanceolate acute with long claw, white to purple, 1·75 in. long, ·5 in. wide. *Stamens* 3–4 fertile, anthers linear-oblong, filaments white, as long as the petals. *Ovary* very long-stalked, puberulous, ovules 16–20, style stoutish ·4 in. long, stigma rather large oblique peltate. *Pod* glabrous 8–12 in. long, ·8–1 in. across, tardily dehiscing, valves firm woody flat, rather pointed at both ends, stipe 1 in long. *Seeds* 12–16, compressed, orbicular, ·5 in. in diam. testa brown. Roxb. Hort. Beng. 31; Ham. in Trans. Linn. Soc. XIII, 497; Wall. Cat. 5797 in part; Roxb. Flor. Ind. II, 320; W. & A. Prodr. 296; Beld. Flor. Sylv. 92; Bak. in Flor. Brit. Ind. II, 284. *B. triandra* Roxb. Hort. Beng. 31; Wall. Cat. 5799; Roxb. Fl. Ind. II, 320. *B. coromandeliana* DC. Prodr. II, 515. *Phanera purpurea* Benth. Pl. Jungh. 262; Miq. Flor. Ind. Bat. 1, 60.

Singapore; *Hullett* 218! perhaps planted. Distrib India; Indo-China; China.

5. Bauhinia mollissima Wall. Cat. 5782 (1830). A rather slender climber, usually small but sometimes reaching 60–80 feet in length, branches slender persistently rusty-tomentose; apparently always without tendrils. *Leaves* roundish, base cordate, apex divided one-third down, sinus wide, lobes obtuse; rigidly subcoriaceous, 4–6 in. long, rarely a little narrower than broad, bright-green; above persistently puberulous along the nerves, elsewhere densely papillose and velvety to the touch but ultimately not hairy, beneath thinly persistently rusty-pubescent; nerves 11–13; petiole 1·25–1·5 in., rusty-pubescent. *Flowers* in leaf-opposed racemes, peduncle subterete ·5–2·5 in. long, compressed towards tip, densely rusty-tomentose, lower flowers usually deciduous, bracts persistent ovate-acute under ·1 in. long, pubescent externally,

glabrous within; pedicels ·25 in. long, rusty-tomentose, 2-bracteolate near the apex; buds narrowly clavate 2–2·5 in. long, the narrowly fusiform upper part rather shorter than the narrow slightly infundibuliform base. *Calyx* densely tawny- to rusty-tomentose limb splitting into reflexed equal linear-lanceolate lobes 1–1·25 in. long, tube 1–1·25 in. long. *Petals* 5, narrowly oblanceolate, the four lower 2 in. long, ·3 in. wide, reddish-brown with a central yellow streak, the upper 2·25 in. long, ·5 in. wide, bright-red with a central branching yellow line, all narrowed into a long claw and pubescent externally. *Stamens* 3 fertile, anthers linear-oblong, filaments yellowish, uniform, glabrous. *Ovary* densely tawny-pubescent, stalk ·5 in. long, tomentose as is the style ·7 in. long, stigma small peltate; ovules 4–6. *Pod* pubescent, 4 in. long, 1 in. wide, tapering to both ends, stipe ·5 in. long. *Seeds* 1–2, compressed, orbicular, about ·4 in. in diam. *B. elongata* Korth. Nat. Verh. Gesch. 89 t. 24 (1839); Bak. in Flor. Brit. Ind. II, 281. *B purpurea* Zoll. & Mor. Syst. Verzeichn. 1; Nat. en Geneesk. Arch. III, 69, not of Linn. *Phanera elongata* Benth. Pl. Jungh 262; Miq. Flor. Ind. Bat. I, 61. *B. Pottsii* G. Don, Gen. Syst. II, 462.

Perak; *Scortechini! Kunstler* 1024! 2461! 5165! Kedah; at Yau, *Ridley* 5206! Penang; *Porter* (Wall. Cat. 5782)! Malacca; *Maingay* 542/2! Distrib. Northwards to Tenasserim; southwards to the Malay Archipelago.

The name given by Korthals being of considerably later date than that employed by Wallich, Dr. Wallich's name is here adopted. Korthals' figure conveys a rather inaccurate idea of the colour of the flower, the true nature of which is given from a full field-note made by Mr. Kunstler.

6. Bauhinia albo-lutea Prain. A slender shrubby climber with slender rusty-pubescent branches, tendrils few circinate glabrous. *Leaves* roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes usually subacute; rigidly subcoriaceous, 2·5–4 in. long, often rather broader than long, dark-green; glabrous above, persistently puberulous, rarely closely pubescent, beneath; nerves 11–13; petiole 1·5–2·5 in., sparsely puberulous; stipules oblong-obtuse, ·2 in. long persistent. *Flowers* in few-flowered lax pyramidal terminal racemes, 3–4 in. long, 3 in. across, pedicels rusty-puberulous erecto-patent the lower 1·5–1·75 in. long, bracts lanceolate ·2 in. long, bracteoles subulate ·15 in., deciduous; buds club-shaped, ·9 in. long, the obovoid upper part exceeding the ampullæform base. *Calyx* rusty-puberulous, limb splitting into reflexed lanceolate segments ·5 in. long, ·1 in. wide, tube ·4 in. long, slightly dilated towards base. *Petals* cream-coloured, 5 subequal, oblanceolate subacute distinctly clawed, 1·25 in. long, ·3 in. wide, glabrous within, and glabrous externally except on the claw and

along the lower third of the midrib. *Stamens* 3 fertile, anthers linear-oblong, filaments uniform 1·5 in. long. *Ovary* distinctly stalked, rusty-pubescent, style slender glabrous, ·8 in. long, stigma oblique peltate. *Pod* thin oblong with black glabrous woody valves. *Seeds* 2 (*fide* Miquel). *Bauhinia ferruginea* Kurz Journ. As. Soc. Beng. XLV. 2. 128 (Enum. Pl. Nicobars); loc. cit. 289 (Burm. Flora) not of Roxb. *Phanera albo-lutea* Miq. Flor. Ind. Bat. 1, 1079.

Nicobars; Great Nicobar, *Jelinek* 241! Distrib. Indo-China; Sumatra.

It is rather strange that this species should occur in Burma, the Nicobars and Sumatra and not have as yet been gathered in the Malay Peninsula. It is nearer to *B. semibifida* than to *B. ferruginea*, with which Mr. Kurz has placed it, both on account of its long pedicels and because of its almost glabrous petals, but it differs very markedly as regards bracts and stipules as well as in its ovary which has a glabrous style. Its nearest allies are, however, the Indian *B. nervosa* which differs in having pubescent petals, and the Sumatran *B. stipularis* Korth., which differs in having petals with cordate instead of cuneate bases.

7. Bauhinia semibifida Roxb. Hort. Beng. 31. A very strong climber often exceeding 30 feet in length, with stems 4–6 in. thick; branchlets stoutish brightly rusty-silky, tendrils glabrous few, thick, woody, circinate. *Leaves* roundish, base cordate, apex divided one-third to one-half down, sinus narrow apiculate, lobes round or subacute; rigidly subcoriaceous, 2–3 in. long, sometimes a little narrower than broad, light-green and glabrous above, beneath with reddish rather densely rusty nerves, elsewhere sparsely adpressed-rusty silky; nerves 9–11; petiole 1–1·5 in., sparsely rusty-silky, stipules broadly ovate, falcate, ·15 in. long, very deciduous. *Flowers* in pyramidal terminal racemes 4–10 in. long, 3 in. across, pedicels erecto-patent, rusty-pubescent, 1–1·5 in. long, bracts ·2 in. long, lanceolate, deciduous; buds club-shaped ·9–1·2 in. long, the obovoid upper part exceeding the ampullæform base. *Calyx* densely rusty-pubescent, limb splitting into reflexed lanceolate segments ·5–·7 in. long, ·15 in. wide, tube dilated slightly towards base, ·4–·5 in. long. *Petals* 5 subequal, oblanceolate obtuse, shortly clawed, ·8–1 in. long, ·35 in. wide, dull, white, glabrous except on the claw and along the base of the midrib externally where there is a faint rusty pubescence. *Stamens* 3 fertile, anthers linear-oblong, filaments white, uniform, shorter than the petals. *Ovary* distinctly stalked densely rusty-silky, ovules 6–8, style thick silky stout, ·4 in. long; stigma large oblique peltate. *Pod* thin oblong, with black glabrous woody valves, 4 in. long, 1·25 in. wide, stipe ·35 in. long. *Seeds* 4–6, flattened, orbicular, ·5 in. in diam. Wall. Pl. As. Rar. t. 253; Cat. 5783; Roxb. Flor. Ind. II, 330; Wight Ic. t. 263; Bak. in Flor. Brit. Ind. II, 280. *Phanera semibifida* Benth. Pl. Jungh. 263; Miq. Flor.

Ind. Bat. I, 61. *Bauhinia ferruginea* VAR. *excelsa* Bak. in Flor. Brit. Ind. II, 283; not *Phanera excelsa* Bl. *Phanera sumatrana* Miq. Flor. Ind. Bat. I, 1078.

MALACCA; *Griffith* 1868; Mount Ophir, *Lobb!* SINGAPORE; *Lobb! Maingay* 542/3! *Schomburgk* 60! *Hullett* 55! 146! *Kunstler* 1251! *Ridley!* DISTRIB. Sumatra; Borneo.

This is very near indeed to *B. ferruginea*, but is easily distinguished by the pubescence on the outside of the petals being limited to a line on the centre near the base. *Phanera excelsa* Bl., from Borneo, reduced by Korthals to *Bauhinia ferruginea* is a quite distinct species, recently again reported by Hullett (n. 246). The Malacca specimen collected by Griffith which Mr. Baker refers to *B. ferruginea* VAR. *excelsa* is not at Calcutta, but Maingay 542/3 referred at Kew to the same variety is, at Calcutta, exactly the same as typical *B. sumatrana* Miq. and is therefore only a large form of *B. semibifida*. Another Maingayan sheet (n. 542/2, referred also to *B. ferruginea* VAR. *excelsa*) is, at Calcutta, the quite different *B. mollissima* Wall. (*B. elongata* Korth.).

8. BAUHINIA HULLETTII Prain. A strong shrubby climber reaching 20 feet in length, branchlets stoutish pubescent, tendrils few circinate pubescent. *Leaves* roundish, base cordate; apex divided one-third down, sinus narrow apiculate, lobes round; rigidly subcoriaceous, 2·5–4 in. long, rather longer than broad, dark-green sparsely pubescent above, paler and closely adpressed-pubescent beneath; nerves 9–11; petiole 1–1·5 in., densely pubescent; stipules orbicular hirsute foliaceous, ·5 in. in diam., persistent. *Flowers* in lax few-fld. lateral leaf-opposed racemes, 3–6 in. long, 3 in. across, pedicels erecto-patent densely rusty-tomentose, 1·25–1·5 in. long, bracts lanceolate ·25 in. long as are the linear bracteoles ·15 in. long; buds club-shaped, ·7–·9 in. long, the obovoid upper part exceeding the ampullæform base. *Calyx* pubescent, rose-red as are the pedicels, limb splitting into reflexed lanceolate segments ·4–·5 in. long, ·1 in. wide, tube slightly dilated towards base, ·3–·4 in. long. *Petals* rose-pink, 5 subequal, oblanceolate-obtuse, long-clawed, 1·25 in. long, ·4 in. wide, far exserted, glabrous within, very densely tomentose externally. *Stamens* 3 fertile, anthers linear-oblong, filaments uniform pink, 2 in. long. *Ovary* distinctly stalked, densely silky, style thick tomentose stout, 1·2 in. long, stigma large oblique peltate. *Pod* unknown.

PENANG; *Curtis* 784! *J. Scott! Kunstler* 1347! PERAK; *Wray* 177! MALACCA; *Holmberg* 775!

Very near *B. Griffithiana* but differs in having the stipules, though similar, very much smaller; in having the leaves pubescent instead of glabrous; in having long-pedicelled lax-flowered lateral corymbs instead of short-pedicelled dense-flowered terminal ones, and in having the flowers red or pink.

9. BAUHINIA GRIFFITHIANA Prain. A very strong shrubby climber reaching 20 feet in length, branchlets stout glabrous, tendrils few cir-

cinate, glabrous. *Leaves* roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes round; rigidly subcoriaceous, 2·5–4 in. long, about as long as broad, dark-green shining above, paler beneath, quite glabrous on both surfaces; nerves 9–11; petiole 1–1·5 in. glabrous; stipules orbicular foliaceous, ·75 in. in diam., persistent. *Flowers* in pyramidal terminal racemes 3·5–6 in. long, 3 in. across, pedicels spreading, rusty-pubescent, ·4 in. long, bracts ovate ·3 in. long, ·25 in. wide, subpersistent as are the two similar subequal bracteoles; buds club-shaped 1 in. long, the broadly obovoid upper part exceeding the ampullæform base. *Calyx* rusty-puberulous, limb splitting into reflexed lanceolate segments ·6 in. long, ·15 in wide, tube slightly dilated towards base ·4 in. long. *Petals* bright-yellow, 5 subequal, oblanceolate obtuse, shortly clawed, 1·25–1·5 in. long, ·4–·5 in. wide, glabrous within, densely tomentose externally. *Stamens* 3 fertile, anthers linear-oblong, filaments red, dilated in the middle, 2 in long. *Ovary* distinctly stalked, densely silky; ovules 6–8; style thick silky, stout, ·6 in. long, stigma large oblique peltate. *Pod* thin, oblong, with black glabrous woody valves, 5 in. long, 1·5 in. wide, stipe ·35 in. long. *Seeds* 4–6, flattened, ovate, ·5 in. long, ·35 in. across. *Bauhinia ferruginea* VAR. *Griffithiana* Bak. in Flor. Brit. Ind. II, 283. *Phanera Griffithiana* Benth. Pl. Jungh. 263; Miq. Flor. Ind. Bat. I, 65.

MALACCA; *Griffith* 1867! *Maingay* 542! *Hervey!* *Derry* 188! *Holmberg* 775! PERAK; *Scortechini* 298! PAHANG; *Ridley* 2606!

This agrees in foliage with *B. ferruginea* with which Mr. Baker has united it, and it has the same pubescence on the outside of the petals. But it differs considerably in flower and very markedly in the nature of its bracts and of its large persistent stipules and Mr. Bentham seems to the writer to have been undoubtedly justified in treating it as specifically distinct. It is in reality more nearly allied to *B. Hullettii* which has however pink flowers and pubescent leaves, and has the long-pedicelled flowers of *B. semibifida* and *B. albo-lutea*, than it is to the species in which Mr. Baker includes it.

10. BAUHINIA FERRUGINEA Roxb. Hort. Beng. 90. A very strong shrubby climber sometimes exceeding 20 feet, branchlets stoutish soon glabrescent, tendrils few circinate glabrous. *Leaves* roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes round; rigidly subcoriaceous, 2·5–4 in. long, always about as broad as long, dark-green, shining and glabrous above, paler and glabrous beneath; nerves 9–11; petiole 1–1·5 in., glabrous; stipules broadly ovate, falcate, ·15 in. long, very deciduous. *Flowers* in pyramidal terminal racemes 3·5–6 in. long, 3 in. across, pedicels spreading, rusty-pubescent, ·4 in. long, bracts ·2 in. long, lanceolate, deciduous; buds club-shaped 1 in. long, the broadly obovoid upper part exceeding the ampullæform base. *Calyx* rusty-puberulous, limb splitting into reflexed lanceolate segments ·6 in. long,

·15 in. wide, tube slightly dilated towards base, ·4 in. long. *Petals* pale greenish-yellow, 5 subequal, oblanceolate-obtuse, shortly clawed, 1–1·25 in. long, ·35 in. wide, glabrous within, densely tomentose externally. *Stamens* 3 fertile, anthers linear-oblong, filaments pink, uniform, 2 in. long. *Ovary* distinctly stalked, densely silky; ovules 6–8; style thick, silky, stout, ·6 in. long, stigma large oblique peltate. *Pod* thin, oblong, with black glabrous woody valves, 8 in. long, 2 in. wide, stipe ·5 in. long. *Seeds* 4–6, flattened, broadly ovate, ·5 in. long, ·4 in. across. Wall. Cat. 5776; Roxb. Flor. Ind. II, 331; Bak. in Flor. Brit. Ind. II, 283 excl. both the varieties and the syn. of Korthals and G. Don. *Phanera ferruginea* Benth. Pl. Jungh. 262; Miq. Flor. Ind. Bat. I, 62.

Perak; *Wray* 622! 1258! *Scortechini* 67! *Kunstler* 2508! 3492! 6173! Penang; *Porter* (Wall. Cat. 5776)! *Curtis* 211!

This is very near to *B. semibifida* Roxb. but is at once distinguished by its petals being externally uniformly pubescent.

Bauhinia ferruginea Korth., referred by Mr. Baker to Roxburgh's plant, is an exceedingly distinct species. Korthal's plant is, in fact, the basis of *Phanera excelsa* Miq., which Mr. Baker elsewhere separates (as to citation) as a variety of *B. ferruginea*. The plant described as var. *excelsa* by Mr. Baker is, however, still another species (*B. sumatrana* Miq., which is only a form of *B. semibifida*). *B. Pottsii* G. Don, also referred here by Mr. Baker, has a tomentose pod and therefore cannot possibly be the present species. Don's plant is doubtless *B. mollissima* Wall. which is the only tomentose-fruited species at all nearly related to the present one.

11. Bauhinia Ridleyi Prain. A very strong shrubby climber reaching 20 feet in length, branches stoutish, thinly but persistently rusty-silky, tendrils few circinate persistently silky. *Leaves* roundish, base cordate, apex divided one-third down, sinus narrow apiculate, lobes usually subacute; rigidly subcoriaceous, 2·5–4 in. long, sometimes a little longer than broad, dark-green strigose above, densely adpressed-pubescent beneath; nerves 9–11; petiole ·75–1 in., densely rusty-pubescent; stipules ovate-lanceolate, falcate, ·15 in. long, very deciduous. *Flowers* in densely congested terminal corymbs 2 in. long and broad, pedicels densely silky ·3 in. long, spreading, bracts and bracteoles equal orbicular, persistent, densely tomentose, ·25 in. long; buds club-shaped ·7 in. long, the obovoid upper part exceeding the ampulliform base. *Calyx* densely softly rusty-pubescent, limb splitting into reflexed lanceolate segments ·4 in. long, ·1 in. wide, tube ·3 in. long, slightly dilated towards base. *Petals* pure-white, 5 subequal, oblong-obtuse, hardly clawed, not exserted, glabrous within, densely tomentose externally, ·4–·5 in. long, ·2 in. wide. *Stamens* 3 fertile, anthers crimson, linear-oblong, filaments ·75 in. long, uniform, red. *Ovary* shortly stalked, densely tomentose, style thick, tomentose, stout, ·5 in. long, stigma large oblique peltate. *Pod* unknown.

Perak; *Scortechini* 140! 519! *Kunstler* 1096! Penang; *Ridley! Curtis* 1291! Johore; *King and Hullett!*

Very nearly related to *B. ferruginea*, *B. Hullettii*, *B. Griffithiana*, and like these species with petals densely pubescent outside; it is, however, easily recognised by its dense corymbs and by its short petals, not at all exserted.

12. Bauhinia glauca Wall. Cat. 5785. A spreading climber with glabrous slender branchlets; tendrils numerous circinate rusty puberulous. *Leaves* cordate at base, bifid to the middle with obtuse lobes and a narrow sinus; firm, thinly coriaceous, rather broader than long, 2–3 in. across, glabrous above, thinly persistently adpressed rusty-pubescent especially on the nerves beneath; nerves 9–11; petiole ·75–1·25 in. long, stipules linear-subulate ·2 in. long. *Flowers* in copious, dense, pedunculed or very rarely subsessile, leaf-opposed and terminal corymbs, the peduncles sparsely rusty often 1–2 in. long, lower pedicels ·5–·75 in. long sparsely rusty, bracts and bracteoles linear-subulate, ·15–·2 in. long; buds clove-shaped ·65 in. long, the ovoid head one-half shorter than the ridged cylindric base. *Calyx* glabrous, limb splitting into subequal ovate-acute lobes ·25 in. long, tube ·4 in. long, puberulous within. *Petals* 5 subequal, cream-coloured, oblong very long-clawed, wavy at the margin, ·75 in. long, sparsely pubescent externally. *Stamens* 3 fertile, anthers short-oblong, filaments white uniform glabrous, ·9 in. long, exceeding the petals, declinate. *Ovary* glabrous with a distinct slender stalk and a stoutish style, ·15 in. long, slightly incurved; stigma small; ovules about 20. *Pod* thin glabrous, flat, 6–8 in. long, 1·5–2·5 in. across, stipe ·25–·3 in. long. *Seeds* 15–20 in a line down the centre of the pod, much compressed, oval, ·5 in. long, ·3 in. wide. Bak. in Flor. Brit. Ind. II, 282. *Phanera glauca* Benth. Pl. Jungh. 265; Miq. Flor. Ind. Bat. I, 68, t. 2 A.

Perak; *Scortechini* 219! *Wray* 3332! Penang; *fide* Baker. Distrib. Indo-China; China; Malayan Archipelago.

The pods are like those of *B. diphylla* but smaller and with shorter stipe. Its nearest allies are the Chinese *B. corymbosa* with similar but smaller leaves and with similar flowers but with narrow pods, and the Assam *B. tenuiflora* with similar pods but with less deeply bifid leaves and with a much longer calyx-tube. Mr. Baker has seen a variety from Singapore with smaller leaves (var. *parvifolia*); this has not yet been sent to Calcutta.

13. Bauhinia cornifolia Bak. in Flor. Brit. Ind. II, 278. A very large slender creeper 100–150 feet long, stems 2–3 in. in diam., branches slender, thinly rusty-downy, tendrils few circinate downy. *Leaves* very slightly cordate at base, narrowed gradually to an obtuse or subacute entire or rarely bifid point, half as long again as broad, 2·5–3·5 in. long, 1·5–2·5 in. across, rather rigidly subcoriaceous, dark-green and glabrous above, thinly adpressed brown-silky beneath; 7- (rarely 5-) nerved; petiole 1 in. long, puberulous, slightly thickened at both ends. *Flowers*

in dense terminal corymbs, 4 in. long and broad; pedicels rusty, erecto-patent, the lower 1·75 in. long, bracts very small deciduous; buds clove-shaped, the cylindric base much longer than the spherical apiculate upper portion. *Calyx* rusty-downy, limb splitting into 5 subequal ovate shortly acuminate lobes ·25 in. long, ·2 in. across; tube cylindric ·6–·7 in. long. *Petals* 5 subequal, deep orange-yellow at length becoming brick-red, oblanceolate-oblong very shortly clawed, ·8 in. long, ·5 in. wide, externally sparsely rusty-pubescent. *Stamens* 3 fertile, anthers shortly oblong, filaments much shorter than petals. *Ovary* densely rusty-downy, shortly stalked, style ·2 in. long; stigma large peltate. *Pod* oblong woody, 4 in. long, 2 in. wide, externally finely adpressed rusty-pubescent; stipe ·15–·2 in. long. *Seeds* about 4, much compressed, dark-brown, 1 in. long, ·7 in. across.

Penang; *Griffith*; *Kurz*! *Hullett* 123! *Curtis* 488! Malacca; *Maingay* 545! Perak; *Kunstler* 6261!

Very closely related to *B. bidentata* but differing in having larger flowers, pubescent pods, and leaves slightly downy beneath. The character derived from the leaf-apex, which appeared reliable when Mr. Baker's account of the Indian *Bauhinias* was published 20 years ago, is now proved, by the large suites of specimens sent to Herb. Calcutta during recent years, to fail within the limits of both of these species.

14. Bauhinia bidentata Jack, Malay. Misc. II, 7, 76. A very large strong creeper over 150 feet long, or sometimes, when growing apart, shrubby or even tree-like (*Kunstler*, *Hullett*), branches slender glabrescent, tendrils few circinate quite glabrous. *Leaves* very slightly cordate at base, sometimes truncate, narrowed gradually to an obtuse or sub-acute bifid or entire point, half as long again as broad, 2·5–5 in. long, 1·5–3·5 in. across, rather rigidly subcoriaceous, dark-green shining above, pale beneath, glabrous on both surfaces; 7–9-nerved; petiole 1 in. long, glabrous, slightly thickened at both ends. *Flowers* in dense terminal corymbs 3 in. long and broad; pedicels finely pubescent, erecto-patent, the lower 1·5 in. long, bracts ultimately deciduous, ovate-acute, ·15 in. long; buds clove-shaped, the cylindric base much longer than the spherical acute but not apiculate upper portion. *Calyx* puberulous, limb splitting into subequal ovate-acute lobes ·3 in. long, ·2 in. across; tube cylindric striate 1 in. long. *Petals* subequal, deep orange-yellow at length becoming scarlet, oblong, spreading, shortly clawed, ·6 in. long, ·35 in. wide, externally sparsely rusty-pubescent. *Stamens* 3 fertile, anthers shortly oblong, filaments short hirsute. *Ovary* sparsely pubescent, distinctly stalked, style ·2 in. long, stigma large peltate. *Pod* oblong woody, 4·5 in. long, 1·5 in. wide, externally quite glabrous, stipe ·25 in long. *Seeds* 4–5, much compressed, ·5 in. long, ·35 in. wide. Hook. Comp. Bot. Mag. I, 223; Wall. Cat. 5778; Bak. in Flor. Brit.

Ind. II, 279. *Phanera bidentata* Benth. Pl. Jungh. 263; Miq. Flor. Ind. Bat. I, 64.

Perak; *Scortechini* 93! 248! *Wray* 1628! *Kunstler* 803! 1000! 3130! 3183! 3528! 4797! 6533! Penang; *Porter* (Wall. Cat. 5778)! *Hullett* 181! *Kunstler* 1300! *Curtis* 136! Selangor; *Ridley* 318! Johore; *King! Hullett* 833! Distrib. Sumatra (*Forbes!*); Philippines.

Nearest to *B. cornifolia* Bak.

15. Bauhinia lucida Wall. Cat. 5779 A. A large creeper more than 100 feet long, with stoutish glabrous branches; tendrils long circinate glabrous. *Leaves* usually distinctly cordate at the base, tapering from below the middle to an ultimately abruptly shortly acuminate point; rather longer than broad, 3–5 in. long, 2–2·5 in. wide, rigidly subcoriaceous, bright-green shining above, glabrous on both surfaces, 5-(rarely 7-) nerved; petiole ·3–·4 in. long, glabrous. *Flowers* in lax long-peduncled copious paniculate racemes, terminal and extending into the axils of the upper leaves, 4–6 in. long, 2 in. across; pedicels rusty-puberulous, erecto-patent, subequal throughout the raceme, rarely exceeding ·75 in. long, bracts lanceolate, deciduous, ·2 in. long, bracteoles 2 subpersistent, subopposite, subulate, ·15 in. long, near base of calyx-tube; bud clove-shaped, the subcylindric base as long as the obovoid blunt upper portion. *Calyx* closely rusty-tomentose, limb splitting into subequal ovate-obtuse lobes ·25 in. long, ·2 in. across; tube subcylindric ·25 in long. *Petals* subequal, bright-yellow, ovate-oblong, long-clawed, ·8 in. long, ·5 in. across, externally rusty-pubescent. *Stamens* 3 fertile, anthers shortly oblong. *Ovary* glabrous except on sutures near the base, stalk distinct pubescent; style ·15 in. long, glabrous, stigma large peltate. *Pod* narrowly oblong, woody, 3·5 in. long, 1 in. wide, narrowing towards the base, valves glabrous; stipe ·25 in. long, rusty-pubescent. *Seeds* 4–6, irregularly orbicular, compressed, ·4 in. across. *Bauhinia emarginata* Bak. in Flor. Brit. Ind. II, 278 not of Mill. and hardly of Jack. *Phanera lucida* Benth. Pl. Jungh. 262.

Penang; *Porter* (*Wall. Cat.* 5779)! Perak; *Wray* 2127! *Scortechini* 66! 1534! *Kunstler* 3434! 3902! 6659!

Mr. Bentham and Mr. Baker both refer to this species *B. emarginata* Jack, from Sumatra. But Jack's plant has, by the original description, corymbose racemes with long pedicelled flowers and has tomentose ovaries. It is therefore quite clear that it cannot be the same as *B. lucida* Wall. In any case the use of the name '*emarginata*' is to be deprecated, seeing that it was applied to a Mexican species (*B. emarginata* Mill. *Dict.*, ed. VIII, 5) before Jack's name was published.

16. Bauhinia Scortechinii Prain. A large climber with slender branches, glabrous except at the rusty-puberulous tips, tendrils long circinate puberulous. *Leaves* one and a half times as long as broad,

very shallowly cordate or truncate at base, from which they taper gradually to the junction of upper and middle third thence more abruptly to a bifid tip; 3·5–4 in. long, 2–2·5 in. wide, rigidly coriaceous, dark-green and shining above, uniformly densely rusty-tomentose beneath; nerves 9, rarely 7; sinus ·75 in. deep, very narrow; petiole 1·5 in. long, glabrous, thickened at both ends. *Flowers* in lax, few-fld., terminal short racemes under 2 in. long; pedicels and rachis rusty-pubescent, the former erecto-patent, subequal throughout, the lowest not exceeding ·5 in.; bracts lanceolate subpersistent ·15 in. long, bracteoles 2 subpersistent subopposite subulate, ·15 in. long; bud ·5 in. long, clove-shaped, the cylindric base as long as the spherical upper portion. *Calyx* closely rusty-tomentose, limb splitting into subequal ovate lobes; tube cylindric ·25 in. long. *Petals* subequal ovate, externally densely rusty-tomentose (fully opened flowers not seen). *Stamens* 3 sometimes 4 fertile, anthers short oblong, filaments hirsute. *Ovary* rusty-pubescent, stalk and style distinct, the latter glabrous; stigma large peltate *Pod* not seen.

Perak; *Scortechini* 698!

This species is evidently very closely related to *B. lucida* with which it agrees altogether in inflorescence and largely in shape of leaf. It differs however in having the leaves densely tomentose beneath and in having them all deeply bifid at the tip. The colour of the flower has not been noted by Father Scortechini, but the petals, in the dried state, are exactly like those of the numerous species that are noted as having orange-yellow flowers which redden with age, and are unlike those petals that are noted as white. Owing to the absence of fully opened flowers the dimensions of petals and the lengths of stipe and style cannot be given.

17. Bauhinia Kingii Prain. A small climber with slender zig-zag glabrous branches, tendrils circinate glabrous, often much thickened. *Leaves* deeply cordate often slightly subpeltate at base, narrowed gradually from the rounded basal lobes to an ultimately shortly acuminate emarginate or often deeply bifid rarely entire apex, rather longer than broad, 3·5–4 in. long, 2·5–3 in. wide, rigidly coriaceous, medium-green, glabrous and shining above, pale and puberulous along the nerves, very sparsely adpressed-pubescent elsewhere beneath; very uniformly 5-nerved, the nerves much branched outwards; petiole 1 in. long, glabrous. *Flowers* in lax, lateral axillary and terminal corymbs, 3 in. long, 2·5 in. broad, sometimes forming large loose leafless or leafy zig-zag panicles 6 in. across and at times 1–1·5 ft. long; pedicels very sparsely puberulous, spreading, the lowest 1·25 in. long; bracts at base ·2 in. long, lanceolate; bracteoles near apex ·1 in. long subulate, both deciduous; bud clove-shaped, ·5 in. long, the narrowly-infundibuliform base as long as the subglobose apiculate upper part. *Calyx* closely rusty-pubescent, limb splitting into subequal ovate, very shortly acuminate lobes ·25 in. long, ·2 in. across; tube narrow-infundibuliform,

·25 in. long, ·15 in. in diam. at apex. *Petals* subequal, bright-red (*Wray*), oblanceolate-obtuse, long-clawed, ·8 in. long, ·25 in. wide, externally rusty-pubescent. *Stamens* 3 fertile, anthers shortly oblong, filaments hirsute. *Ovary* rusty-pubescent along sutures, long-stalked; style long, curved, puberulous, ·25 in. long, stigma large peltate. *Pod* small, quite glabrous; woody, narrowly ovate, tapering to both ends, 2 in. long, ·8 in. across; stipe ·2 in. long, pubescent. *Seeds* 1 or 2, ovate, compressed, ·3 in. long, ·2 in. across.

Perak; *Scortechini* 320! on Gunong Batu Puteh, at 4500 feet, *Wray* 392! Selangor; Bukit Etam, *Kellsall* 2001! Distrib. Borneo?

This is an exceedingly distinct species, more nearly approaching *B. Finlaysoniana* than any of the other Peninsular species, but amply distinct in the shape and colour of its flowers, the smaller size of its pods, the pubescence on its leaves beneath; also in the shape of the leaves and the type of nervation. Beccari n. 835, from Borneo, of which however there are only 2 leaves and one flower at Calcutta, appears to be the same.

18. Bauhinia Finlaysoniana Grah. in Wall. Cat. 5801. A large climber, over 100 feet long, branches slender glabrous, tendrils few circinate glabrous. *Leaves* slightly cordate at base, oblong, narrowed rather suddenly from above the middle to an obtuse or emarginate or acute point; about twice as long as broad, 3–5 in. long, 1·5–2·5 in. across, rigidly coriaceous, medium-green, glabrous on both surfaces, 5- (rarely 3-) nerved; petiole ·3–·4 in. long, glabrous. *Flowers* in rather lax, terminal corymbs 3–4 in. long, 2–3 in. across; pedicels closely rusty-pubescent, erecto-patent, the lowest 1 in. long; bracts lanceolate, ·15 in. long, deciduous; buds clove-shaped, the subcylindric base rather shorter than the ovoid-acute upper portion. *Calyx* densely rusty-tomentose, limb splitting into subequal ovate-acute lobes ·25 in. long, ·2 in. across; tube subcylindric, ·2 in long. *Petals* subequal, creamy-white or pale yellow, orbicular, distinctly clawed, ·6 in. long, ·5 in. across, externally rusty-pubescent. *Stamens* 3 fertile, anthers shortly oblong. *Ovary* densely pubescent along sutures and on the distinct stalk, style short (·15 in.), glabrous, stigma large peltate. *Pod* (not quite ripe) linear-oblong, woody, 2 in. long, ·6 in. wide. *Seeds* 4–6. Bak. in Flor. Brit. Ind. II, 278. *Phanera Finlaysoniana* Benth. Pl. Jungh. 262.

Penang; foot of Government hill, *Curtis* 295! Perak; *Scortechini* 247! 1463! *Kunstler* 3589! *Wray* 2300! Distrib. Siam (*Finlayson*).

Mr. Bentham describes this as having almost glabrous petals; this is not the case in the Peninsular specimens. Both Mr. Bentham and Dr. Miquel doubt whether it be more than a form of *B. lucida*; it is, however, extremely distinct from that species and is much more nearly related to *B. Kockiana* Korth. (*Verh. Nat. Geschied.* 87, t. 10), which differs mainly in usually having 3-nerved leaves and in always having rather longer pedicels and a much longer calyx-tube. Dr. Finlayson's

specimens are said by Mr. Bentham to be from the Malay Archipelago, by Mr. Baker to be from the Peninsula; we know, however, from Dr. Wallich's correspondence that the majority of Finlayson's specimens, more particularly those without any definite locality, came from Siam.

19. Bauhinia Wrayi Prain. A shrubby creeper 15–30 feet long, with slender glabrous branches and circinate glabrous tendrils. *Leaves* flexible, truncate very rarely cordate at the base, tapering from about the middle to an acute entire, very rarely an obtuse emarginate apex, rather longer than broad, 2–3 in. long, 1·25–1·75 in. across, medium-green, glabrous above, glaucescent glabrous or faintly puberulous only on the nerves beneath; very uniformly 5-nerved; petiole slender, glabrous, ·5–·6 in. long. *Flowers* in dense close-fld. terminal and axillary racemes, 2·5–4 in. long, the lower flowers deciduous except the few that become fertilised, the remaining terminal portion corymbose 2·5 in. long and broad; pedicels very slender, thickening in fruit, 1·35 in. long, sparsely rusty as is the slightly nodose main-rachis, bracts subulate ·2 in. long, very deciduous; bud clove-shaped, only ·2 in. long, the spherical minutely apiculate upper part in diameter equalling the length of the slender cylindric base. *Calyx* glabrous, tube ·15 in. long, limb splitting into 5 spathulate subequal lobes ·15 in. long. *Petals* pale greenish-yellow, or white at length pinkish, broadly oblanceolate, long-clawed, 6 in. long, ·2 in. across, margins slightly wavy, sparsely pubescent externally. *Stamens* 3 fertile, anthers shortly oblong. *Ovary* small, 3–4 ovuled, distinctly stalked, quite glabrous throughout, style ·15 in. long, stigma small peltate. *Pod* obovate to oblong-obtuse, tapering to base, thin, woody, stipe ·2 in. long, 2–3 in. long, 1 in. across, quite glabrous. *Seeds* 1–2, rarely 3, very much compressed, broadly ovate, ·5 in. long, ·4 in. across, testa dark-brown, dull.

Perak; *Kunstler* 2238! 2466! 4049! 5243! *Scortechini* 1652! *Wray* 1934! 2782! Selangor; *Kunstler* 8758!

Very distinct from any other Peninsular species, and by its inflorescence (in which it most resembles *B. integrifolia* among the *Phaneras*) connecting *Phanera* with *Lasiobema*, its small flowers approaching those of the latter section. It is extremely nearly allied to a Bornean species (represented by *Mottley* n. 376 and *Haviland* n. 95) which differs in having deeply cordate leaves, in having quite glabrous pedicels, and in having the petals, though similarly crenulate, larger and almost glabrous. It is just possible that the Borneo plant may be the lost *B. cordifolia* Roxb.

20. Bauhinia integrifolia Roxb. Hort. Beng. 90. A large climber over 100 feet long, branches slender rusty-puberulous, tendrils circinate rusty. *Leaves* usually deeply cordate, always about as long as broad, mostly 4–6 in. across and with a deltoid apical sinus ·4–·6 in. deep; the leaves in the region of inflorescences usually small 1·25 in. long, 1 in. across, not infrequently entire; the leaves on young root-shoots

or seedlings paler and larger often 8 in. across, much broader than long with an obtuse-angled sinus reaching nearly halfway down and with divergent deltoid lobes 3–4 in. long; thinly subcoriaceous, bright-green, glabrous and shining above, at times brownish underneath especially on the nerves which are sometimes rusty-puberulous; nerves 11, very rarely 9; petiole glabrous cylindric thickened at both ends, usually 1·75–2·25 in. long, upper petioles in inflorescence ·25–·5 in. only; petioles of young shoots and seedlings sometimes exceeding 4 in. *Flowers* in terminal leafy panicles a foot long, the individual racemes dense close-fld., 3–6 in. long, the lower flowers deciduous except the few that are fertilised, the remaining terminal portion corymbose 3 in. long and broad; pedicels very slender, thickening in fruit, 1·5 in. long, spreading, rusty-pubescent as is the nodose main-rachis; bracts very short, ovate-acute, sometimes persisting; bud clove-shaped, ·35 in. long, the cylindric base slightly shorter than the ovate upper part. *Calyx* rusty-pubescent, tube ·15 in. long, limb splitting into 5 subequal ovate-acute lobes ·2 in. long. *Petals* 5 subequal, bright-yellow passing with age to orange and brick-red, broadly obovate, long-clawed, ·7 in. long, ·3 in. wide, margins slightly wavy, very densely rusty-pubescent externally. *Stamens* 3 fertile, anthers shortly oblong. *Ovary* 4–6-ovuled, densely pubescent, shortly stalked, style very long, ·6 in., glabrous, stigma small peltate. *Pod* oblong, flat, woody, 7–8 in. long, 2·5 in. across, externally pubescent, stipe ·15 in. long only. *Seeds* 3–5, very much compressed, broadly ovate, ·9 in. long ·7 in. across, margin deeply notched at micropyle; funicle flat triangular ·5 in. long, ·5 in. broad at base, narrowing obliquely to the hilum. Wall. Cat. 5780; Roxb. Flor. Ind. II, 331; Bak. in. Flor. Brit. Ind. II, 279. *Phanera integrifolia* Benth. Pl. Jungh. 263; Miq. Flor. Ind. Bat. I, 64 *and* Suppl. 286.

Pahang; *Ridley* 1360! 5023! Penang; *Wallich* 5780 B! *Curtis* 300! 500! 501! Prov. Wellesley; *Kunstler* 1608! Perak; *Scortechini* 98! 515! 1174! *Kunstler* 819! 964! 3585! 3947! 4897! 5538! *Wray* 46! Malacca; *Maingay* 541! 544! *Hullett* 89! *Hervey!* *Derry* 6! 76! 484! 1118! *Holmberg* 850! 866! *Goodenough* 1276! 1672! Distrib. Sumatra.

Like *B. Wrayi* this species serves to connect *Phanera* with *Lasiobema*. In Perak, Mr. Wray informs us, the Malay name of this species is *Dadau*; he says that string and rope are made from the inner bark. Dr. Jack, on the other hand limits the name *Dadaub*, in Sumatra, to his *B. emarginata*. In Malacca there appears to be some dubiety as to the Malay name of the species, the following being those noted:—*Akar Katop-Katop* (Derry, 1118; Holmberg, 866; Goodenough, 1276): *Akar tapak kuda merah* (Goodenough, 1672): *Sarau* (Holmberg, 850): *Panya Sarau* (Derry, 484).

21. Bauhinia glabrifolia Bak. in Flor. Brit. Ind. II, 281. A slender climber 50–80 feet long, stem 1·5 in. in diam., branchlets slender at first grey-silky, tendrils few short, circinate, woody, sparsely silky. *Leaves* truncate or shallowly cordate, very rarely deep-cordate at base, gradually tapering to an acute point, towards apex of twigs entire, lower down cleft at tip, with narrow sinus extending one-sixth to one-fourth down and with narrow acute lobes; the leaves of young plants and root-shoots bifid to the very base; rather longer than broad, 4–6 in. long, 3–4·5 in. wide, light-green, shining, quite glabrous above, when young pubescent on the nerves at length glabrous beneath; nerves 9 more rarely 7, in the quite 2-fid. leaves 3 or 4 to each lobe; petiole 1·25–2 in., glabrous. *Flowers* in terminal panicles, 8 in. long, 4 in. wide, of numerous dense short-peduncled many-flowered corymbs 2 in. long, 1·25 in. wide, pedicels erecto-patent ·35–·5 in. long, loosely grey-silky, bracts at bases of corymb-peduncles 2, stipellar, ovate-acute, ·15 in. long, silky beneath, glabrous above, at base of pedicels solitary, lanceolate, persistent, ·2 in. long, bracteoles about middle of pedicels 2, subopposed, subulate, ·15 in. long; buds clove-shaped, the spherical subapiculate upper part longer than th narrowly cylindric base. *Calyx* rather laxly grey-silky, limb splitting into spreading subequal ovate lobes with inturned tips, ·25 in. long, tube ·15 in. long. *Petals* small white, obovate, clawed, ·3 in. long, densely grey-silky outside. *Stamens* 3 fertile, anthers very shortly oblong, filaments white slender glabrous, ·5 in. long. *Ovary* densely silky especially along sutures, distinctly stalked, style glabrous slender, ·2 in. long, stigma small. *Pod* (young) with silky sutures and glabrous valves; stipe ·25 in. long. *Bauhinia diptera* Blume ex Miq. Anal. Ind. I, 12. *B. piperifolia* Kurz, Journ. As. Soc. Beng. XLV, 2, 288 not of Roxb. *B. anguina* Kurz, Journ. As. Soc. Beng. XLV, 2. 288 not of Roxb. *Phanera diptera* Miq. Flor. Ind. Bat. I, 70.

Perak; *Scortechini* 316! 1512 (spp. with distinct leaflets = *B. diptera* Bl.)! *Kunstler* 4311! 4511! 6170! *Wray* 3960! Penang; *Curtis* 801! 1541! Distrib. Tenasserim; Pegu; Borneo.

This is extremely nearly related to *Bauhinia piperifolia* Roxb. (*Phanera glabrifolia* Benth.) and has, indeed, been united with Roxburgh's species both by Mr. Kurz and by Mr. Baker. It is however very easily distinguished by its stipelliform main-bracts, not present in *B. piperifolia*; its much longer persistent bracts at base of pedicels; its pedicels less than half as long, with a spreading, not adpressed, tomentum; and its densely woolly ovaries, those of *B. piperifolia* being quite glabrous.

The oldest name is *Bauhinia diptera* Bl. but as the term is applicable only to young leafy root-shoots or to seedling plants and is quite inappropriate when used in connection with flowering branches of adult plants, it seems much better to neglect it. When Mr. Baker's name is used, however, it has to be recollected

that it is merely the name which one employs, and that this can be done only because Baker has referred to his *B. glabrifolia* some Tenasserim specimens collected by Helfer that differ specifically from the plant he describes; both the diagnosis and the cited synonyms of the *Flora of British India* must be altogether excluded.

§ 4. LASIOBEMA Korth. Fertile *stamens* 3. *Calyx* with very short tube and equally 5-partite or entire truncate limb. *Pod* dehiscent or (*B. anguina*) indehiscent. Slender climbers with long narrow racemes of very small flowers.

22. BAUHINIA ANGUINA Roxb. Hort. Beng. 31. A woody climber with slender glabrous branchlets and circinate tendrils. *Leaves* ovate, base cordate, apex of upper leaves often entire, of the others very variably shallowly to deeply 2-fid, sometimes on young plants and root-shoots quite divided to the base with more or less divergent and more or less acuminate lobes; membranous, 2·5–5 in. long, 2–3 in. wide, bright-green, shining, glabrous on both surfaces; nerves 5–7; petiole 1 in. long, glabrous. *Flowers* very small in many-fld. racemes arranged in terminal panicles often extending into axils of upper leaves, 6 in. long, as much across, individual racemes 2–4 in. long, ·5 in across, pedicels spreading, equal, ·15 in. long, very slender, faintly puberulous as is the main-rachis, bracts minute linear; buds small spherical, ·07 in. in diam. *Calyx* faintly puberulous, tube campanulate very short, lobes ovate ·07 in. long, spreading. *Petals* oblanceolate, ·12 in. long, puberulous externally, white. *Stamens* 3 fertile, filaments ·1 in. long. *Ovary* distinctly stalked, glabrous, style slender ·1 in. long, stigma minute. *Pod* thin flat oblong, glabrous, indehiscent, 1·5–2 in. long, 1 in. across. *Seeds* oblong, ·6 in. long, ·35 in. wide, only slightly compressed, long diameter in long axis of pod. Cor. Pl. III, t. 285; DC. Prodr. II, 516; Wall. Cat. 5773; Roxb. Flor. Ind. II, 328; W. & A. Prodr. 298; Bak. in Flor. Brit. Ind. II, 284. *B. scandens* Linn. Sp. Pl. I, 374 (as to Rheede's Malabar, not as to Rumphius' Malayan plant.) *Lasiobema anguinum* Korth. ex Miq. Flor. Ind. Bat. I, 71.

MALAYAN PENINSULA; *fide* Baker in *Flora of British India*. DISTRIB. India; Indo-China; Malay Archipelago.

Mr. Baker notes this as being from the Eastern Peninsula; no specimens have been sent to Calcutta as yet. Dr. Miquel claims it also as a native of the Malay Archipelago; from this region likewise, no specimens have as yet been sent here; all those at Calcutta from the Archipelago belong to *Lasiobema Horsfieldii* Miq. This latter form Mr. Baker has reduced to *B. anguina* and the writer agrees with Baker in believing that the two plants are not specifically separable. At the same time he considers it better to treat *L. Horsfieldii* as varietally distinct, on account of its much smaller pods which are only 1–1·25 in. long, and ·5–·6 in. wide: Dr. Watt too has, in Herb. Calcutta, proposed for the plant the name *B. anguina* VAR. *Horsfieldii* Watt MSS. The point is here dwelt on because of the possibility that, when *B. anguina* is again collected in the Peninsula, it may prove to be this Sumatra and

Java var. *Horsfieldii*, and not the typical, larger fruited Indian variety, that is characteristic of the region.

23. Bauhinia Curtisii Prain. A woody climber with slender very faintly puberulous branchlets. *Leaves* ovate-oblong, base rounded, apex divided at the tip into two short diverging deltoid lobes, sinus wide rectangular, a few of the smallest uppermost leaves entire at apex; membranous, 2·5–4 in. long, 2–2·5 in. wide, bright-green glabrous on both surfaces; nerves 5–7; petiole 1·25 in. long, glabrous. *Flowers* very small in terminal, simple, many-fld. racemes or panicles that extend into axils of upper leaves, 4 in. long and as much across, individual racemes 3 in. long, 1 in. across, pedicels spreading, equal, ·5 in. long, very slender, faintly puberulous as is the main rachis, bracts minute linear; buds small ovate-acute, ·15 in. long. *Calyx* puberulous externally, tube campanulate very short, lobes ovate-lanceolate spreading, ·15 in. long. *Petals* spathulate, glabrous, ·25 in. long, clawed, white. *Stamens* 3 fertile, filaments ·35 in. long. *Ovary* shortly stalked, glabrous, style slender, ·15 in. long, stigma minute. *Pod* thin flat, black, somewhat flexible, slightly recurved, quite glabrous, 2·5 in. long, ·75 in. wide, stipe ·07 in. long. *Seeds* 3–5, not seen quite ripe.

Kedah; Langkawi, Trutow, *Curtis* 1682! near the lake, *Curtis* 2619!

Very nearly related to *B. Championii* Benth., from S. China and the Eastern Himalaya, which has similar but rather larger pods. The present species, however, has longer pedicels, smaller buds, shorter calyx-lobes, a shorter stipe to the ovary and pod. The ovary here is also quite glabrous as are the leaves beneath; in *B. Championii* the ovary is somewhat silky, the leaves adpressed pubescent beneath. It is easily distinguished from *B. anguina* by the longer pods and pedicels. Mr. Curtis' specimens have no tendrils.

24. Bauhinia strychnoidea Prain. A slender climber 60–80 feet long with stems only 1 in. in diam., branches slender glabrous, tendrils few very small circinate glabrous. *Leaves* ovate-acute, base cuneate or rarely rounded, apex entire; rigidly subcoriaceous, 3–3·5 in. long, 1·5–2 in. wide, bright-green glabrous, polished above, dull beneath; nerves 5, the outer pair very slender the inner almost as strong as the laterally branching midrib with whose base they are usually more or less confluent; petiole ·75 in., glabrous. *Flowers* small, in many-fld. racemes arranged in terminal panicles extending into axils of upper leaves, 8–12 in. long, 4–6 in. across, individual racemes 6–10 in. long, 2 in. wide, pedicels spreading, equal, ·75 in. long, very slender, glabrous as is the main rachis, bracts minute linear; buds small, obovoid, ·2 in. long, *Calyx* glabrous, tube campanulate very short, limb wide-campanulate ·2 in. long and as much across, the entire margin truncate with 5 minute projections representing calyx tips. *Petals* spathulate, quite glabrous externally,

slightly puberulous within along midrib, the upper rather longer subacute, the others obtuse ·35 in. long, light-red, spreading. *Stamens* 3 fertile, filaments ·3 in. long. *Ovary* very shortly stalked, densely pubescent, style ·2 in. long, stigma large peltate. *Pod* thin flat densely velvety, 3–5 in. long, 2 in. across, valves woody; stipe very short. *Seeds* 3–5, ovate, dark-brown, 1 in. long, ·6 in. across.

Perak; *Kunstler* 5914! 7054! *Scortechini!* Selangor; Kwala Lampar, "top of the cave," *Kelsall* 1971!

A very remarkable species at once distinguished from any of the other Malayan ones by its leaves, which have the nervation of a *Strychnos*; and from all the hitherto known species by its truncate entire calyx. It might on this account be perhaps treated as the type of a new section. As regards fruit it might be placed in the section *Phanera*; as regards its other characters it agrees better with *Lasiobema* in which it is now placed.

48. Cynometra Linn.

Erect unarmed trees. *Leaves* with few coriaceous odd-pinnate leaflets. *Flowers* copious, minute, in axillary corymbs or racemes. *Calyx* with a very short tube and subbasal disc; divisions 4–5, oblong, imbricated. *Petals* 5, oblanceolate, equal, not exserted. *Stamens* 10, or in *C. polyandra* indefinite, filaments erect, free, filiform, exserted; anthers small, oblong, versatile, dehiscing longitudinally. *Ovary* sessile or short-stalked, 2-ovuled; style filiform, stigma capitate. *Pod* turgid, oblique-oblong, with very thick indehiscent, usually rugose, tough, somewhat fleshy valves. *Seed* exalbuminous, central, filling up the cavity. Distrib. Species 20, spread everywhere in the tropics.

Stamens 10 (§ *Eucynometra*); leaf-rachis glabrous:—

Flowers on stem and thick branches in racemes with a produced axis; pedicels glabrous; (leaves 1-jugate) ... 1. *C. cauliflora.*

Flowers among the leaves in racemes or corymbs without a produced axis; pedicels puberulous:—

Corymbs laxly umbelliform, bracts small very deciduous; pods rugose; leaves 1–2-jugate ... ... 2. *C. ramiflora.*

[Leaves 1-jugate ... ... subsp. *genuina*;

Leaves 2-jugate ... ... subsp. *bijuga*;

End-leaflets acute much exceeding basal pair ... ... var. *heterophylla*,

End-leaflets obtuse hardly exceeding basal pair ... ... var. *mimosoides*.]

Racemes dense subspicate, bracts subpersistent; pod smooth; leaves 3-jugate ... ... 3. *C. inaequalifolia.*

Stamens 40–60 (§ *Pseudocynometra*); leaf-rachis puberulous; (flowers in axillary corymbs; pedicels puberulous) ... 4. *C. polyandra.*

[Pod smooth ... ... var. *typica*;

Pod very rugose, leaflets considerably larger ... ... VAR. ? *Kurzii.*]

§ 1. EUCYNOMETRA. Stamens 10.

1. CYNOMETRA CAULIFLORA Linn. Sp. Pl. 382. A shrub or small tree 8–16 feet high. *Leaves* even-pinnate, leaflets 1-jugate with petiole under ·2 in. long or occasionally with one of the leaflets abortive, dimidiate-oblong to subfalcate-oblong, subsessile, 2–3 in. long, ·75–1·5 in. wide, base cuneate, apex acute or subacute slightly notched, subcoriaceous, dark-green, glabrous on both surfaces, slightly shining above, lateral nerves few ascending not very prominent beneath, not visible above. *Flowers* in small elongated sessile racemes, ·5–2 in. long, occasionally reduced to very short 2–3-fld. stalklets or to single flowers, clustered, rarely solitary, on rugose nodes on the stem, the bracts small concave-ovate, persistent, ·05 in. long, glabrous, pedicels ·2 in. long, slender glabrous, with small concave-ovate basal bracteoles, ·05 in. long. *Calyx*-tube very short, lobes 5, lanceolate, white, ·15 in. long. *Petals* linear, ·15 in. long, white or pink. *Stamens* 10, filaments ·2 in. long, slender, glabrous. *Ovary* glabrescent, shortly stipitate, oblique; ovules 2. *Pod* thick and fleshy, oblong to irregularly globose, apiculate, glabrous, 1–2 in. long, edible. DC. Prodr. II, 509; Roxb. Hort. Beng. 32; Wall. Cat. 5816 A, B; W. & A. Prodr. 293; Miq. Flor. Ind. Bat. I, 77; Bak. in Flor. Brit. Ind. II, 268.

MALACCA; *fide* Baker. DISTRIB. Cultivated occasionally in India and in our area; generally in the Malay Archipelago.

2. CYNOMETRA RAMIFLORA Linn. Sp. Pl. 382. A medium-sized, spreading, sea-coast tree, 20–30 feet high. *Leaves* even-pinnate; leaflets 1-jugate with petiole under ·2 in. long, or 2-jugate with rachis 1·25–2 in. long, the lowest pair always slightly, often much, smaller than the terminal, obliquely obovate-oblong to subfalcate-oblong, subsessile, 1–5 in. long, ·25–2·5 in. wide, base obliquely cuneate, apex obtuse or shortly bluntly acuminate, coriaceous, dark-green, glabrous on both surfaces, shining above, lateral nerves numerous, spreading, rather distinct. *Flowers* in small subumbellate corymbs on small branches above the axils of fallen leaves, ·3–·6 in. long, the bracts small ovate, the outer ·15–·2 in. in diam., very deciduous, pedicels ·3–·5 in. long, very slender, finely puberulous, with small lanceolate basal bracteoles. *Calyx*-tube very short, lobes 5, ovate-lanceolate, white, ·12 in. long. *Petals* white, linear-lanceolate, ·15 in. long, much narrower than sepals. *Stamens* 10, filaments slender, ·25 in. long, glabrous; anthers versatile. *Ovary* densely pubescent, subsessile, very oblique; ovules 2. *Pod* fleshy, strongly wrinkled, irregularly oblong or ovoid with a thick terminal fleshy tip, ·5 in. long, ·4 in. broad and nearly as thick. *Seed* oblong, ·4 in. long, ·3

in. wide, ·2 in. thick. Lamk. Encyc. Meth. II, 240; DC. Prodr. II, 509; Bak. in Flor. Brit. Ind. II, 267.

Subsp. *genuina*; leaves 1-jugate, leaflets subfalcate-oblong, shortly bluntly acuminate. *C. ramiflora* Miq. Flor. Ind. Bat. I, 78. *C. ramiflora* var. α W. & A. Prodr. 293.—Rumph. Herb. Amboin. I, t. 63; Lamk. Ill. t. 331 f. 2.

Not reported from our area. Distrib. Java, *Horsfield* 146 (erroneously distributed as *C. bijuga*)! Ceram, *Teysmann* 1961 (erroneously distributed as *C. cauliflora*)! Amboina, *Rumphius* (icon.)! *Teysmann* 5528!

Subsp. *bijuga*; leaves 2-jugate. *C. bijuga* Spanoghe, Linnaea XV, 201 (1841), name only.

α. Var. *heterophylla* Thw. Enum. Pl. Zeyl. 97; terminal pair of leaflets acute or shortly acuminate, larger than the basal pair. *C. bijuga* Miq. Flor. Ind. Bat. I, 78. *C. ramiflora* Bedd. Fl. Sylvat. t. 315, not of Linn. *C. polyandra* Miq. Anal. Bot. Ind. I, 11, not of Roxb.

Andamans; Coco Group, rare, *Prain!* S. Andaman coast, very rare, *King! King's Collector!* Perak; Matong, on the coast, *Wray* 2503! Johore; Skudai River, *Hullett and King!* Singapore; Sungei Jurong, *Ridley* 5891! Distrib. Ceylon, (*Walker*)! Sumatra, (*Forbes*)! Java, Timor, Borneo.

β. Var. *mimosoides* Bak. in Flor. Brit Ind. II, 267; terminal pair of leaflets obtuse, emarginate or retuse, hardly larger than the basal pair; leaflets much smaller than in var. α. *C. mimosoides* Wall. Cat. 5817 (1830). *C. ramiflora* var. β. W. and A. Prodr. 293. Rheede, Hort. Malab. IV, t. 31; Lamk, Ill. t. 331, f. 1? (seems to show 1-jugate leaflets only).

Andamans; very common in every tidal and beach forest. Distrib. Malabar, *Rheede* (icon.)! Ceylon, *Wallich* (*Cat.* n. 5816 C in part; mixed with cultivated examples of *C. polyandra* from Madras and erroneously distributed as *C. cauliflora*)! Sundribuns; Arracan; Martaban and Tenasserim.

The three plants here included in *C. ramiflora* have been somewhat misunderstood by Linnæus and indeed by most subsequent botanists. That the plant of Rumphius, here treated as subsp. *genuina*, will have to be kept apart from the other two as a distinct species in any careful monograph of the genus seems to admit of little question. Though mentioned in many works as Indian, no one has ever sent Indian specimens to Calcutta; the only authors who have actually seen specimens that were not from the Malay Archipelago are Wight and Arnott, Thwaites, and Trimen; the specimens mentioned by these writers in every case came from Ceylon not from India. No one has ever sent it from the Malay Peninsula.

It is tolerably certain that the two plants which form what is here termed

subsp. *bijuga* are not specifically separable, for some examples from the Andamans seem intermediate between the two. There are, however, no specimens that serve to link either of the forms with the 1-jugate subsp. *genuina*, and it will always be necessary to keep them apart as distinct—they are certainly very easily distinguishable—varieties.

Var. *heterophylla* is also said to be Indian; it is, however, only found in Indian gardens, though it does appear to be wild on the coasts of Ceylon. That var. *mimosoides* occurs in India seems likely from its having been figured by Rheede, though no one has ever collected it in Malabar again. It is, however, quite common in the Sundribuns at the northern end of the Bay of Bengal and extends from that area down the eastern side of the Bay as far as Tenasserim and the Andamans; it has never been reported from the Malay Peninsula or Archipelago, where var. *heterophylla* (*C. bijuga* Miq.) is the representative form. And just as the two forms grow side by side in the beach forests of the Andamans, so they both occur on the coasts of Ceylon, for a plant from Trincomalee issued by Wallich under 5816/C is the same thing as his own *C. mimosoides* from the coasts of Burma. Wight and Arnott, too, say that they also have seen specimens from Ceylon which are the same as Rheede's Malabar plant; there is no doubt that Rheede's plant is Wallich's *C. mimosoides*.

In the event of subsp. *bijuga* being treated as a "species" of which *heterophylla* and *mimosoides* are only varieties, it must be noted that the name to be employed, from the point of view of priority, should be Wallich's, which is a decade anterior to Spanoghe's. But the adoption of Wallich's name will afford an excellent example of the disadvantage of the modern craze that insists on a rigid adherence to the laws of priority, Spanoghe's name being so much the more suitable of the two.

3. Cynometra inæqualifolia A. Gray, Bot. U. S. Expl. Exped. 473. A lofty tree 150–200 feet high; leafy shoots at first enveloped in imbricating bracts. *Leaves* even-pinnate, rachis glabrous 2–3 in. long; leaflets 3-jugate, elliptic-oblong, base obliquely cuneate, inner side with the lower third to two-thirds of margin straight, narrower than outer with uniformly curved outline, apex subacuminate; rigidly coriaceous, dark-green, glabrous and smooth on both surfaces, shining above, lateral nerves 8–9 pairs very faint and hardly distinguishable from the secondary reticulations; sessile, 2–3 in. long, 1–1·25 in. wide, the lowest the smallest. *Flowers* in subcapitately congested axillary racemes 1–1·5 in. long, 1 in. wide, the closely imbricating bracts hard, striate, scarious, broadly ovate, ·25 in. across, pedicels puberulous, ·25–·3 in. long, with two oblong membranous basal bracteoles ·15 in. long. *Calyx*-tube very short, lobes 5, narrowly obovate, imbricate, ascending, ·2 in. long, white. *Petals* 5, oblanceolate, white, ·2 in. long, a little narrower than sepals. *Stamens* 10, filaments slender, ·4 in. long, glabrous, anthers versatile. *Ovary* densely pubescent, shortly stipitate, very oblique; ovules 2. *Pod* obovoid, thickly woody, obliquely obovoid, 2–2·25 in. long, 1·5 in. wide, ·75 in. thick. *Seed* solitary, irregularly oval-oblong, 1·6 in. long, 1 in. broad, ·5 in. thick. Bak. in Flor. Brit. Ind. II, 267.

Malacca; *Maingay* 589! *Derry* 893! Prov. Wellesley; Tasek Gelugur, *Ridley* 6981! Perak; *Scortechini* 2190! at Goping, *Kunstler* 6022! 6066!

§ 2. Pseudocynometra. Stamens 40–60.

4 Cynometra polyandra Roxb. Hort. Beng. 32. A large tree, the leafy shoots at first enveloped in imbricating bracts, the basal ones scarious ·3 in. in diam., the inner membranous and reaching 2 in. long, 1 in. across. *Leaves* even-pinnate, rachis puberulous 3–7 in. long; leaflets 3-jugate, elliptic-obovate or oblong, base obliquely cuneate, inner side with the lower half of margin straight, narrower than outer with uniformly curved margin, apex subacuminate, subcoriaceous, dark-green above, paler beneath, glabrous and smooth on both surfaces, hardly shining, lateral nerves 7–8 pairs more prominent beneath than the secondary reticulations, sessile, 2–5·5 in. long, 1–2·5 in. across, the lowest the smallest. *Flowers* in sessile axillary corymbs 2 in. long, 1·5 in. wide, the closely imbricating bracts hard striate scarious, broadly ovate, ·3 in. across, soon deciduous, pedicels pubescent, ·6–1 in. long with 2 very deciduous basal bracteoles. *Calyx*-tube very short, lobes 4, narrow-obovate, imbricate, reflexed, ·4 in. long, white. *Petals* 5, lanceolate, ·4 in. long, narrower than sepals, white. *Stamens* 40–60, filaments slender, ·5 in. long, glabrous, anthers versatile. *Ovary* densely pubescent, subsessile, very oblique; ovules 1–2. *Pod* oblique, oblong, woody, 2–2·5 in. long, 1·25–1·5 in. wide, smooth or rugose. *Seed* solitary, irregularly oblong, 1·5 in. long, 1 in. wide, ·5 in. thick.

Var. *typica;* pod smooth. *C. polyandra* Roxb. Hort. Beng. 32; Pl. Coromand. III, t. 286; Flor. Ind. II, 372; DC. Prodr. II, 509; Wall. Cat. 5815; W. & A. Prodr. 294.

Penang and Malacca; *fide* Baker. Distrib. Khasia, Silhet.

Var. ? *Kurzii;* pod very rugose, leaflets rather larger. *C. cauliflora* Wall. Cat. 5816 E.

Penang; *Jack* (Wall. Cat. 5816 E)! *Kurz!* on Govt. Hill, "Apl. 1890" and "May 1893" *Curtis!* Perak; *Scortechini!*

There are no specimens of *C. polyandra* proper from Penang or Malacca in Herb. Calcutta. The specimens of "var.? *Kurzii,*" which may possibly prove, when fully represented, to be a distinct species, has been obtained in fruit by Kurz alone; all the other specimens are in leaf only; its flowers are, so far, unknown.

49. Tamarindus Linn.

A spineless tree. *Leaves* abruptly pinnate. *Flowers* in racemes. *Calyx*-tube turbinate; disc produced above its base; teeth lanceolate much imbricated, the two lowest connate. *Petals* only the three upper developed, the two lateral ovate, the upper hooded, the two lower

reduced to scales. *Stamens* monadelphous, only 3 developed, the others reduced to mere bristles at the top of the sheath; anthers oblong, versatile, dehiscing longitudinally. *Ovary* many-ovuled, with a stalk adnate to the calyx-tube; style filiform, stigma capitate. *Pod* linear-oblong, many-seeded, with a thin crustaceous epicarp and thick pulpy mesocarp. *Seeds* exalbuminous. One species, now planted everywhere in the tropics.

TAMARINDUS INDICA Linn. Sp. Pl. 34. A large unarmed tree with spreading branches, 40–60 feet high, stem 2–3 feet in diam., the young branchlets at first puberulous, elsewhere quite glabrous. *Leaves* even-pinnate, 2·5–6 in. long, leaflets 10–20 pairs rather close, oblong-obtuse, ·35–1·25 in. long, ·2–·3 in. across, glabrous on both surfaces, medium-green above, paler sometimes glaucescent beneath; coriaceous, subsessile, reticulate-veined; stipules linear, early caducous. *Flowers* in simple or panicled terminal or lateral racemes 2–4 in. long, bracts concave, caducous, ·25–·3 in. long, obovate-elliptic, pedicels articulated under the base of calyx, slender, ·25 in. long, glabrous; bracteoles small with puberulous margins. *Calyx* ·5 in. long, faintly puberulous, tube narrowly turbinate, ·2 in.; limb 4-partite, segments subequal, ·3 in. long, ·2 in. wide, ovate-acute, entire, much imbricated, membranous. *Petals* 3, an upper and two lateral, yellowish with pink stripes, obovate-oblong, subequal, ·4 in. long, slightly exceeding calyx-limb, ·25 in. across, slightly narrowed to a short claw; the two lower petals replaced by small scales. *Stamens* 3 fertile, anterior, connate nearly half their length, alternating with rudimentary bristle-like staminodia; anthers oblong, versatile. *Ovary* stipitate, style rather short equalling the stamens; stigma terminal, obtuse, slightly thickened; ovules 8–10 or more. *Pod* linear-oblong, nearly straight, thickened, subcompressed; 3–8 in. long, 1 in. wide, ·4 in. thick; outer layer of pericarp thin, crustaceous, scurfy; middle layer pulpy, acid, traversed by fibres. *Seeds* 3–10, obovate-elliptic, compressed, ·6 in. long, ·4 in. wide, ·2 in. thick; testa thick shining, sides areolate. DC. Prodr. II, 488; Roxb. Flor. Ind. III, 215; Wall. Cat. 5824; W. & A. Prodr. 285; Miq. Flor. Ind. Bat. I, 82; Bak. in Flor. Brit. Ind. II, 273; Oliver, Flor. Trop. Africa, III, 307. *T. occidentalis* Gaertn. Fruct. II, 310, t. 146; DC. Prodr. II, 488. *T. umbrosa* Salisb. Prodr. 323. *T. officinalis* Hook. Bot. Mag. t. 4563.

ANDAMANS; Great Coco Island, introduced by the sea, *not* planted, *Prain!* KEDAH; "growing wild at the top of limestone hills," *Kunstler* 1728! SELANGOR; "in dense old jungle," *Kunstler* 8613! DISTRIB. Planted throughout the tropics; believed by Oliver to be truly indigenous in Africa.

50. SINDORA Miq.

Unarmed lofty trees. *Leaves* abruptly pinnate; leaflets few rigidly

coriaceous. *Flowers* small, panicled. *Calyx* with a very short tube and basal disc; segments 4, valvate or very slightly imbricated. *Petal* 1, the size and shape of the upper calyx-segment. *Stamens* 10, the upper free and without anther, the others declinate shortly monadelphous, hirsute, unequal, the two nearest the free staminode always fertile, rather larger than the rest which are alternately short and long and may casually have sterile anthers or none; anthers oblong, versatile, dehiscing longitudinally. *Ovary* 2–5-ovuled, short-stalked, pubescent; style long, filiform, circinate, stigma small terminal capitate. *Pod* more or less oblique, broadly rounded-oblong, dehiscent, the valves flat, hard and woody, armed or not all over the face with straight, conical, firm prickles. *Seeds* usually 2, rarely 3–5, with a hard shining testa and resting on the cupshaped apex of a thick obconic arillate funiculus. Species 9; eight Malayan, one Cambodian.

The earliest publication of any species of this genus was in Rumphius, *Herb. Amboin.* II, t. 13. It thus forms, by citation, a part of the genus *Galedupa* Lamk. (*Encyc. Meth.* II, 591 [1786]); it is not, however, covered by the description of *Galedupa indica* given by Lamarck; that description applies only to the *Pongam* of Rheede (*Hort. Malab.* VI, t. 3), now known as *Pongamia glabra* Vent. As this latter name is validly established—Rheede's genus having been published by Adanson as *Pongam*, before it was mistaken by Lamarck for *Galedupa*—it may be one day found necessary to restore Lamarck's name *Galedupa indica* and restrict it to Rumphius' *Caju Galedupa*. In any case *Galedupa* is the generic name first applied to, and therefore, by the modern canons, the one that should be used for what is at once *Sindora* Miq., *Echinocalyx* Benth., and *Grandiera* Lefevre. The writer, be it understood, is of those who consider our modern priority-hunting to be frequently unwise; this consideration will probably be shared by sober-minded students who, after reading what is said here and what has been already said under *Pongamia*, may take the trouble to examine the treatment that adepts in the art are prepared to accord the names now under discussion.

The genus is not a member of the tribe *Cynometreæ* but of the *Amherstieæ*, where it has to be placed close to the genera *Pahudia* Miq. and *Afzelia* Linn. *Pahudia* is in fact almost exactly intermediate between *Sindora* and *Afzelia* since it combines the thinner leaves and the much imbricated sepals of the latter, with almost the pod and exactly the seeds of the former. The stamens in both *Pahudia* and *Sindora* are similarly united in a sheath, but there is the curious difference that the two nearest the fissure are abortive and represented by bristles on the tube in *Pahudia*, whereas in *Sindora* these are fully developed and in some of the species are at times the only fertile stamens present.

Pods armed on the face with strong straight prickles (unknown in *S. velutina*); leaves puberulous or pubescent beneath :—

Pods subequally rounded at base, stylo and beak at opposite ends of its long axis; rachis of raceme straight with spirally-set bracts and flowers :—

Stipules large foliaceous; calyx-lobes with a few spines outside in their upper third ... ... 1. *S. Wallichiana.*

Stipules inconspicuous; calyx-lobes rather densely spinescent outside in their upper two-thirds ... 2. *S. Echinocalyx.*

Pods obliquely rounded at base, beak projecting laterally at right angles to direction of stalk (unknown in *S. velutina*); rachis of raceme zig-zag with subdistichously-set bracts and flowers:—

Leaflets 3-jugate, puberulous beneath; calyx-lobes slightly spinescent in their upper third outside ... 3. *S. intermedia.*

Leaflets 5–6-jugate, densely pubescent beneath; calyx-lobes not spinescent ... ... 4. *S. velutina.*

Pods unarmed; leaves glabrous beneath; (pod subequally rounded at base, calyx-lobes not spinescent) ... ... 5. *S. coriacea.*

1. SINDORA WALLICHIANA Benth. A large tree with slightly rusty-pubescent branchlets. *Leaves* equally pinnate with puberulous rachis 4–6 in. long, stipules very large foliaceous semi-lunar sub-intrapetiolar, ·6 in. long, acute at apex, rounded auriculate at base, pubescent on both sides; leaflets 3-jugate, oblong, apex round or acute, base round or cuneate, 1·5–3·25 in. long, 1 in. wide, the lowest pair slightly the smallest, very coriaceous, shining glabrous above, dull uniformly pubescent beneath, nerves numerous close horizontal slightly irregular, faint beneath not visible above, petiolules ·2 in. long, puberulous. *Flowers* in axillary and terminal lax panicles 6–8 in. long, 5–6 in. wide, individual racemes 3–4 in. long with straight pubescent rachis, flowers spirally arranged, bracts broadly ovate-obtuse, ·4 in. long, densely pubescent beneath, sparsely puberulous above, pedicels ·35 in. long, with two ovate-lanceolate bracteoles, ·2 in. long, at the apex; buds oblong densely pubescent, ·4 in. long. *Calyx*-tube short, lobes 4, thick, ·25 in. long, densely strigose within, ovate-acute, valvate, sparingly spinescent externally in the upper third. *Petal* 1, as long as the calyx-lobes, inside densely hairy. *Staminal*-sheath and filaments declinate pubescent. *Ovary* very hirsute, style twisted, stigma capitate. *Pod* broadly oblong, subequally rounded at base so that the short stout straight beak projects in the direction of the long axis, 3 in. long, 2 in. across; valves dehiscent, puberulous, woody, uniformly armed on the outside with strong straight conical spines ·15 in. long. *Seeds* usually 2, with arillate funicle. *Sindora Wallichii* Benth. in Hook. Icon. Plant. t. 1018 *not* t. 1017; Bak. in Flor. Brit. Ind. II, 268 in part, excl. syn. *Echinocalyx* Bth. and both VARS. *Guilandina Wallichiana* Grah. in Wall. Cat. 5805. *Galedupa Wallichiana* Prain MSS.

SINGAPORE; *Wallich* 5805! *Kurz! T. Anderson* 41! MALACCA; *Griffith!*

The Griffithian specimens referred to were given by Dr. Griffith to Dr. McClelland; from his collection they passed into the Calcutta Herbarium under Griffith's original name "*Cassia* sp." They were afterwards examined by Dr. T.

Thomson, who referred them to the genus *Schotia* which is much nearer their real position. They are very distinct, by reason of their less spiny calyx-lobes and their large foliaceous stipules, from another Griffithian gathering from Malacca, first issued from Kew as n. 1818 under the name "*Dialium?* sp." and subsequently made by Mr. Bentham the type of his genus *Echinocalyx*. When afterwards referring *Griffith* n. 1818 and *Wallich* n. 5805 to one species, Mr. Bentham, who apparently had only Wallich's specimens at his disposal, did not know that the Singapore plant has large foliaceous stipules.

2. Sindora Echinocalyx Prain. A large tree with glabrescent branchlets. *Leaves* equally pinnate with puberulous rachis 2–3 in. long, stipules small; leaflets 3-jugate oblong, apex round or slightly acute, base round or slightly cuneate, 1·25–2 in. long, ·75–1 in. wide, the lowest pair slightly the smallest, very coriaceous, shining glabrous above, dull minutely puberulous beneath especially on the midrib, nerves numerous close horizontal slightly irregular, faint beneath not visible above, petiolules ·15 in. long, puberulous. *Flowers* in axillary and terminal lax panicles 4–5 in. long, 2·5–3 in. wide, individual racemes 1·25–1·5 in. long, with straight puberulous rachis, flowers spirally disposed, bracts ovate-obtuse ·25 in. long, glabrescent above, puberulous beneath, pedicels ·25 in. long, puberulous, with two oblanceolate bracteoles, ·2 in. long, at the apex; buds oblong, puberulous, ·3 in. long. *Calyx*-tube short, lobes 4 thick, ·2 in. long, pubescent inside, ovate-acute, valvate, rather densely uniformly spinescent externally in the upper two-thirds. *Petal* 1, pubescent internally. *Staminal*-sheath and filaments declinate, hairy. *Ovary* very hirsute, style curved, stigma capitate. *Pod* broadly oblong, subequally rounded at base so that the slender straight beak projects in the direction of the long axis, 2·25 in. long, 1·5 in. across; valves dehiscent, puberulous, thinly woody, uniformly armed on the outside with strong straight conical spines ·15 in. long. *Seeds* 2, funicle arillate. *Sindora Wallichii* Benth. in Hook. Icon. Plant. t. 1017, *not* t. 1018 and *not Guilandina Wallichiana* Grah. *S. Wallichii* var. *ovalifolia* Maingay MSS. *Echinocalyx* Benth. in Benth. & Hook. f. Gen. Pl. 1, 584. *Galedupa Echinocalyx* Prain MSS.

Malacca; *Griffith* 1848! *Maingay* 562/1!

Nearest to *S. Wallichiana* but easily distinguished by its less pubescent leaves, different stipules, and smaller flowers with more spinescent calyx.

3. Sindora intermedia Baker. A large tree, over 100 feet high, with slightly rusty-tomentose branches. *Leaves* equally pinnate, with puberulous rachis 4–6 in. long, stipules small; leaflets 3-jugate, oblong, apex round or slightly acute, base round or slightly cuneate, 1·5–2·5 in. long, 1 in. wide, the lowest pair slightly the smallest, very coriaceous, shining glabrous above, dull minutely puberulous beneath especially on the midrib, nerves numerous close horizontal slightly irregular, not very

conspicuous beneath, not visible above, petiolules ·15 in. long, puberulous. *Flowers* strongly scented, in axillary and terminal dense panicles, 4–6 in. long, 2·5–3 in. wide, individual racemes 2 in. long with suberect zig-zag rusty-tomentose rachis, flowers subdistichous, bracts ovate-acute ·3 in. long, densely puberulous beneath, sparsely so above; pedicels ·35 in. long rusty-tomentose, with two ovate-lanceolate bracteoles, ·2 in. long, at the apex; buds oblong densely pubescent, ·4 in. long. *Calyx*-tube short, lobes 4, thick, ·25 in. long, very densely strigose on the inside, ovate-acute, valvate, sparingly spinescent externally in the upper third. *Petal* 1, reddish, as long as the calyx-lobes, densely hairy. *Staminal*-sheath and filaments declinate, red with rusty hairs; perfect anthers 9. *Ovary* very hirsute, style twisted, stigma capitate. *Pod* wide-oblong, obliquely rounded at base so that the small recurved beak projects laterally at right angles to direction of stalk, 2 in. long, 2·5–3·5 in. across; valves dehiscent, puberulous, woody, uniformly armed on the outside with strong straight conical spines ·2 in. long *Seeds* usually 2, rarely 3–5, with hard black shining testa, oblong, horizontal, ·5 in. long, ·75 in. across, resting on a basal, arillus-like, thick obconic funiculus about ·75 in. long. *Sindora Wallichii* VAR *intermedia* Bak. in Flor. Brit. Ind. II, 268. *S. Wallichii* Scortechini MSS. not of Benth. *Galedupa intermedia* Prain MSS.

PANGKORE; Gunong Tungal, *Curtis* 1630! *Scortechini* 1064! MALACCA; *Maingay* 562! PERAK; *Scortechini!*

This is at once distinguished by its transverse pods from both of the species placed under *S. Wallichiana* by Mr. Bentham. Mr. Curtis gives the Malay name of this in Pangkor as "*Sapetir.*"

Two other species with similarly oblique pods are *S. sumatrana* Miq. and *S. cochinchinensis* Baill.; it is just possible that *S. velutina* Bak. may prove to share the character and to belong to the same group.

4. SINDORA VELUTINA Bak. in Flor. Brit. Ind II, 269. A large tree with densely tawny-tomentose branches. *Leaves* equally pinnate with sparsely pubescent rachis 5–7 in. long, stipules not seen; leaflets 5–6-jugate, oblong, apex subacute or acute, base round or slightly cuneate, 2·5–3·5 in. long, 1–1·75 in. wide, the lowest pair rather the smallest, very coriaceous, shining glabrous above, dull densely uniformly softly pubescent beneath, nerves numerous close horizontal slightly irregular, very faint beneath, not visible above, petiolules ·1 in., densely pubescent. *Flowers* in axillary and terminal lax racemes 5–7 in. long, 3 in. wide; individual racemes 2 in. long, with zig-zag densely tawny-pubescent spreading rachis, flowers subdistichous, bracts ovate-acute, ·3 in. long, densely tawny-tomentose, pedicels ·15 in. long, densely tomentose as are the two lanceolate bracteoles; buds oblong, densely pubescent, ·4 in. long. *Calyx*-tube short, lobes 4, thick, ·25 in. long, densely hairy

within, ovate-acute, valvate, without spines externally. *Petal* 1, as long as calyx-lobes, densely hairy. *Staminal*-sheath and filaments declinate hairy. *Ovary* very hirsute, oblique; style twisted, stigma capitate. *Pod* not yet known. *Galedupa velutina* Prain MSS.

Malacca; Maingay 607!

Of this very distinct species the only specimens hitherto collected are Maingay's. One of these has been very kindly placed at Dr. King's disposal, for purposes of description, by the Director of the Royal Gardens, Kew. There is no doubt as to its affinity being greatest, as Mr. Baker has already indicated, with *S. intermedia*, and though it is as yet impossible to say if the pod is marked by the presence or absence of spines, it is very probable, from the obliquity of the ovary, that it has a transverse pod like *S. intermedia* and *S. sumatrana*.

5. Sindora coriacea Prain. A large tree with glabrous branches. *Leaves* equally pinnate with glabrous rachis 5–6 in. long, stipules small; leaflets 4-jugate, oblong, apex rounded or subacute, base round or slightly cuneate, 2–3 in. long, 1·25–1·5 in. wide, the lowest pair rather the smallest, very coriaceous, shining glabrous above, dull glabrous beneath, nerves numerous close horizontal slightly irregular, very faint, petiolules ·15 in. glabrous. *Flowers* in axillary and terminal lax panicles 8–10 in. long, 4 in. wide; individual racemes 2 in. long, with straight, thinly rusty-puberulous, spreading rachis; flowers spirally disposed, bracts and bracteoles not seen, pedicels thinly rusty, ·2 in., buds oblong, thinly rusty, ·25 in. long. *Calyx*-tube short, lobes 4, thick, ·2 in. long, very faintly imbricated; spineless externally. *Petal* 1. *Staminal*-sheath and filaments hairy. *Pod* broadly oblong, subequally rounded at base so that the strong slightly recurved beak, ·3 in. long, continues the direction of the stalk, tip subobliquely cuneate, tapering abruptly on the dorsal, slightly rounded on the ventral suture, 3 in. long, 2·25 in. across; valves dehiscent, glabrous, woody, unarmed. *Seeds* 2–3, funicle thick arillate. *Afzelia? coriacea* Bak. in Flor. Brit. Ind. II, 275. *Intsia coriacea* Maingay MSS. *Galedupa coriacea* Prain MSS.

Malacca; Chaban, *Maingay* 556! *Ridley* 2328! Penang; Tulloh Bahang, *Curtis* 430!

This fine tree is said by Mr. Ridley to be the "*Sapetir*" of Malacca; this name, it will be noticed, is used in Pangkor for the nearly allied but quite distinct *S. intermedia*. Mr. Curtis says it is known in Penang as "*Mirbau;*" the "*Mirbau*" of the Mainland, it will be observed, is *Afzelia palembanica*.

Of the specimens referred to, the writer has only seen leaves of Maingay's, and only fruits of Curtis' and of Ridley's gatherings. The description of the flowers is therefore constructed from the characters stated and implied in the brief description of the *Flora of British India*. The number of stamens mentioned by Maingay, still more their monadelphous nature, makes it certain that the plant can be no *Afzelia* and goes to indicate that it is a species of *Sindora*; the fruiting specimens sent by Mr. Curtis and Mr. Ridley show that this is really the case.

The leaflets of this species are exactly like those of *S. sumatrana* but the pods differ in being much larger, and in being neither transversely twisted nor armed. The pods both in shape and in the absence of spines resemble those of *S. Galedupa* (*Galedupa indica* Lamk. Encyc. Meth. II, 594, as to syn. *Caju Galedupa* Rumph. Herb. Amboin. II, 59, t. 13) and only differ in being a good deal larger. The two may indeed ultimately prove to be forms of one species.

51. Afzelia Smith.

Erect unarmed trees. *Leaves* abruptly pinnate, with few pairs of opposite leaflets. *Flowers* in copious terminal panicles. *Calyx* with the disc produced to the top of the elongated tube; sepals 4, much imbricated, slightly unequal. *Petal* only one developed, orbicular with a distinct claw, the others absent or rudimentary. *Stamens* 3 perfect, filaments long, pilose; anthers minute, oblong, opening longitudinally. *Pod* large oblong flattish, sublignose, subindehiscent. *Seeds* exalbuminous. Species 10–12; tropics of Old World.

Leaflets 4, rarely 2:—

Pedicels and calyx glabrous	1. *A. retusa.*
Pedicels and calyx puberulous	2. *A. bijuga.*
Leaflets 8, rarely 10 or 6; (pedicels and calyx pubescent) ...	3. *A. palembanica.*

1. Afzelia retusa Kurz, Journ. As. Soc. Beng. XLIII, 2, 73. A small tree 15–20 feet high, stem 6–8 in. in diam. *Leaves* even-pinnate, 3–6 in. long; leaflets 2- (very rarely only 1-) paired, sometimes only subopposite, subcoriaceous, glabrous on both surfaces, oblong, base rounded, apex obtuse, emarginate or retuse, 2–4 in. long, 1·5–2 in. wide, nerves numerous fine spreading reticulate, petiolules distinct, ·15 in. long, glabrous as is the rachis. *Flowers* in numerous terminal simple rarely slightly branched few-flowered glabrous racemes 2·5–3 in. long; pedicels stout glabrous, ·5 in. long, bracteoles ovate-oblong, glabrous, ·2 in. long, very early caducous as are the similar bracts. *Calyx* quite glabrous, tube slightly dilated upwards, ·5 in. long, somewhat exceeding limb with 4 subequal oblong spreading lobes ·35 in. long, ·25 in. wide. *Petal* ·7 in. long, limb ·6 in. wide, ·4 in. deep with rounded waved apex and wide-cuneate entire base, white or pinkish, claw very slender ·3 in. long; pubescent along claw and midrib externally. *Stamens* 3 fertile, filaments 1·25 in., sparsely pubescent, pink. *Ovary* stalked, pubescent on lower suture, soon glabrous, style glabrous slender, 1·5 in. long. *Pod* 5–6 in. long, 2 in. wide, oblong, rigid, curved, coriaceous. *Seeds* orbicular, 1 in. in diam., ·25 in. thick. Bak. in Flor. Brit. Ind. II, 274.

Andamans; very common on all the coasts. Perak; *Wray* 2491! Pangkore; *Scortechini* 975! Malacca; *Griffith* 1855! Singapore; *Ridley* 4675! 6006! Distrib Gangetic Delta.

Very nearly related to *A. bijuga* and perhaps only a variety of that species.

Mr. Baker attributes to this, just as Mr. Kurz does to *A. bijuga*, the occasional presence of 3 pairs of leaflets; none of the numerous specimens at Calcutta have more than two pairs of leaflets.

2. AFZELIA BIJUGA A. Gray, Bot. Amer. Explor. Exped. 467, t. 51. An erect tree reaching 50 feet in height, 1–1·5 feet in diam. *Leaves* even-pinnate, 3–6 in. long; leaflets 2-(very rarely only 1-) paired sometimes only subopposite, subcoriaceous, glabrous on both surfaces, oblong, base slightly oblique wide-cuneate or rounded, apex obtuse or bluntish acuminate emarginate, 2–4 in. long, 1·5–2 in. wide, nerves numerous fine spreading reticulate, petiolules distinct ·15 in. long, glabrous as is the rachis. *Flowers* in leaf-opposed or terminal corymbose pubescent panicles 6 in. long, 4 in. wide, the individual racemes 1·5–2 in. long; pedicels slender puberulous ·6 in. long, jointed, 2-bracteolate under the calyx, bracteoles oblong puberulous ·1 in. long, bracts oblong ·1 in. long caducous. *Calyx* puberulous, tube cylindric ·3 in long, rather shorter than limb with 4 subequal oblong spreading lobes ·35 in. long, ·25 in. wide. *Petal* ·6 in. long, limb ·5 in. wide, ·35 in. deep, with rounded waved apex and wide cuneate entire base, white or pink, claw very slender, ·25 in. long; pubescent along claw and midrib externally. *Stamens* 3 fertile, filaments 1·25 in., sparsely pubescent, pink. *Ovary* stalked, pubescent on both sutures, exserted, style glabrous slender, 1·5 in. long. *Pod* 6–8 in. long, 2·5 in wide, oblong, rigid, thickly coriaceous. *Seeds* orbicular 1 in. across, ·25 in. thick. Bak. in Flor. Brit. Ind. II, 274. *Intsia amboinensis* Thouars Gen. Nov. Madag. 22; DC. Prodr. II, 509; Miq. Flor. Ind. Bat. I, 80, all in part: Miq. Flor. Ind. Bat. Suppl. 288. *Baryxylum rufum* Lour. Fl. Coch. Chin. 266 in part. *Macrolobium bijugum* Colebr. in Trans. Linn. Soc. XII, 359, t. 17. *Outea bijuga* DC. Prodr. II, 511; Wall. Cat. 5823. *Metrosideros amboinensis* Rumph. Herb. Amboin. III, 21 (in part) t. 10. *Jonesia triandra* Roxb. Flor. Ind. II, 220.

ANDAMANS; very common in all the coast forests, *Kurz! Prain! King's Collectors!* NICOBARS; Kamorta, *Kurz!* SINGAPORE; *Wallich* (Cat. n. 5823 B)! *Ridley!* DISTRIB. All coasts from Eastern Polynesia to the Mascarene Islands.

In Mr. Kurz's description of this species occurs the statement that the leaflets may be at times in 3 pairs, and the same variation is indicated in Rumphius' figure quoted above. But the writer finds, as Mr. Baker does, that this species has not more than 4 leaflets. Mr. Kurz's statement is due to his having treated Andamans specimens of *Afzelia palembanica* as representing a form of *A. bijuga*.

The synonym *Intsia amboinensis* only applies to this species in the sense in which it is used by Miquel in his *Suppl.*: there is an authentic example of the Sumatra plant so named by Miquel in the Calcutta Herbarium; it is a specimen of *Afzelia bijuga*. The earlier use of the name must be neglected, since it has been made to cover Rumphius' description. For, while it is clear that that des-

cription includes this sea-coast species, it also includes one, if not more than one, inland species of far greater dimensions than this littoral tree ever attains.

Roxburgh's *Jonesia triandra* is not a *Saraca* but is this species.

3. Afzelia palembanica Bak. in Flor. Brit. Ind. II, 275. A tall erect tree 100–150 feet high, stem 2–3 feet in diam. *Leaves* even-pinnate 6–8 in. long; leaflets usually 4- (very rarely only 3-, more often 5-) paired, sometimes only subopposite, subcoriaceous, glabrous on both surfaces, oblong, base slightly oblique, rounded or subcordate, apex obtuse or bluntish-acuminate emarginate, 2–4 in. long, 1·5–2 in. wide, nerves numerous fine spreading reticulate, petiolules distinct ·15 in. long, glabrous as is the rachis. *Flowers* in leaf-opposed or terminal corymbose pubescent panicles of few-flowered racemes, 3·5 in. long, 2·5 in. across, the individual racemes 1 in. long; pedicels slender, pubescent, ·15–·2 in. long, jointed 2-bracteolate under the calyx, bracteoles ovate, pubescent, ·2 in. long, bracts small ovate, ·15 in. long, caducous. *Calyx* downy, tube cylindric ·2 in. long, shorter than limb with 4 subequal oblong spreading lobes ·25 in. long, ·2 in. wide. *Petal* ·35 in. long, limb oblong ·25 in. long, ·2 in. wide, margin uniform, claw ·1 in. long, glabrous. *Stamens* 3 fertile, filaments ·75 in., sparsely pubescent, dark-claret coloured, two sterile filaments at base of petal. *Ovary* stalked, pubescent, exserted; style glabrous, slender, ·75 in. long. *Pod* 10–12 in. long, 3·5 in. wide, oblong, almost woody. *Seeds* wide-oblong, 1·25 in. long, 1 in. wide, ·3 in. thick. *A. bijuga* Kurz, For. Flor. Brit. Burm. I, 412 not of Gray.

Andamans; South Point, *Kurz!* Perak; *Wray! Kunstler* 4433! 7387! *Scortechini* 1839! Malacca; *Griffith! Maingay* 565! *Cantley* 1670! *Holmberg* 776! Distrib. Siam (*Teysmann!*).

This is, according to Maingay, "the best Malacca timber tree;" according to Scortechini it affords "the best timber in the Peninsula." The Malay name, according to Scortechini, is *Mirbau* in Perak; Holmberg gives this as the Malacca name also. In Penang however, according to Curtis, the name *Mirbau* is used for *Sindora coriacea*.

While this species is *Afzelia palembanica* Bak., it certainly is not *Intsia palembanica* Miq., of which one of the original types is in Herb. Calcutta. That tree, as Miquel says, has ovate-lanceolate leaflets (3 in. long by 1·25 in. wide, tapering to an acute point), it has also large ovate *persistent* bracts, ·3 in. across. It does not seem necessary to alter the name in this place, but in a monograph of *Afzelia* it will be necessary to term the Peninsular species *Afzelia Bakeri*.

Mr. Baker has pointed out incidentally an omission in Mr. Kurz's *Forest Flora of Brit. Burma:* Kurz himself collected this species in the Andamans; strangely no one has met with it there again. He has, however, united it with *A. bijuga* and it is this union that explains Mr. Kurz's double error of attributing to *A. bijuga* pods a foot long and leaves with more than 4 leaflets.

52. Saraca Linn.

Erect trees. *Leaves* abruptly pinnate, leaflets glabrous rigid subcoriaceous or coriaceous, in bud minutely stipellate, stipels very rarely persistent, stipules large intrapetiolar scarious completely united, rarely foliaceous partially free. *Flowers* in dense sessile paniculate rarely simple corymbs on old nodes, or rarely axillary, with subpetaloid coloured persistent or rarely deciduous bracts and bracteoles. *Calyx* petaloid, limb 4-cleft lobes imbricate subequal, tube cylindric crowned by a lobed disc. *Corolla* 0. *Stamens* 2–8, exserted, with long filiform filaments and oblong versatile anthers opening longitudinally. *Ovary* many-ovuled, with a stalk attached to and produced beyond the disc, in most of the flowers rudimentary; style long filiform, stigma minute suboblique capitate. *Pod* flat dehiscent, rigidly coriaceous. *Seeds* exalbuminous. Species 16 or more; all South-Eastern Asiatic.

Leaves quite glabrous; stipules small at length scarious quite united along their inner margins; stipels vanishing; flowers yellow, at length becoming reddish, in paniculate corymbs:—

Bracts and bracteoles very deciduous, large where known; (pedicels glabrous):—

Leaflets 7-jugate, petiolules ·4 in. long; calyx-lobes shorter than tube, bracts and bracteoles very large:—

Corymbs subsessile, dense, subsimple; pods over 3 in. broad; (calyx-lobes more than half as long as tube; stamens 4) ... ... 1. *S. thaipingensis.*

Corymbs in lax long-peduncled panicles; pods 2 in. broad:—

Calyx-lobes one-third as long as tube; stamens 4; pod beakless ... ... 2. *S. declinata.*

Calyx-lobes half as long as tube; stamens 7–8; pod beaked ... ... 3. *S. cauliflora.*

Leaflets 2–3-jugate, petiolules ·25 in. long; calyx-lobes as long as tube; (corymbs in lax long-peduncled panicles; pods 1·5 in. broad; bracts and bracteoles unknown; stamens apparently 7) ... ... 4. *S. Kunstleri.*

Bracts and bracteoles persistent, small; (petiolules not exceeding ·2 in.):—

Stamens 7–8; (pedicels glabrous):—

Leaflets 4–6-jugate, coriaceous; bracteoles amplexicaul, ascending ... ... 5. *S. indica.*

Leaflets 1–2-jugate, subcoriaceous; bracteoles not amplexicaul, spreading ... ... 6. *S. bijuga.*

Stamens 3–4:—

Pedicels glabrous; ovary glabrous (leaflets 4–7-jugate) ... ... 7. *S. macroptera.*

Pedicels puberulous; ovary pubescent:—

Leaflets 4–7-jugate, corymbs short ... ... 8. *S. palembanica.*

Leaflets 2–4-jugate, corymbs long ... ... 9. *S. triandra.*
Leaves with rachis, petiolules and nerves beneath pubescent; stipules large foliaceous, united only in lower third; stipels persistent, flowers white in simple corymbs; (stamens 2) ... 10. *S. latistipulata.*

1. Saraca thaipingensis Cantley MSS. in Herb. Kew. A tree 50–80 feet high, with rather slender stem 6–15 in. in diam. *Leaves* with rachis 16–30 in. long; leaflets membranous, strongly veined, 6–8-paired, oblong-lanceolate, apex acuminate, base slightly obliquely wide-cuneate, 12–16 in. long, 4–5 in. wide, secondary nerves about 12 pairs, dark-green, dull and glabrous on both surfaces; petiolules stout ·4 in. long, stipels caducous; stipules coriaceous at length scarious, usually soon deciduous, the two united throughout into a convolute sheath for the subsequent bud, when laid open narrowly oblong, 1 in. long, ·4 in. across, parallel-nerved and emarginate at the apex. *Flowers* in dense simple corymbs from old nodes on thick branches and stems, 3 in. long and 3–4 in. across; peduncles and pedicels glabrous, stout; bracts large oblanceolate-obtuse, lowest 1·5 in. long, ·3 in. wide, tapering from near the apex to the narrow-cuneate base, decreasing upwards; bracteoles 2 oblanceolate, deciduous, ·5 in. long, pedicels below bracteoles ·3 in. long. *Calyx* yellow at length becoming red, tube ·8 in. long, less than twice as long as limb of 4 oblong sepals, ·5 in. long. *Petals* 0. *Stamens* 4 with a rudimentary filament, the filaments slender throughout; anthers nearly twice as long as broad; filaments twice as long as sepals. *Ovary* stalked, puberulous along sutures, elsewhere glabrous, usually rudimentary; style declinate. *Pod* purple when young, shining dark-red when ripe, 15–18 in. long, 3·25 in. wide, linear-oblong, considerably curved, much compressed, stipe under ·25 in. long, apex beakless, straight on lower, rounded on upper suture at the blunt apex, more rounded on upper than on lower suture at the oblique base.

Perak; Thaiping, *Cantley* 36! Tupai, *Wray* 2448! Larut, *Scortechini! Kunstler* 2249! 2768! Goping, *Kunstler* 4248! 6088! Malacca; Ulu Chembong, *Derry* 999! Bukit Tampin, *Goodenough* 1875 A!

Mr. Derry gives the local name of this as "*Talan;*" Mr. Goodenough notes it as "*Gapis:*" consult also the note under *S. cauliflora.*

2. Saraca declinata Miq. Flor. Ind. Bat. I, 84. A tree 20–60 feet high with rather slender stem 6–15 in. in diam. *Leaves* with rachis 12–24 in. long; leaflets thinly subcoriaceous, strongly veined, 6–8-paired, oblong-lanceolate, apex acuminate, base slightly obliquely wide-cuneate, 9–12 in. long, 3–4 in. wide, secondary nerves about 12 pairs, dark-green shining above, dull beneath, glabrous on both surfaces; petiolules thick ·4 in. long, stipels caducous; stipules coriaceous at length scarious, usually soon deciduous, the two united throughout into a convolute sheath for the subsequent bud, when laid open ·75 in. long, ·3 in. wide,

parallel-nerved. *Flowers* in panicles of corymbs from leaf axils and from old nodes on branches and stems, 1 foot long, sometimes nearly as broad, individual corymbs 4–6 in. long, peduncles and pedicels glabrous, stout, bracts very large ovate-acuminate, 2 in. long, ·7 in. wide, tapering from the middle to both ends, decreasing upwards: bracteoles 2, elliptic, deciduous, ·5 in. long, pedicels below bracteoles ·5 in. long. *Calyx* bright yellow, tube 1 in. long, cylindric, slender, slightly curved, thrice as long as limb of 4 obovate obtuse-sepals. *Petals* 0. *Stamens* 4 with a rudimentary filament, the filaments slender throughout and inserted in the retiring angles of a 5-lobed disc; anthers nearly twice as long as broad; filaments thrice as long as sepals. *Ovary* stalked, puberulous along sutures elsewhere glabrous, most often rudimentary; style declinate. *Pod* black, 12 in. long, 2·75 in. wide, linear-oblong, quite straight, compressed, stipe under ·25 in. long, base equally cuneate and apex equally acute to the beakless tip. *Jonesia declinata* Jack, Malay. Miscell. II, 7. 74; Walp. Rep. I, 844.

Pahang; Tembeling, *Ridley* 2587! Perak; Kwala Kearing, *Wray* 544! *Scortechini* 1747! Larut, *Kunstler* 2729! 3961! 5393! Selangor; Kwala Lampar, *Curtis!* Malacca; Nyalas, *Goodenough* 1720! Distrib.; Sumatra, Java.

This species is said by Mr. Goodenough to be "*Gapis Kognet*" or "*Talan Kognet*," the same names as he cites for *S. cauliflora*; see note under that species.

3. Saraca cauliflora Bak. in Flor. Brit. Ind. II, 272. A tree 20–60 feet high, with rather slender stem 6–15 in. in diam. *Leaves* with rachis 12–16 in. long; leaflets rigidly subcoriaceous, strongly veined, 5–6-paired, oblong-lanceolate, apex acuminate, base slightly obliquely wide-cuneate, 9–12 in. long, 3–4 in. wide, secondary nerves about 12 pairs, dark-green shining above, dull beneath, glabrous on both surfaces; petiolules stout ·4 in. long, stipels caducous; stipules coriaceous at length scarious usually soon deciduous, the two united throughout into a convolute sheath for the subsequent bud, when laid open ·75 in. long, ·3 in. wide, parallel-nerved. *Flowers* in panicles of corymbs from old nodes on branches and stems, 6 in. long and as much across, individual corymbs 3 in. long, peduncles and pedicels glabrous stout; bracts very large, obovate-acute, deciduous, lowest 2 in. long, ·6 in. wide, tapering from above the middle to a cuneate base, decreasing upwards; bracteoles 2, lanceolate, deciduous, ·5 in. long, pedicels below bracteoles ·5 in. long. *Calyx* yellow, tube 1 in. long, twice as long as limb of 4 oblong sepals. *Petals* 0. *Stamens* 7–8 with a rudimentary filament and two acute angular projections on the disc; the filaments alternately slender throughout and widened towards the base; anthers nearly twice as long as broad; filaments twice as long as sepals. *Ovary* stalked, puberulous

along sutures elsewhere glabrous, usually rudimentary; style declinate. *Pod* black, 12–15 in. long, 2·25 in. wide, linear-oblong, somewhat curved, compressed, stipe ·3 in. long, base cuneate towards upper suture, apex acute tapering towards lower suture which is prolonged into a stout beak 1 in. long.

Malacca; *Griffith, Maingay, Derry! Goodenough!* Perak; *Scortechini!*

The local name of this species is said by Mr. Goodenough to be "*Gapis Kognet*" or "*Talan Kognet*;" Mr. Derry notes it as "*Bunga Talan?*"

How far the characters are valid that separate this species and *S. thaipingensis* from *S. declinata* is, in the writer's opinion, a very doubtful matter. The chief diagnostic character, in the case of *S. cauliflora*, is the presence of 7 stamens and the writer has accordingly placed in Mr. Baker's species only those specimens where 7 or 8 stamens occur. These however consist of but two gatherings, one from Malacca and one from Perak; for, as it happens, neither Maingay's nor Griffith's specimens that form the original types of the species are represented at Calcutta. The pods described were collected by Goodenough in Malacca and are placed here because they certainly differ from the pods that are known to belong to the tree described as *S. declinata* and from those that belong to *S. thaipingensis*. But young pods of *S. declinata* from Java are rather more like those here supposed to belong to *S. cauliflora* than like those of the Peninsular *S. declinata* and a careful field study of the forms by Malayan botanists is urgently called for. The species which Mr. Cantley has named *S. thaipingensis* has usually been distributed as *S. cauliflora* and it is, as a matter of fact, of the three here described, the one that best accords with Mr. Baker's account of the leaves and of the corymbs of his *S. cauliflora*. But *S. thaipingensis* appears never to have more than 4 stamens and therefore can hardly be Baker's plant. If it can only be shown that the characters to be derived from the stamens and the pods are at all variable it may be possible to reduce both Mr. Baker's and Mr. Cantley's plants to *S. declinata*.

4. Saraca Kunstleri Prain. A tree 20–40 feet high, stem 3–5 in. in diam., branchlets zigzag glabrous. *Leaves* even-pinnate, rachis 5–10 in. long, glabrous; leaflets petiolulate large, 2–3-jugate, diminishing downwards, ovate-acuminate, base cuneate, distal 8–10 in. long, 3·5–4 in. wide, basal if 2 pairs and central if 3 pairs 4–5 in. long, 2·25–2·5 in. wide, basal if 3 pairs 3·5–4 in. long, 2–2·25 in. wide; all chartaceous, dark-green above, rather paler beneath, glabrous on both surfaces, main-nerves ascending, 6–9 pairs, more prominent beneath as is the midrib and the fine secondary reticulation; petiolules ·25 in. long. *Flowers* in terminal long-peduncled paniculate corymbs, the peduncles 8–12 in. long, glabrous as are the branches 1–2 in. long, and the pedicels. *Calyx*-tube and pedicels, especially the latter, very short, together only ·4–·5 in. long; bracts not seen; calyx-lobes ovate-oblong ·2 in. long, glabrous. *Corolla* 0. *Filaments* 7, anthers not seen. *Pod* falcate 4–6 in. long, 1·5 in. wide, glabrous. *Seeds* 5–6, transversely ovate, ·5 in. long, ·7 in. across, ·25 in. thick, testa black, smooth, shining, crustaceous.

Perak; Gunong Batu Patch, 1500–2000 feet, *Kunstler* 8048!

A very distinct species, apparently nearest *S. Lobbiana* Bak.; unfortunately good flowers are not yet available for description.

5. Saraca indica Linn. Mant. I, 98. A low wide-spreading tree 20–30 feet high, stem 2 feet thick, branches glabrous. *Leaves* with rachis 7–8 in. long, rachis glabrous, leaflets subcoriaceous 5, less often 6 rarely 4 pairs, oblong-lanceolate apex obtuse or acute, base rounded or cuneate slightly oblique, 6–9 in. long, 2–3 in. wide, margins faintly undulate, dark-green shining above, dull and paler beneath, both sides quite glabrous; petiolules short ·2 in. long very stout, stipels deciduous; stipules small at first coriaceous, green, at length scarious, brown, the two united completely from base to apex into a convolute sheath for the subsequent bud, when laid open ovate-oblong ·4 in. long, ·25 in. wide, parallel-nerved and minutely laciniate at the wide tip. *Flowers* in dense corymbs 3–4 in. in diam., axillary; peduncles and pedicels reddish, glabrous, rather stout, basal bracts ovate-subacute with ciliolate margins, bracteoles 2 subopposed persistent ascending oblong-spathulate subacute amplexicaul, ·15 in. long, pedicels below bracteoles ·3–·5 in. long. *Calyx* bright-orange becoming at length red, tube ·5–·6 in. long, cylindric, about twice as long as limb of 4 obovate-oblong sepals. *Petals* 0. *Stamens* 7 or 8 with 2 rudimentary filaments, all filaments slightly widened and slightly connate at base, reddish, anthers nearly twice as long as broad, purple; filaments thrice as long as sepals. *Ovary* stalked, puberulous along the sutures elsewhere glabrous, 8–12-ovuled, in most flowers rudimentary and then quite glabrous; style filiform declinate nearly as long as filaments. *Pod* black, 4–10 in. long, 1·7 in. wide, linear-oblong, compressed, valves strongly wide-reticulate; stipe ·25 in. long. *Seeds* 4–8, oblong, compressed, 1·5 in. long. Miq. Flor. Ind. Bat. I, 83; Bedd. Fl. Sylv. t. 57; Bak. in Flor. Brit. Ind. II, 271. *S. arborescens* Burm. Fl. Ind. 85, t. 25, f. 2. *Jonesia Asoca* Roxb. As. Res. IV, 355; Fl. Ind. II, 218; DC. Prodr. II, 487; Wall. Cat. 5822; W. & A. Prodr. 284; Wight Ic. t. 206; Bot. Mag. t. 3018. *J. pinnata* Willd. Sp. Pl. II, 287.

Malacca; *fide* Baker in *Flora of Brit. India.* Probably planted; the species has never been sent to Calcutta by any Malayan botanist.

6. Saraca bijuga Prain. A tree with spreading branches 20–30 feet high, stem ·6 in. to 2 feet thick; branches glabrous. *Leaves* with rachis 1 in. long, leaflets thinly subcoriaceous 2-, or not infrequently 1-jugate, oblong-lanceolate, apex gradually narrowed in the upper third to a sharp point, bases of terminal pair very oblique, rounded on lower cuneate on upper margin, of lower pair rounded or subcordate on both sides, 4–10 in. long, 1–2·75 in. wide, margins faintly undulate, dark-green

and shining above, dull and paler beneath, both sides quite glabrous; petiolules very short under ·1 in., stout, stipels deciduous; stipules small coriaceous at length scarious, completely united from base to apex, narrowly ovate-oblong ·6 in. long, ·2 in. wide, tip subacute. *Flowers* in dense corymbs 4–5 in. in diam., axillary, peduncles and pedicels reddish, glabrous, slender, basal bracts ovate-subacute with ciliolate margins, bracteoles 2 subopposed persistent spreading, ovate-obtuse not amplexicaul, ·15 in. long, pedicels below bracteoles ·15–·2 in. long. *Calyx* orange becoming at length light-red, tube ·25 in. long, cylindric, hardly longer than the limb of 4 ovate-obtuse sepals. *Petals* 0. *Stamens* 7 or 8, all filaments slightly widened and faintly connate at base, dark claret-coloured; anthers not much longer than broad; filaments thrice as long as sepals. *Ovary* stalked, very sparsely puberulous along sutures, in most flowers rudimentary and then quite glabrous. *Pod* reddish-yellow, smooth, polished, faintly reticulate, 6–8 in. long, 2·35 in. across; stipe ·2 in. long. *Seeds* 4–6.

PERAK; Larut; in open jungle generally near running streams, *Kunstler* 2749! 2382! 4059! Kinta, near limestone hills, *Kunstler* 7221! Larut, *Scortechini* 1503! Batu Togoh, *Wray* 2152!

This is the nearest of the native Malayan species to the common Indian *Saraca indica*; it is however very distinct on account of its 2-jugate leaves, its smaller flowers with spreading bracteoles and its very different pods. Elsewhere the writer has indicated the possibility of this proving ultimately to be only a variety of the not very fully described Javanese *S. minor* Miq. But from Miquel's account of that plant this must be at least an exceedingly distinct variety.

7. SARACA MACROPTERA Miq. Flor. Ind. Bat. I, 1080. A tree 30–40 feet high, stem 4–6 in. in diam. *Leaves* with rachis 4–15 in. long; leaflets rigidly subcoriaceous 4–7-paired, oblong-lanceolate, apex gradually narrowed to an acuminate tip, base slightly unequally rounded, 5–12 in. long, 1·5–3·5 in. wide, secondary nerves about 12 pairs, curving forward, prominent beneath, bright-green shining above, paler dull beneath; petiolules ·15 in. long, glabrous as is the rachis, stipels caducous; stipules completely united in a scarious bud-sheath ·5 in. long. *Flowers* in densely fascicled corymbs in leaf axils and on old nodes, 1 in. long, 1·5 in across; peduncles and pedicels quite glabrous very slender, the latter ·25–·3 in. long below the two ovate-oblong spreading persistent bracteoles ·15 in. long; bracts ovate-acute ·1 in. long. *Calyx* bright-yellow, tube slender cylindric ·25 in. long, exceeding the limb of 4 oblong sepals ·2 in. long. *Petals* 0. *Stamens* 3–4, twice as long as sepals, filaments slender and inserted on the crenately lobed disc; anthers short oblong. *Ovary* stalked glabrous. *Pod* not seen.

PERAK; Larut, in low wet ground, *Kunstler* 5511! DISTRIB. Sumatra, Borneo.

This is extremely closely related to *S. palembanica* but is readily distinguished by its glabrous peduncles and pedicels, and its glabrous ovary. The solitary Perak gathering differs from the original Sumatrana specimens (n. 863 *Hort. Bogor*) in having much smaller flowers, but is not otherwise distinguishable. It may, on the whole, be better, however, to treat the Peninsular plant as a distinct variety, VAR. *parvidora*; unless it should be found that the two differ markedly in fruit they can hardly be looked upon as distinct species: as yet, the fruit is unknown in either plant.

8. SARACA PALEMBANICA Miq. ex Bak. in Flor. Brit. Ind. II, 272. A tree with spreading branches, 30–40 feet high, stem 8–10 in. in diam. *Leaves* with rachis 8 in. long; leaflets rigidly subcoriaceous 4–7 paired, oblong, apex obtuse shortly abruptly acuminate, base slightly unequally rounded, 5–14 in. long, 2·5–4·5 in. wide, secondary nerves about 12 pairs, curving forward, prominent beneath, dark-green above, paler beneath, rather dull; petiolules ·15 in. long, glabrous as is the rachis, stipels caducous; stipules completely united in a scarious bud-sheath ·5 in. long. *Flowers* in densely fascicled corymbs on old nodes, 2 in. long nearly as much across; peduncles and pedicels pubescent, slender, the latter ·5 in. long below the two ovate-oblong spreading persistent bracteoles ·2 in. long; bracts ovate-subacute ·2 in. long. *Calyx* orange-yellow, tube slender cylindric ·35 in. long, exceeding the limb of 4 oblong sepals ·25 in. long. *Petals* 0. *Stamens* 4, at times only 3, two and a half times as long as sepals, filaments slender and inserted in the retiring angles of a crenately lobed fleshy ring, deep-purple as are the shortly oblong anthers. *Ovary* stalked, densely hairy, in most flowers rudimentary and then subglabrous. *Pod* not seen. *Jonesia* (Saraca) *palembanica* Miq. Flor. Ind. Bat. Suppl. 291.

PENANG; Kulang Ulu, *Curtis* 647! PANGKORE; Dindings river, *Curtis* 1386! MALACCA; *Maingay!* DINDINGS TERRITORY; "in wet low lands," *Bryant!* PERAK; Larut, "in low wet ground," *Kunstler* 6372! *Scortechini* 138! DISTRIB. Sumatra.

This is very near *S. macroptera* Miq. but differs in having rather smaller flowers, with pubescent peduncles and pedicels, and more densely clustered corymbs. Miquel describes the ovary as glabrous, but it is densely pubescent except in the case of the abortive ovaries which occur, however, in the vast majority of the flowers. Though its leaves very much resemble those of *S. macroptera*, it is less closely allied to that species than it is to *S. triandra*, a species which is much more common in the Malay Peninsula than either of the others.

9. SARACA TRIANDRA Bak. in Flor. Brit. Ind. II, 272. A slender tree 15–30 feet high, stem 4–8 in. in diam. *Leaves* with rachis 1·5–3 in. long; leaflets thinly subcoriaceous, 2–3-, very rarely 4-paired, oblanceolate-oblong, obtuse with or without an abrupt acumen, or subacute, tapering from beyond the middle to a cuneate base, lower pair very rarely rounded at base, and narrowed towards apex; 5–12 in. long, 2–6 in. wide, secondary nerves about 12 pairs, the lowest pair distinctly

marginal to half-way up, the others curving forward prominent beneath; dark-green shining above, dull beneath, glabrous on both surfaces; petiolules ·15 in. long, glabrous as is the rachis, stipels caducous; stipules completely united in a scarious bud-sheath ·5 in. long. *Flowers* in lax fascicled corymbs in leaf-axils and on old nodes, 5–8 in. long and broad; peduncles and pedicels slender pubescent, the latter ·75 in. long below the two ovate-oblong spreading persistent bracteoles ·25 in long; bracts ovate subacute ·2 in. long. *Calyx* yellow becoming pink or red, tube slender cylindric, ·25 in. long, about as long as limb of 4 oblong sepals. *Petals* 0. *Stamens* 3–4, two and a half to three times as long as sepals, filaments slender, inserted on a crenated fleshy ring, purplish as are the anthers. *Ovary* long-stalked, densely pubescent, mostly rudimentary. *Pod* oblong, very obliquely rounded at base on lower suture, obliquely obtuse at apex with lower suture projecting as a beak ·25 in. long; 4–6 in. long, 1·5–1·75 in. wide, much compressed, valves brown when ripe, uniformly finely puberulous. *Seeds* 3–4.

Malacca; *Griffith! Miller! Hervey! Goodenough* 1463! 1478! *Maingay* 563! Perak; in dry rocky places, *Kunstler* 2138! 2757! 34·4! 3797! 3886! 3912! 3957! 4507! 4517! 5563! 7912! 8516! 8561! *Ridley* 3026! 3099! *Wray* 41! *Scortechini* 1143! 1675! Penang; Government Hill, *Curtis* 165! Dindings; at Rajah Hitam, *Bryant!* Distrib.; Sumatra, (Moera Enim; *Teysmann* 3638!)

Mr. Goodenough gives the native name of this as "*Talan*." The species is remarkably closely related to *S. palembanica* and differs only by its larger laxer corymbs and its fewer leaflets, and further investigation on the part of field-botanists in Malaya may demonstrate that Mr. Baker's species is only a form assumed in dry localities by the tree that was previously described by Miquel as *Jonesia palembanica*. Both the synonyms of the *Flora of British India* should be deleted, for *Jonesia triandra* Roxb. is *Afzelia bijuga*, while *J. scandens* Roxb. is, by Roxburgh's definition, clearly not this species and probably not a *Saraca* at all.

10. Saraca latistipulata Prain. A small tree with slender leafy pubescent branches. *Leaves* 8 in. long, rachis puberulous, leaflets rigidly coriaceous, 6 pairs, ovate-lanceolate, apex acuminate, base slightly obliquely rounded, 4·5–6 in. long, 1·5 in. across, dark-green, dull glabrous above, pubescent on the midrib beneath and puberulous along the margins, petiolules short, ·15 in. long, pubescent, stipels small subulate persistent pubescent; stipules large foliaceous each with a strong midrib, ovate-acute, auriculate at base on their outer free margin, connate between petiole and branch for one-third their length on the inner margin, from ·5–1·5 in. long, ·25–1 in. wide, usually slightly unequal. *Flowers* in very few-flowered cymes, sometimes reduced to single pedicels, clustered on rugose woody nodes along thick old branches, under ·75 in. long; with ovate-lanceolate persistent basal bracts and two sub-

opposite amplexicaul triangular persistent erect bracteoles midway between bract and calyx-tube, pedicels and bracteoles puberulous. *Calyx* white, tube cylindric ·15 in. long, shorter than limb of 4 narrow-oblong sepals, pubescent along margin at tip. *Petals* 0. *Stamens* 2 with a rudimentary filament between them, opposite to and involved by the inmost calyx segment; filaments widened at base and subconnate, pink; anthers nearly twice as long as broad, filaments twice as long as sepals. *Ovary* pubescent. *Pod* oblong, obliquely obtuse at apex with a rather pronounced beak, obliquely rounded at base, 2 in. long, ·1 in. across.

Perak; Dindings, Lumut, *Ridley* 3089! 8006!

A very remarkable species, easily distinguished from all those hitherto known by its large foliaceous stipules, and its stipellate leaves with pubescent rachis. It has been obtained twice, both times in the same locality, and on both occasions by Mr. Ridley.

53. Crudia Schreb.

Shrubs or trees. *Leaves* odd-pinnate or spuriously even-pinnate by the approximation of the penultimate to the terminal leaflet, the leaf-rachis sometimes prolonged beyond the ultimate leaflet, the remaining leaflets usually conspicuously alternate rarely occasionally subopposed; stipules interpetiolar, stipels 0. *Flowers* in racemes either terminating, or simple or in clusters at the bases of, the glabrous or pubescent new leafy shoots. *Calyx*-tube very short, with a short disc, segments 4 oblong, imbricated, persistent, reflexed in flower. *Petals* 0. *Stamens* 10 (or 8–9) exserted, filaments free filiform, anthers oblong, versatile, dehiscing longitudinally. *Ovary* pubescent, few-ovuled; with distinct short glabrous stalk and filiform incurved glabrous style; stigma terminal capitate, small. *Pod* with 2 rigidly coriaceous subcompressed valves. *Seeds* few, often only 1, exalbuminous. Species, one each Indian and African; nine or ten American; about twelve Malayan.

The oldest names for this genus, according to the *Index Kewensis*, are *Aplatoa* Aubl. and *Touchiroa* Aubl. As the first name was based on the flowers of one species of this genus with the fruit of a *Pterocarpus*, it cannot possibly be used. There seems nothing against the employment of the second name which was given to a species of the group with few leaflets to the leaf-rachis — the group to which *C. bantamensis*, *C. gracilis* and *C. Wrayi*, among Malayan species, belong.

Leaflets more than 3 (§ *Crudia*):—

Leaflets coriaceous, very long caudate-acuminate, rachis prolonged beyond the last of the oblanceolate, all conspicuously alternate leaflets; (innovations and petioles densely rusty-tomentose) ... ... 1. *C. caudata.*

Leaflets papery, acute or shortly acuminate, rachis not prolonged beyond the two terminal, often spuriously opposite leaflets:—

Innovations and petioles pubescent, leaflets uniformly puberulous or pubescent beneath; racemes rather lax; petiolules and pedicels rather long:—

Leaflets 11–13, lanceolate, pubescence tawny, pod densely rusty-pubescent ... ... 2. *C. Scortechinii.*

Leaflets 7–9, obovate to oblong, pubescence grey, pod tawny-puberulous... ... ... 3. *C. Curtisii.*

[Leaflets puberulous beneath; apex shortly acuminate ... ... VAR. *typica*;

Leaflets densely pubescent beneath; apex acute ... ... VAR.? *Wallichii.*]

Innovations and petioles glabrous; racemes rather dense; petiolules and pedicels rather short:—

Leaflets 7–8, glaucous, glabrous on the nerves, elsewhere uniformly puberulous beneath ... ... 4. *C. glauca.*

Leaflets 5 (rarely 3), pale-green, quite glabrous beneath ... ... 5. *C. speciosa.*

Leaflets 3 or by abortion fewer (§ *Touchiroa*):—

Leaflets small oblanceolate, racemes dense with puberulous rachis and pedicelled flowers ... ... 6. *C. Wrayi.*

Leaflets large ovate-oblong, racemes sparse with glabrous rachis and sessile flowers ... ... 7. *C. gracilis.*

1. CRUDIA CAUDATA Prain. A small tree with slender at length glabrescent branches, and densely rusty-tomentose new shoots. *Leaves* odd-pinnate, rachis 1·5–2 in. long, petiole articulate, the interpetiolar stipules united by their inner margins at the base only, elsewhere free, lanceolate, densely rusty-pubescent on their petiolar, glabrous on their axillary aspect; leaflets 5–7, petiolules ·1 in long, densely rusty-tomentose as is the rachis, which is prolonged beyond the last leaflet into a subulate process; alternate, oblanceolate, base rounded in lower, deltoid in upper leaflets, apex prolonged into a ·75 in. long, narrow-caudate tip, 2·5–4 in. long, 1 in. across, rigidly coriaceous, dark-green glabrous and shining above, dull and densely rusty-pubescent on the nerves beneath, lateral nerves 6–7 pairs slightly ascending, looped within the margin, secondary venation prominent beneath, all nerves obscure above. *Flowers* in narrow racemes at the bases of new leafy shoots, with round densely rusty-tomentose rachis, pedicels rather stout, under ·25 in. long, densely rusty with a subulate bracteole close under calyx; buds oblong ·2 in. long. *Calyx*-tube very short, lobes 4, imbricate, reflexed in flower, densely rusty outside, quite glabrous within. *Stamens* not seen. *Ovary* stipitate, densely rusty-velvety, 1-ovuled, stalk glabrous as long as calyx-tube. *Pod* (young) linear-oblong, obliquely rounded at base,

apex obtuse apiculate, compressed, 2 in. long, ·75 in. across, valves densely, shortly, subscabridly rusty-pubescent. *Seed* 1. *Touchiroa caudata* Prain MSS.

Johore; Tanjong Kupang, *Ridley* 6399! Distrib. Borneo.

A remarkably distinct species, though recalling in some respects the description given by Hasskarl of *C. orientalis* (*Cat. Hort. Bog.* 288). Hasskarl's species has, however, more numerous leaflets which are only rusty-pubescent on their margins; it has also larger, 2-seeded pods.

2. Crudia Scortechinii Prain. A tree 80–90 feet high, young branches tawny-pubescent. *Leaves* odd-pinnate, rachis 6–8 in. long, petiole articulate on an auricled node with an interpetiolar entire stipule, leaflets 11–13, with petiolules ·2 in. long, sparsely tawny-pubescent as is the rachis, alternate, lanceolate, base slightly unequally rounded, apex acuminate, 2–3 in. long, 1 in. wide, papery, green and glabrous above, paler and pubescent with short sparse tawny hairs beneath, lateral nerves spreading, 12–16 pairs, not much stronger than the fine secondary venation. *Flowers* in narrow racemes at the ends and bases of new leafy shoots, 3–6 in. long, with angular tawny-pubescent rachis; pedicels slender at length ·4 in. long, tawny-puberulous, many of the lower caducous, minutely bracteolate about the middle; buds oblong ·2 in. long. *Calyx*-tube very short lined by a disc, lobes 4, imbricate in bud reflexed in flower, sparsely pubescent on both surfaces. *Petals* 0. *Stamens* 9, filaments glabrous, free, alternately short and long, anthers broadly ovate, versatile. *Ovary* stipitate, densely tawny-villous, 1- or 2-ovuled; stalk glabrous as long as calyx-tube, style glabrous incurved. *Pod* oblong, obliquely rounded at both ends, densely rusty-tomentose, rugulose, 2·5 in. long, 1·5 in. across, flat. *Seed* 1, funiculus elongated. *Touchiroa Scortechinii* Prain MSS.

Perak; Goping, *Scortechini* 2129!

A very distinct species.

3. Crudia Curtisii Prain. A tall tree 80–150 feet high with spreading crown and densely grey-pubescent branchlets; stem 2–3 feet in diam. *Leaves* odd-pinnate, rachis 3–4 in. long, petiole articulate on an auricled node with an interpetiolar 2-lobed stipule, leaflets 7–9, with petiolules ·25 in. long, closely puberulous as is the rachis, alternate, obovate to oblong, base slightly obliquely rounded or cuneate, apex rounded or tapering to an at length bluntly caudate tip, 2–3·5 in. long, 1–1·5 in. wide, membranous, green and glabrous above, paler and uniformly sparsely puberulous beneath, lateral nerves ascending prominently looped within margin, secondary venation indistinct. *Flowers* in rather lax narrow racemes at the ends and bases of new leafy shoots, 4–6 in. long, with angular densely grey-pubescent rachis; pedicels very

slender, at length ·6 in long, grey-puberulous, with a caducous subulate bracteole about the middle; buds oblong ·15 in long. *Calyx*-tube very short, lobes 4, imbricate, reflexed in flower, sparsely pubescent externally, glabrous within. *Petals* 0. *Stamens* 10, filaments glabrous, free, alternately long and short, anthers broadly oblong, versatile. *Ovary* stipitate densely grey-downy, 1- or 2-ovuled, stalk glabrous longer than calyx-tube, style glabrous incurved. *Pod* oblong, obliquely rounded at base, subequally rounded and apiculate at tip, rusty-puberulous, rather distinctly reticulate, 3 in. long, 2 in. wide, ·5 in. thick, valves very firmly coriaceous. *Seed* 1, oblong, 1·25 in. long, 1·2 in. wide, ·35 in. thick. *Touchiroa Curtisii* Prain MSS.

Penang; Govt. Hill, 1200 feet elev., *Curtis* 3007! Malacca; Bukit Sadanan, *Derry* 1164! Perak; Larut, *Kunstler* 7467! Thaiping, *Kunstler* 8514! Kinta, *Kunstler* 4753!

Var.? *Wallichii* Prain; leaf-rachis and leaflets beneath densely softly velvety; leaflets acute, not cuspidate or caudate at the tip. *Leguminosa* Wall. Cat. 5983. *Ignota* Wall. Cat. 8089. *Touchiroa Wallichii* Prain MSS.

Penang; *Porter* (Wall. Cat 5983)! *Wallich* (Cat. 8089)!

This fine tree is, according to Mr. Derry, known in Malacca as '*Kumpas rumah*.' Though very nearly related to *C. glauca* it seems to be quite distinct and is easily separated by its longer petiolules; pubescent leaf-rachis, rachis of inflorescence and young leafy shoots; also by its rather smaller leaflets and pods. It is likewise very closely related to *C. speciosa* but it has longer pedicels and a less dense inflorescence than that species, which moreover has the leaflets quite glabrous.

The plant here tentatively referred to the species as var.? *Wallichii* occurs twice in the Wallichian Herbarium, on both occasions without flowers or fruits. It has never been obtained again and it is just possible that when it is re-discovered it will prove a distinct species, *C. Wallichii*.

4. Crudia glauca Prain. A tree 50–70 feet high, with spreading glabrous branches; stem 1·5–2·5 feet in diam. *Leaves* odd- (or sometimes even-) pinnate, rachis 2–2·5 in. long, petiole articulate on an auricled node with an interpetiolar 2-lobed stipule, leaflets 7–8, with petiolules ·15 in. long, quite glabrous as is the rachis, alternate or occasionally subopposite, oblanceolate-oblong, base slightly obliquely rounded, apex rounded and at length abruptly obtusely cuspidate, 2·5–4 in. long, 1·25–1·75 in. wide, thinly papery, dark-green and quite glabrous above, very glaucous glabrous on the nerves elsewhere finely adpressed-puberulous beneath, lateral nerves ascending, prominently looped one-third their length within the margin, secondary venation indistinct. *Flowers* in dense narrow racemes at the bases of new leafy shoots, 3–5 in. long, with angular glabrous rachis. *Calyx* not seen. *Pod* oblong tapering subequally at base to a stipe ·25 in. long, and at apex to a

short acute beak, closely tawny-puberulous, rather distinctly reticulate, 4 in. long, 2 in. wide, ·6 in. thick; valves very firmly coriaceous. *Seed* 1, oblong, 1·5 in. long, 1·2 in. across, ·4 in. thick. *Touchiroa glauca* Prain MSS.

PERAK; Goping, *Kunstler* 8175!

This is very nearly related to *C. Curtisii* but differs markedly in having leaflets very glaucous beneath, the leaflets being also rather larger and the petiolules shorter; in having the leaf-rachis, petiolules, and nerves beneath glabrous; and in having, as is shown by the scars on the rachis of the infruitescence, much more densely flowered racemes; the pods also are larger than in *C. Curtisii*. Flowers have not yet been sent. Of all the Malayan species, this is the one that most nearly approaches the Ceylon *C. zeylanica*.

5. CRUDIA SPECIOSA Prain. A handsome tree with slender pendulous glabrous branches and glabrescent new shoots. *Leaves* odd-pinnate, rachis 2–3 in. long, petiole articulate on an auriculate node, with an interpetiolar 2-lobed stipule, leaflets 5 (rarely 3), with petiolules ·15 in. long, glabrous as is the rachis; alternate, oblong, base unequally rounded or truncate, apex abruptly tapering to a short acutely caudate tip, 2–2·5 in. long, 1–1·5 in. wide, papery, dark-green above, paler beneath, quite glabrous or both surfaces, lateral nerves spreading slender, looped within margin, hardly more prominent than secondary venation. *Flowers* in rather dense narrow racemes at the ends of new leafy shoots, 6–10 in. long with round glabrescent rachis; pedicels spreading, very slender, quite glabrous, ·35 in. long, with a minute bracteole below the middle; buds oblong, ·25 in. long. *Calyx*-tube very short, lobes 4, imbricate, reflexed in flower, very sparsely puberulous externally, glabrous within. *Petals* 0. *Stamens* 10, filaments glabrous, free, alternately short and long, anthers broadly oblong, versatile. *Ovary* stipitate, densely pubescent, 1- or 2-ovuled; stalk as long as calyx-tube, glabrous, style glabrous incurved. *Pod* not seen. *Touchiroa speciosa* Prain MSS.

PUNGAH; "a very handsome tree with dark-green leaves and slender pendulous branches; growing in the Rajah's Garden," *Curtis* 2955!

Nearest to *C. Curtisii* and *C. glauca* but evidently quite distinct from both.

6. CRUDIA WRAYI Prain. A small tree with slender glabrous branches. *Leaves* odd-pinnate, rachis 1 in. long, petiole articulate on an auriculate node, the interpetiolar lanceolate stipules united at their very base only, glabrous as are the leaf-rachis and the petiolules, ·15 in. long; leaflets 3, alternate, oblanceolate, base cuneate, apex acute or rounded and shortly abruptly acuminate, 1·5–2·5 in. long, ·5–1 in. wide, thinly papery, pale yellowish-green, glabrous on both surfaces, lateral nerves spreading, 7–8 pairs, slender, looped within margin, secondary nervation fine but distinct. *Flowers* in narrow dense racemes at the ends and

bases of new leafy shoots, 4–8 in. long, with angular puberulous rachis; pedicels slender ·2 in. long, puberulous, bracteolate in the middle; buds oblong, ·15 in. long. *Calyx*-tube very short, lobes 4, imbricate in bud, spreading in flower, faintly puberulous outside, glabrous within. *Petals* 0. *Stamens* 8–9, alternately long and short, anthers broadly ovate, versatile. *Ovary* shortly stipitate, densely pubescent, 1- or 2-ovuled; stalk glabrous equalling calyx-tube, style glabrous incurved. *Pod* unknown. *Touchiroa Wrayi* Prain MSS.

Perak; Larut, at Sungei on the plains, *Wray* 2874!

This is a member of the group of species forming the original genus *Touchiroa*, to which *C. bantamensis* and *C. gracilis*, among Malayan species, also belong. But *C. Wrayi* is easily distinguished from both the species mentioned by its very small leaflets and its much longer pedicels; the flowers, except for having longer stalks, are extremely like those of *C. bantamensis*.

7. Crudia gracilis Prain. A slender shrub 6–8 feet high, young branches glabrous. *Leaves* odd-pinnate, rachis ·75–1 in. long, petiole articulate on a small node, with interpetiolar glabrous lanceolate stipules united only at their very bases, leaflets 3 (or occasionally 2 from abortion of one lateral leaflet), with stout petiolules ·25 in. long, glabrous as is the rachis; alternate, ovate-oblong to oblong-lanceolate, base cuneate or slightly unequally rounded, apex shortly caudate-acuminate, 4·5–6 in. long, 2–3 in. across, firmly papery, pale yellowish-green, glabrous on both surfaces, lateral nerves ascending, about 6 pairs, distinct, secondary venation somewhat distinct beneath. *Flowers* in very narrow sparse spikes at the ends of new leafy shoots, 10–12 in. long with angular quite glabrous rachis; sessile, minutely bracteolate below the calyx; buds oblong, ·15 in. long. *Calyx*-tube very short, lobes 4, imbricate in bud, spreading in flower, quite glabrous on both surfaces. *Petals* 0. *Stamens* 8–9, filaments glabrous, free, alternately short and long, anthers broadly ovate, versatile. *Ovary* shortly stipitate, densely pubescent, 1- or 2-ovuled; stalk glabrous, shorter than calyx-tube, style glabrous incurved. *Pod* unknown. *Touchiroa gracilis* Prain MSS.

Perak; Thaiping, in low wet ground in dense forest, rare, *Kunstler* 8468!

This is extremely closely related to *Touchiroa bantamensis* Hassk. which has also 3- (or by abortion 2-) foliolate leaves, but has larger leaflets, puberulous rachis and sepals, and distinct though very short pedicels.

54. Peltophorum Vogel.

Tall unarmed trees. *Leaves* abruptly bipinnate. *Flowers* showy, yellow or white, in axillary and in panicled terminal racemes. *Calyx* with the disc confined to the base, teeth subequal, very deeply cut, imbricate. *Petals* oblong or roundish, imbricated, spreading. *Stamens*

10, free, declinate; filaments with a dense tuft of hairs at the base; anthers uniform, linear-oblong. *Ovary* sessile, free, few-ovuled; style long filiform incurved, stigma large peltate. *Pod* oblong, flat, thin, hard, indehiscent, with a firm broad wing on each suture. Species 7–8; cosmopolitan in the tropics.

Flowering pedicels not exceeding the calyx ...	... 1. *P. ferrugineum.*
Flowering pedicels 3–4 times as long as calyx ...	... 2. *P. dasyrachis*

1. PELTOPHORUM FERRUGINEUM Benth. Flor. Austral. II 279. A tall tree 70–80 feet high; branchlets covered with a thin rusty tomentum. *Leaves* 6–12 in. long, petiole 1–1·5 in., sparingly rusty-pubescent; pinnæ 16–20, distal 4–6 in. long, progressively shortening towards proximal, 3–4 in.; leaflets close, ligulate-oblong, sessile, base unequal, apex obtuse, ·5–·75 in. long, ·35 in. wide, subcoriaceous, puberulous above, faintly rusty-pubescent beneath. *Racemes* in a large terminal panicle 12 in. long, 8–9 in. across, branches 4–6 in. long, bracts linear under 1 in. long, very caducous, bud ·35 in. in diam., pedicels ·15–·25 in. long, rachis, branches and pedicels densely rusty-pubescent. *Calyx* partite to ·15 in. from base, lobes subequal, ovate-lanceolate, ·25 in. long, densely rusty-pubescent externally. *Corolla* 1·25 in. wide, petals ·8 in. long, yellow, the thickened base densely rusty-hairy on both sides, the blade more or less glabrous but the margin ciliate with rusty hairs. *Stamens* 10, free, filaments equal, pubescent at the base. *Ovary* densely villous, style very sparingly pubescent throughout, the stigma peltate. *Pod* 2–4 in. long, 1 in. across, narrowed to both ends, rigid, glabrous, closely longitudinally veined outside. Bak. in Flor. Brit. Ind. II, 257. *Poinciana Roxburghii* G. Don, Gen. Syst, II, 433. *Cæsalpinia inermis* Roxb. Flor. Ind. II, 367. *C. ferruginea* Dene, Nouv. Ann. Mus. II, 462; Miq. Flor. Ind. Bat. I, 111. *C. arborea* Zoll. Nat. en Geneesk. Arch. III, 65; Miq. Flor. Ind. Bat. I, 112.

ANDAMANS; *Kurz!* NICOBARS; *Jelinek* 240! *Heinig!* KEDAH; Langkawi, *Curtis* 370! MALACCA; *Griffith* 1903! *Hervey* 2078! SINGAPORE; *Ridley* 265! JOHORE; *Ridley* 3977! DISTRIB. Borneo (*Hullett*); Java; Timor.

2. PELTOPHORUM DASYRACHIS Kurz ex Bak. in Flor. Brit. Ind. II, 257. A tall tree 70–80 feet high; branchlets covered with a fulvous tomentum. *Leaves* 6–15 in. long, petiole 1–1·5 in. long, tomentose; pinnæ 14–18, distal 4–5 in. long, shortening progressively towards proximal 2–2·5 in.; leaflets close, ligulate-oblong, sessile, base unequal, apex rounded, ·5–·75 in. long, ·35 in. wide, subcoriaceous, puberulous above, slightly rusty-pubescent beneath. *Racemes* 6–9 in. long, 3 in. across, pedicels patent 1–1·5 in. long, bracts lanceolate, ·5 in. long, subpersistent; bud ·35 in. in diam.; rachis, pedicels and bracts rusty-pubescent. *Calyx* partite to ·15 in. from base, lobes equal, ovate-lanceolate, ·25 in. long,

densely rusty-velvety externally. *Corolla* 1·5 in. across, petals 1 in. long, oblong, yellow, the thickened base very densely hairy on both sides, the blade glabrous. *Stamens* 10, free, filaments equal, pubescent at the base. *Ovary* densely villous, style sparsely pubescent throughout, the stigma large peltate glabrous. *Pod* 4–5 in. long, 1·25–1·4 in. across, rigid, 1–5-seeded, narrowed at both ends, faintly puberulous and not veined externally. *Cæsalpinia Finlaysoniana* Grah. in Wall. Cat. 5971. *C. dasyrachis* Miq. Flor. Ind. Bat. Suppl. 292.

Perak; Goping, *Scortechini*, 1994! Trang, *Kunstler* 1394! 8172! Malacca; common, *Griffith! Maingay* 560! *Holmberg* 884! *Derry* 1049! Distrib. Sumatra.

The native name in Malacca is "*Batai*" or "*Kayu Batai*."

There is a third species of *Peltophorum* in Sumatra (*P. grande*), a very tall tree with white flowers tinged with pink.

55. Cæsalpinia Linn.

Robust erect trees, shrubs, or woody prickly climbers. *Leaves* large, abruptly bipinnate. *Flowers* showy, yellow, in copious axillary racemes. *Calyx* deeply cleft, with the disc confined to its base, the lobes imbricated, the lowest the largest, cucullate. *Petals* spreading, usually orbicular with a distinct claw, the uppermost smaller than the others. *Stamens* 10, free, declinate; anthers oblong, uniform, versatile. *Ovary* sessile or subsessile, few-ovuled; style filiform, sometimes clubbed at the tip, stigma terminal. *Pod* oblong or ligulate, thin and flat, or thicker and subturgid, indehiscent or dehiscent, smooth or (in subgen. *Guilandina*) armed all over with wiry spines. Species about 40, widely spread in the tropics of both hemispheres.

Pod armed with abundant wiry prickles; petals narrow (Guilandina):—
- Leaves stipulate, leaflets small, bracts squarrose ... 1. *C. Bonducella.*
- Leaves without stipules, leaflets larger, bracts ascending ... 2. *C. Bonduc.*

Pod unarmed, petals broad:—
- Pod dry, thin-valved with narrow sutures (Eucæsalpinia):—
  - Leaflets few, coriaceous, large; pods short, seeds solitary or rarely 2 (§ *Nugaria*) ... ... 3. *C. Nuga.*
  - Leaflets many, membranous or subcoriaceous, small; pods longer than broad, seeds 5–8:—
    - Stamens long, far-exserted; petals long-clawed (§ *Cæsalpinaria*)... ... ... 4. *C. pulcherrima.*
    - Stamens short, little-exserted; petals short-clawed (§ *Sappania*):—
      - Petals orbicular, flowers ·75 in. across:—
        - Stipules 0, petals subequal, pod wingless broadly blunt-pointed with recurved beak ... ... 5. *C. Sappan.*

Stipules large, upper petal smaller than the others, pod narrowly winged along ventral suture, obliquely round-pointed with straight beak ... 6. *C. sepiaria.*

Petals oblong (subequal), flowers only ·3 in. across, (pod wingless, broadly blunt-pointed with straight beak) ... ... 7. *C. parviflora.*

Pod somewhat fleshy, thick-valved with wide sutures (CINCLIDOCARPUS):—

Leaflets oblong; racemes lax, pedicels much exceeding calyx ... ... 8. *C. digyna.*

Leaflets ligulate, racemes denser, pedicels hardly exceeding calyx ... ... 9. *C. tortuosa.*

SUBGEN. 1. GUILANDINA Bak. *Pod* dry, armed on the face with abundant wiry prickles; *petals* narrow.

1. CÆSALPINIA BONDUCELLA Fleming, Asiat. Research. XI, 159. A climber, often very extensive, with finely grey-downy branches armed with many small hard falcate yellow prickles. *Leaves* 1 to 2 feet long, with a pair of reduced pinnæ (or compound stipules) at their base; pinnæ 12–16, 2–3 in. long, slightly lengthening upwards, leaflets 12–18, membranous, rather pale-green, ovate or elliptic, base slightly unequally rounded, apex cuneate or rounded mucronulate, ·5–1 in. long, ·3–·6 in. wide, glabrous above, slightly puberulous beneath, more closely on the margins, petiolules very short; lobes of compound stipules suborbicular. *Racemes* terminal and slightly supra-axillary, simple or panicled, dense at top, laxer downwards, 6–10 in. long; pedicels ·2 in. (in fruit ·3 in.) long, with squarrose reflexed lanceolate deciduous bracts ·25–·3 in. long, finely brown-downy as are the pedicels and main-rachis. *Calyx* ·25–·3 in. long, closely downy. *Petals* oblanceolate, little exserted, yellow except the broader shorter ovate-acute upper with reddish base. *Stamens* densely grey-silky, declinate. *Pod* short-stalked, oblong, 2–3 in. long, 1·75 in. wide, densely strongly aculeate externally. *Seeds* usually 2, oblong, lead coloured, ·5 in. across. Roxb. Flor. Ind. II, 357; Bak. in Flor. Brit. Ind. II, 254. *Guilandina Bonducella* Linn. Sp. Pl. 381; Wall. Cat. 5803. *G. Bonduc* W. & A. Prodr. 280 in part; Miq. Flor. Ind. Bat. I, 113 in part.

ANDAMANS; common on the coasts. PENANG; *Curtis* 99! DISTRIB. Cosmopolitan in the tropics.

2. CÆSALPINIA BONDUC Roxb. Hort. Beng. 32. A large shrubby creeper often very extensive, with sparingly pubescent branches armed with rather strong falcate brown prickles. *Leaves* 1–2 feet long, without stipules; pinnæ 8–16, 5–8 in. long, slightly lengthening upwards, leaflets 12–14, papery, ovate, base subequally rounded, apex cuneate mucronate, 1·5–2 in. long, ·75–1 in. wide, dark-green shining glabrous above, rather closely puberulous beneath, petiolules ·08 in. long. *Racemes*

terminal and supra-axillary simple or panicled, rather lax throughout, 6–12 in. long; pedicels ·2 (in fruit ·3) in. long, with membranous lanceolate deciduous bracts ·2 in. long, finely brown-pubescent as are the pedicels and main-rachis. *Calyx* ·2–·25 in. long, closely downy, light-green, tinged with pink. *Petals* oblanceolate, little exserted, yellow. *Stamens* silky, declinate. *Pod* rather distinctly stipitate, oblong, 5 in. long, 2·5 in. wide, sparsely strongly aculeate externally. *Seeds* usually 4, oblong, ·5 in. across. Roxb. Flor. Ind. II, 362; Bak. in Flor. Brit. Ind. II, 255. *Guilandina Bonduc* Linn. Sp. Pl. 381; DC. Prodr. II, 480; Wall. Cat. 5806; W. & A. Prodr. 280 in part; Miq. Flor. Ind. Bat. I, 113 in part.

Nicobars; *King's Collector!* Penang; *Wallich* 5806! Pahang; *Ridley* 2650! Perak; *Scortechini* 1062! *Kunstler* 7147! *Wray* 3089! Distrib. Cosmopolitan in the tropics.

Subgen. 2. Eucæsalpinia. *Pod* dry, unarmed, valves thin; petals broad.

§ 1. Nugaria DC. *Leaflets* few coriaceous shining; *petals* short-clawed; *stamens* not far exserted; *seeds* 1, rarely 2.

3. Cæsalpinia Nuga Ait. Hort. Kew. III, 32. A very extensive littoral climber, with glabrous green branches armed with very strong, short, hard, dark, hooked prickles. *Leaves* 6–12 in. long, pinnæ 6–8, rather remote, subequal, 2–3 in. long, leaflets 4 or (oftener) 6, rigidly coriaceous, dark-green and shining above, ovate, acute or very rarely obtuse, base slightly unequally rounded or sometimes cuneate, 1–2·5 in. long, ·5–1 in. wide, quite glabrous on both surfaces; petiolules ·15 in. long. *Racemes* in a terminal panicle extending into the axils of the uppermost leaves, 10–15 in. long, 6–8 in. across, individual racemes 2·5–3 in. long; pedicels ·3 (in fruit ·5) in. long, with small ovate-lanceolate deciduous bracts ·1 in. long. *Calyx* ·25–·3 in. long, leathery, quite glabrous. *Corolla* ·5 in. across, fragrant, petals yellow, orbicular except the rather smaller ovate-acute upper blotched with red. *Stamens* densely woolly at base, declinate. *Pod* 2 in. long, 1·35 in wide, oblong, beaked, hard, slightly turgid, indehiscent. *Seed* solitary, black, 1 in. long, ·75 in. wide. DC. Prodr. II, 481; Miq. Flor. Ind. Bat. I, 108; Bak. in Flor. Brit. Ind. II, 255. *Cæsalpinia paniculata* Desf. Cat. ed. 2, 210; Roxb. Hort. Beng. 32; DC. Prodr. II, 481; Roxb. Flor. Ind. II, 364; W. & A. Prodr. 281; Wight, Ic. t. 36. *C. sumatrana* Wall. Cat. 5831 B, C, not of Roxb. *C. bijuga* Wall. Cat. 5833, not of Sw. *C. scandens* Koenig in Roth, Nov. Sp. 289; DC. Prodr. II, 482; Wall. Cat. 5829. *Guilandina Nuga* Linn. Sp. Pl. ed. II, 545. *Nuga sylvarum* Rumph. Herb. Amboin. V, t. 50.

Andamans; very common on all the coasts and near muddy creeks.

Nicobars; common. Kedah; Pulo Langkawi, *Curtis* 2618! 2867! Perak; *Scortechini* 1096! *Kunstler* 1029! Malacca; *Griffith* 1898! Pahang; *Ridley* 1377! Distrib. Coasts of S.-E. Asia, North Australia and Western Polynesia.

The nearest ally of this species is not any plant known as a *Cæsalpinia*, but a species from China known as *Mezoneuron sinense*.

§ 2. Cæsalpinaria Bth. & Hk. f. *Leaflets* small, numerous, membranous; *petals* very long-clawed; *stamens* very far exserted; *seeds* 6–8.

4. Cæsalpinia pulcherrima Sw. Obs. 166. A shrub with glabrous unarmed or very sparsely and weakly prickly branches. *Leaves* 4–6 in. long, pinnæ 12–16, 2–4 in. long, the proximal and distal rather shorter than those between, leaflets 16–24, distinctly petiolulate, close, membranous, elliptic-oblong, apex obtuse, base slightly oblique, cuneate on upper rounded on lower side, ·5–·7 in. long, ·35–·45 in. wide, dark-green, glabrous on both surfaces. *Racemes* terminal and axillary, simple or very sparingly branched, 8–12 in. long, at length subcorymbose, 4–6 in. wide, pedicels ascending, the lowest reaching 3–4 in. in length; bracts subulate ·2 in. long, very early caducous. *Calyx* ·6 in. long, quite glabrous, leathery, the lower segment very large and deeply cucullate, ·4 in. wide. *Corolla* spreading, 1·5 in. across, all petals long-clawed, the lower four ·75 in. long, yellow or red, lamina orbicular with crisped margin, ·5 in. in diam., the upper smaller. *Stamens* far-exserted, red, glabrous, 1·75 in. long. *Pod* thin, flat, ligulate, glabrous, nearly straight, 2–3 in. long, ·6 in. wide; seeds 6–8, broadly oval, compressed, brown, ·4 in. long, ·3 in. wide. Benth. Pl. Jungh. 258; Miq. Flor. Ind. Bat. I, 111; Bak. in Flor. Brit. Ind. II, 255. *Poinciana pulcherrima* Linn. Sp. Pl. 380; DC. Prodr. II, 484; Bot. Mag. t. 995; Wall. Cat. 5813; Roxb. Flor. Ind. II, 355; W. & A. Prodr. 282. Rheede, Hort. Malab. VI, t. 1; Rumph. Herb. Amboin. II, t. 20.

A garden or hedge plant in most of our provinces.

The native country of this species is uncertain, but apparently it is not anywhere truly wild in S.-E. Asia. The other species of the section are American, so that this one has perhaps also been originally derived from the Western Hemisphere.

§ 3. Sappania *DC.* *Leaflets* many, membranous, small; *petals* short-clawed; *stamens* not far exserted; *seeds* 3–6.

5. Cæsalpinia Sappan Linn. Sp. Pl. 381. A tree 20–30 feet high with thorny stem 6–10 in. in diam.; branches rusty-pubescent with few small prickles. *Leaves* 8–15 in. long, pinnæ 16–24, 4–6 in. long; leaflets 20–36, close, membranous or chartaceous, oblong, very oblique, sessile, attached at lower corner, apex obtuse or slightly retuse, ·5–·75 in. long, ·35 in. wide, glabrous above, slightly puberulous on the nerves

beneath. *Racemes* in a terminal panicle extending into the axils of the uppermost leaves, 12–16 in. long, 8 in. across, individual racemes 4–6 in. long; pedicels ·5–·6 in. long, bracts lanceolate ·3 in. long, very deciduous. *Calyx* ·4 in. long, leathery, glabrous. *Corolla* ·75 in. across, petals bright-yellow, the upper with a pinkish basal patch, all orbicular subequal. *Stamens* waxy-white, densely woolly at base, declinate. *Ovary* grey-velvety. *Pod* 3–4 in. long, 1·5–2 in. wide, subcompressed, polished, indehiscent, with a hard recurved short beak at upper angle of obtuse apex. Roxb. Cor. Pl. I, 17, t. 16; Hort. Beng. 32; DC. Prodr. II, 482; Wall. Cat. 5838; Roxb. Flor. Ind. II, 357; W. & A. Prodr. 281; Miq. Anal. Ind. I, 9; Flor. Ind. Bat. I, 108; Bedd. Flor. Sylvat. 90; Anal. Gen. t. 13, f. 1; Bak. in Flor. Brit. Ind. II, 255. *Biancæa Sappan* Todaro, Hort. Bot. Panorm. 3. *Lignum Sappan* Rumph. Herb. Amboin. IV, t. 21.

Perak; open jungle at foot of hills, Ulu Bubong, *Kunstler* 10567! Pahang; Pulo Changei, *Ridley* 2590! Distrib. India, Indo-China; Malay Archipelago.

6. Cæsalpinia sepiaria Roxb. Hort. Beng. 32. A moderate climber with stout woody stem and somewhat densely grey- or brown-pubescent branches armed with strong sharp prickles. *Leaves* stipulate, 9–15 in. long; pinnæ 12–20, 2–3 in. long, subequal, leaflets 16–24, very shortly petiolulate, close, membranous, oblong, apex obtuse, base rounded on both sides, slightly oblique on upper, ·5–·8 in. long, rather pale-green glabrous above, glaucous and slightly pubescent beneath; stipules very obliquely ovate with crisped margins, long-acuminate apex, and with projecting auriculate lower angle of base, ·5 in. long, ·3 in. wide, soon deciduous. *Racemes* terminal and axillary all simple, drooping, 6–12 in. long, 2–2·5 in. across, pedicels erecto-patent, ·75 in. long, bracts large, ovate-lanceolate caducous, ·4 in. long, densely pubescent. *Calyx* ·5 in. long, densely pubescent. *Corolla* spreading, ·75 in. across, petals bright yellow, all orbicular, ·5 in. across except the upper only ·25 in. in diam. *Stamens* little exserted, declinate, greenish-white, densely woolly in the lower half. *Pod* indehiscent, linear-oblong, 3–5 in. long, 1·2 in. across, sublignose, glabrous, slightly recurved and slightly turgid, rather strongly reticulate-veined especially in the half next lower suture; upper suture dilated into a narrow wing; faces slightly depressed between the 6–8 mottled seeds, ·4 in. long, ·3 in. wide. Wall. Cat. 5834; Roxb. Flor. Ind. II, 360; W. & A. Prodr. 282; Wight, Ic. 37; Miq. Flor. Ind. Bat. I, 109; Bak. in Flor. Brit. Ind. II, 256. *C. ferox* Hassk. Pl. Jav. Rar. 400. *C. japonica* Sieb. & Zucc. Fl. Jap. 9. *C. crista* Thunb. Flor. Jap. 179, not of Linn. *Reichardia decapetala* Roth. Nov. Sp. 9; DC. Prodr. II, 484. *Biancæa scandens* Todaro, Hort. Bot. Panorm. 4, t. 1.

beneath. *Racemes* in a terminal panicle extending into the axils of the uppermost leaves, 12–16 in. long, 8 in. across, individual racemes 4–6 in. long; pedicels ·5–·6 in. long, bracts lanceolate ·3 in. long, very deciduous. *Calyx* ·4 in. long, leathery, glabrous. *Corolla* ·75 in. across, petals bright-yellow, the upper with a pinkish basal patch, all orbicular subequal. *Stamens* waxy-white, densely woolly at base, declinate. *Ovary* grey-velvety. *Pod* 3–4 in. long, 1·5–2 in. wide, subcompressed, polished, indehiscent, with a hard recurved short beak at upper angle of obtuse apex. Roxb. Cor. Pl. I, 17, t. 16; Hort. Beng. 32; DC. Prodr. II, 482; Wall. Cat. 5838; Roxb. Flor. Ind. II, 357; W. & A. Prodr. 281; Miq. Anal. Ind. I, 9; Flor. Ind. Bat. I, 108; Bedd. Flor. Sylvat. 90; Anal. Gen. t. 13, f. 1; Bak. in Flor. Brit. Ind. II, 255. *Biancæa Sappan* Todaro, Hort. Bot. Panorm. 3. *Lignum Sappan* Rumph. Herb. Amboin. IV, t. 21.

Perak; open jungle at foot of hills, Ulu Bubong, *Kunstler* 10567! Pahang; Pulo Changei, *Ridley* 2590! Distrib. India, Indo-China; Malay Archipelago.

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Penang; Govt. Hill, 2500 feet, *Curtis*, 385! Distrib. Eastern and South-Eastern Asia, introduced in America.

7. Cæsalpinia parviflora Prain. A small tree or, at times, a climber, with stem 8–12 in. in diam. and with rusty-pubescent branches sparingly armed with small prickles. *Leaves* stipulate 8–10 in. long, pinnæ 18–24, 2–3 in. long; leaflets 30–36, close, firmly subcoriaceous, oblong, sessile, attached sub-centrally but with the lower corner subauriculately produced, apex obtuse or rounded, ·35–·5 in. long, ·2–·25 in. wide in var. *typica*, ·75 in. long, ·35 in. wide (or rarely even larger), in. var? *stipularis*, dark-green glabrous and shining above, dull beneath and glabrous in var. *typica*, sparsely puberulous on the midrib in var? *stipularis*; stipules lanceolate or oblong ·45–·75 in. long. *Racemes* in an ample terminal again branching panicle extending into the axils of the upper leaves, 2–3 feet long, 12–15 in. across, primary branches 5–8 in. long, final individual racemes 3 in. long; pedicels ·25 in. long, slender, densely puberulous as are the main-rachis and branches of panicle; bracts linear or lanceolate, ·2–·25 in. long, deciduous. *Calyx* ·25 in. long, thinly coriaceous, puberulous. *Corolla* ·3 in. across, petals greenish-yellow, oblong, subequal, hardly exserted. *Stamens* green, densely woolly at base. *Ovary* sparsely pubescent. *Pod* of var. *typica* 1 in. long, ·5 in. wide, with a recurved beak at upper angle of obtuse apex; seeds (young) oval, 4, ·25 in. long.

Var. *typica*; leaflets not exceeding ·5 in. in length, glabrous beneath; stipules lanceolate, ·45 in. long, ·2 in. wide, margin entire; bracts linear, ·2 in. long, hardly equalling the pedicels.

Perak; at low elevations, *Kunstler* 3499! 7584! *Wray* 1909!

Var.? *stipularis*; leaflets ·75 in length or longer, the midrib beneath puberulous; foliaceous stipules broadly ovate-oblong, ·75 in. long, ·35 in. wide, continued in the leafless portion of the more diffusely branching and more densely puberulous inflorescence, their margins often incised; bracts lanceolate, ·25 in. long, equalling the pedicels.

Perak; Larut, in the plains, *Wray* 3983! 3991! 4261!

The foliage of the typical variety of this species is very like that of *C. cinclidocarpa* Miq. or *C. tortuosa* Roxb. but the remarkably small flowers and the different fruit (which is exactly like a miniature *C. Sappan* pod) abundantly distinguish it from all other Indo-Malayan species.

The pod of var? *stipularis* is not yet known and it may ultimately be necessary to separate it specifically from *C. parviflora*. But its flowers, except that the calyx is somewhat more puberulous, are exactly as in *C. parviflora*, and though var? *stipularis* has a somewhat different facies on account of its larger leaflets and especially its much longer foliaceous subpersistent stipules, it seems better in the meantime to treat it tentatively as no more than a variety of *C. parviflora*. Wray notes that var. *typica* is a "small tree;" Kunstler states on one occasion that it is

a tree 30–40 feet high, on another that it is a climber 100–150 feet long. Of all three gatherings of VAR.? *stipularis* it is noted that the plant is a climber.

SUBGEN. 3. CINCLIDOCARPUS Bak. *Pod* rather fleshy, indehiscent, naked on the faces, with thickened sutures. *Petals* broad.

8. CÆSALPINIA DIGYNA Rottl. ex Willd. Nov. Act. Nat. Cur. IV, 198 t. 3. A climber with glabrous or slightly downy branches armed with scattered prickles. *Leaves* 6–9 in. long, pinnæ 8–9, 1·5–2·5 in. long increasing upwards, leaflets 16–20, close, membranous, oblong, obtuse, sessile, base subequally rounded, ·35–·45 in. long, ·25 in. wide, medium-green and glabrous above, greyish and obscurely downy beneath; stipules subulate, membranous, very early deciduous. *Racemes* simple axillary, 8–12 in. long, 3 in. wide, pedicels distant slender horizontal or slightly deflexed, 1 in. long, glabrous as is the main-rachis. *Calyx* leathery, quite glabrous, ·3 in. long. *Corolla* spreading, ·75 in. across, petals orbicular, ·3 in. in diam., subequal, yellow except the upper slightly streaked with red. *Stamens* little exserted, filaments greenish-white, densely woolly in the lower half, declinate. *Pod* rather fleshy, indehiscent, oblong, glabrous, with much thickened sutures, 1·5–2 in. long, 1 in. across, turgid, torulose; seeds 2–4, black, ovoid, ·5 in. long, ·4 in. wide. DC. Prodr. II, 482; Wall. Cat. 5839; W. & A. Prodr. 281; Bak. in Flor. Brit. Ind. II, 256. *C. oleosperma* Roxb. Hort. Beng. 32; Fl. Ind. II, 356. *C. flavicans* Grah. in Wall. Cat. 5825. *C. gracilis* Miq. Flor. Ind. Bat. I, 110. *Pterolobium lacerans* Wall. Cat. 5841 *letters* F, H, and I; not of R. Br.

MALACCA; *Griffith!* PENANG; *Curtis* 448! TONGKAH; *Curtis' Collector* 2862! DISTRIB. India, Indo-China, Malay Archipelago.

9. CÆSALPINIA TORTUOSA Roxb. Hort. Beng. 32. A stout subscandent straggling shrub, with slightly downy spreading branches armed with very strong prickles. *Leaves* 12–18 in. long, pinnæ 30–40, 2·5–4 in. long, the proximal and distal rather shorter than those between, leaflets 40–60, sessile, close, rigidly subcoriaceous, narrowly ligulate, apex obtuse or rounded, base obliquely cuneate, ·25–·3 in. long, ·1 in. wide, dark-green, glabrous on both surfaces, shining above. *Racemes* axillary, simple, erect, 15–18 in. long, 1·5 in. across, pedicels spreading, ·5 in. long, slender, glabrous as is the stout rachis, bracts very small caducous. *Calyx* ·5 in. long, leathery, quite glabrous, the lower segment very deeply cucullate, ·35 in. wide. *Corolla* spreading, ·75 in. across, petals bright-yellow with red streaks near base, all orbicular clawed, ·5 in. across except the upper only ·25 in. in diam. *Stamens* little-exserted, declinate, green, densely woolly in lower half. *Pod* oblong, twisted, indehiscent, glabrous, with much thickened sutures, 2–3 in. long, 1 in. across, turgid, torulose; seeds 2–5, hard, smooth, dark-brown,

·4 in. across. Wall. Cat. 5827, A, B, and C.; Roxb. Flor. Ind. II, 365; Miq. Flor. Ind. Bat. I, 109; Bak. in Flor. Brit. Ind. II, 257.

Penang; Penara Bukit, 700 feet, *Curtis* 1027! Distrib. Sumatra, Tenasserim.

Very nearly related to *C. cinclidocarpa* Miq. which differs by its branching inflorescence and its pubescent calyx; also to *C. acanthobotrya* Miq. which has shorter, more laxly-flowered racemes and broader leaflets. Mr. Kürz indeed has in Herb. Calcutta proposed to treat *C. acanthobotrya* as a variety (var. *latifolia*) of *C. tortuosa* but the examination of an authentic example of Dr. Miquel's plant leads the writer to believe that it is better, at least at present, to consider it specifically distinct.

56. Mezoneuron Desf.

Robust woody prickly climbers. *Leaves* abruptly bipinnate. *Flowers* in ample panicled racemes. *Calyx* very oblique, usually deeply cleft, with a basal or intertubal disc, the lobes imbricated, the lowest largest covering the others in bud like a hood. *Petals* spreading, obovate-spathulate, subequal or the upper smallest. *Stamens* free, declinate, usually exserted; anthers oblong, uniform. *Ovary* sessile or shortly stipitate, declinate, few- or many-ovuled; style filiform, stigma small, capitate, the margin often fringed. *Pod* large, thin, oblong, flat, indehiscent, with a broad wing down the upper suture; seeds compressed, orbicular, cotyledons flat, radicle straight. Species about 15; all in the tropics of Eastern Hemisphere.

Calyx deeply cleft, with a wide short tube and a basal disc, the anterior lobe deeply cucullate (*Eumezoneuron*) :—		
Leaflets opposite, large; pods 1-seeded	1.	*M. cucullatum.*
Leaflets alternate, medium to small; pods several seeded :—		
Leaflets beneath and calyx externally pubernlous ...	2.	*M. hymenocarpum.*
Leaflets beneath and calyx externally glabrous :—		
Pedicels puberulous, jointed near base of calyx; leaflets cuneate at apex	3.	*M. Kunstleri.*
Pedicels glabrous, jointed considerably below base of calyx; leaflets obtuse	4.	*M. andamanicum.*
Calyx shallowly cleft, with a narrow long tube and a disc extending above the base, anterior lobe shallowly hooded (*Tubicalyx*); (leaflets alternate)	5.	*M. sumatranum.*

Subgen. 1. Eumezoneuron; calyx deeply cleft, disc basal; lower lobe deeply cucullate.

1. Mezoneuron cucullatum W. & A. Prodr. 283. A large climber, branches glabrous armed with small dark short recurved prickles. *Leaves* 6–12 in. long, pinnæ 4–10, 6–8 in. long; leaflets 8–10, opposite, rigidly subcoriaceous, ovate-acute, base wide-cuneate slightly unequal, 2–4 in. long, 1·25–1·75 in. wide, glabrous on both surfaces, dark-green

above, paler beneath, secondary veins 4–5 pairs and intermediate reticulations faint; petiolules ·2 in. long. *Inflorescence* a terminal or axillary panicle of simple or occasionally branched racemes, 1–1·5 feet long, with terete glabrous main-rachis; single racemes 4–8 in. long; pedicels close-set, slender, ·3 in. long, jointed a little above the middle. *Calyx* yellow, quite glabrous, leathery, anterior sepal cucullate, obtuse, ·25 in. long, the rest orbicular, tube shallow. *Corolla* ·45 in. across, pale-green, standard 2-lobed, shorter but wider than the other subequal orbicular 4. *Stamens* far exserted, puberulous at base, declinate, unequal. *Ovary* declinate, 1–2-ovuled. *Pod* thin, 3–3·5 in. long, 1·25 in. wide (including wing ·3 in. wide), faintly reticulated; seeds usually solitary, very rarely 2.

Andamans; common. Distrib. Eastern Himalaya, India, Indo-China.

2. Mezoneuron hymenocarpum W. & A. Prodr. I, 283. A large climber, branches finely puberulous, with a few scattered recurved brown prickles. *Leaves* 1–1·5 feet long, pinnæ 1–10, 3–4 in. long, leaflets 10–14, alternate or subopposite, rigidly subcoriaceous, obovate, apex obtuse or rounded, base cuneate unequal, ·5–1 in. long, ·25–·6 in. wide, puberulous above, puberulous to densely pubescent beneath, secondary veins 5–6 pairs very faint; petiolules ·15 in. long. *Inflorescence* a large terminal thyrsoid panicle of unbranched racemes extending into the axils of the uppermost leaves, 2 feet long, 8–10 in. wide, the single racemes 6–8 in. long, puberulous as are the main-rachis and slender pedicels, ·35–·5 in. long, jointed ·15 in. under base of calyx. *Calyx* densely puberulous, leathery, anterior sepal cucullate subacute, ·25 in. long, the others orbicular. *Corolla* ·5 in. across, yellow, petals ovate-orbicular, upper small. *Stamens* far exserted, hirsute at base, declinate, unequal. *Ovary* declinate, about 5-ovuled; stigma slightly fringed. *Pod* thin, 4 in. long, when ripe 1 in. wide (including posterior wing ·25–·3 in wide), faintly wide-reticulated, 5-seeded. *Cæsalpinia hymenocarpa* Wall. Cat. 5832. *Mezoneuron pubescens* Bak. in Flor. Brit. Ind. II, 259 not of Desf.

Andamans; very plentiful near Port Blair, *King's Collectors!* Distrib. Burma; Ceylon.

Resembles *M. andamanicum* but is easily distinguished by its leaves and its calyx being pubescent; by its pedicels being shorter; and by its pods being smaller and not so distinctly reticulated.

3. Mezoneuron Kunstleri Prain. A large climber, branches glabrous, with a few brown scattered recurved prickles. *Leaves* 6–8 in. long, pinnæ 4–6, 4–5 in. long, leaflets 6–8, alternate, subcoriaceous, ovate, cuneate at apex and base, almost equally decurrent on the short petiolule,

·5–1·25 in. long, ·35–·75 in. wide, glabrous on both surfaces, dark-green above, glaucescent beneath, secondary veins few, faint, widely reticulated; petiolules ·15 in. long. *Inflorescence* a large terminal thyrsoid panicle of unbranched racemes 1·5–2 feet long, 8–9 in. wide, the single racemes 8–10 in. long, faintly puberulous as in the main-rachis; pedicels slender ·35–·45 in. long, distinctly puberulous, jointed ·2 in. under base of calyx. *Calyx* quite glabrous, leathery, anterior sepal deeply cucullate obtuse, ·25 in. long, the rest orbicular, all gland-dotted as is the shallow tube. *Corolla* ·5 in. across, bright-yellow, petals ovate-orbicular, upper smaller than the others. *Stamens* far exserted, hirsute at base, declinate, unequal. *Ovary* declinate, about 5-ovuled; stigma slightly fringed. *Pod* only seen very young; wing half as wide as body of pod.

Perak; Sungah Ryah, *Kunstler* 895!

A species very near *M. andamanicum*, with which it agrees in number, size, and disposition of leaflets, and which it closely resembles in flowers. The different shape of the leaflets, however, and especially the much shorter distance between the joint in the pedicel and the base of the calyx, with the much shorter puberulous pedicels, mark it as abundantly distinct. The wing, too, of the very young pod is in *M. Kunstleri* almost twice as wide as the wing in the corresponding stage of the pod in *M. andamanicum*.

4. Mezoneuron andamanicum Prain, Journ. As. Soc. Beng. LXI, 2. 131. A large climber, branches glabrous with a few scattered prickles. *Leaves* 1–1·5 feet long, pinnæ 4–10, 5–7 in. long, leaflets 8–10, alternate, rigidly subcoriaceous, obovate, slightly retuse, base cuneate slightly unequally decurrent on the short petiolule, ·5–1·5 in. long, ·35–1 in. wide, glabrous on both surfaces, dark-green above, pale beneath, secondary veins few faint widely reticulated; petiolules ·15 in. long. *Inflorescence* a large terminal thyrsoid panicle of unbranched racemes extending into the axils of the uppermost leaves, 2–2·5 feet long, 1 foot wide, the single racemes 10–12 in. long, quite glabrous as are the main-rachis and the slender pedicels ·5–·75 in. long, jointed ·3 in. under base of calyx. *Calyx* quite glabrous, leathery, anterior sepal deeply cucullate obtuse, ·25 in. long, the rest orbicular all reticulate-veined and yellow gland-dotted as is the shallow tube. *Corolla* ·5 in. across, rather pale-yellow, petals ovate-orbicular, the upper smaller than the others with a thickened claw prolonged into a ligular ciliate ridge, the rest with claw hirsute internally and with lamina red-blotched at base and pink-veined. *Stamens* far exserted, hirsute at base, declinate, 2-seriate, free, unequal. *Ovary* declinate, ovules about 6; stigma slightly fringed. *Pod* thin, 5 in. long, when ripe 1–1·5 in. wide (including posterior wing ·25–·35 in. wide), finely wide-reticulated, distantly 3–5-seeded.

Andamans; very common near Port Blair, *Prain! Man! King's Collector!*

Subgen. 2. Tubicalyx Miq. Flor. Ind. Bat. I, 1081. *Calyx* shallowly cleft, the disc extending above the base, lower lobe shallow-cucullate.

5. Mezoneuron sumatranum W. & A. Prodr. I, 283. A large climber, branches glabrous, armed with a few dark short recurved prickles. *Leaves* 1–1·5 feet long, pinnæ 6–10, 8–12 in. long, leaflets 6–8, alternate, rigidly subcoriaceous, obovate-oblong, emarginate and apiculate, base rounded very slightly unequal, 1·5–2·5 in. long, 1·25–1·75 in. wide, glabrous on both surfaces, dark-green above, paler beneath, secondary veins rather prominently closely reticulate beneath; petiolules ·2 in. long. *Inflorescence* a terminal or axillary panicle of simple or occasionally branched racemes 1·5–2 feet long, with terete thick glabrous main rachis, single racemes 5–6 in. long; pedicels close-set slender, ·25 long, curved. *Calyx* quite glabrous, leathery, anterior sepal orbicular ·25 in. long, twice as large as the others, tube compressed ·5 in. long. *Corolla* ·35 in. wide, ·5 in. long, of 5 subequal petals, oblong, narrowed to the base, the standard reddish the other petals yellowish. *Stamens* hardly exserted, declinate, glabrous, unequal. *Ovary* declinate stipitate glabrous, 3–4-ovuled, stigma glabrous. *Pod* thin, 3–4 in. long, 1·35 in. wide (including posterior wing ·25 in. wide), finely wide-reticulate, distantly 3–4-seeded. Miq. Flor. Ind. Bat. I, 105 and I, 1081; Bak in Flor. Brit., Ind. II, 259. *Cæsalpinia sumatrana* Roxb. Hort. Beng. 32; Flor. Ind. II, 336; Wall. Cat. 5831 A only.

Malacca; *Griffith! Maingay* 534! Perak; Thaipeng, *Scortechini* 67! Kwala, *Scortechini* 1766! Simpat, *Ridley* 3083! Dindings; Lumot, *Ridley & Curtis!* Singapore; near Krangi, *Ridley* 2105! 6026!

The great difference in the appearance of the calyx no doubt justifies Dr. Miquel's proposal to treat this plant as the type of a distinct subgenus of *Mezoneuron*.

57. Pterolobium R. Br.

Robust woody prickly climbers. *Leaves* abruptly bipinnate. *Flowers* in panicled racemes. *Calyx* deeply cleft, with the disc near the base, the lobes imbricated, the lowest longer and more hooded than the others. *Petals* spreading, oblong and clawed equalling the calyx. *Stamens* 10, free, declinate, little exserted; anthers oblong versatile. *Ovary* sessile, 1-ovuled; style filiform, stigma small terminal. *Pod* indehiscent, samaroid with a large horny oblique terminal wing. Species 7; one African, one Australian, two Chinese, three South-East Asiatic.

Racemes with thin angular glabrous rachis, laxly 20–30-fld., pedicels longer than calyx	1. *P. macropterum.*
Racemes with stout terete puberulous rachis, densely 150–200-fld., pedicels not longer than calyx	2. *P. densiflorum.*

1. Pterolobium macropterum Kurz, Journ. As. Soc. Beng. XLII, 2. 71. A large climber, young branches sparsely pubescent, all parts

sparingly armed with small prickles. *Leaves* 6–9 in. long; pinnæ 14–16, 2–2·5 in long with puberulous rachis; leaflets 14–20, elliptic-oblong, apex rounded or obtuse, base unequal, abruptly rounded on upper, narrow-cuneate on lower side, ·45 in. long, ·25 in. wide, chartaceous, dark-green above, paler beneath, glabrous on both surfaces. *Racemes* lax, in spreading terminal and axillary panicles with glabrous slender angular rachis and branches, 8 in. long, 4 in. across, individual racemes 3–4 in. long, 20–30-fld.; pedicels glabrous slender spreading, ·4–·6 in. long. *Calyx* glabrous, thinly coriaceous, lowest sepal ·25 in. long. *Corolla* white, ·25 in. long. *Pod* 2·5–2·75 in. long, glabrous; seed-bearing base turgid reticulate, ·75 in. long, ·5 in. wide, wing ·7–·8 in. wide, the upper margin straight or slightly recurved thickened, the lower thin irregularly sinuately convex, the apex rounded. *Pterolobium lacerans* Miq. Flor. Ind. Bat. I, 106 not of R. Br., nor of Wall., nor of Wight. *P. indicum* VAR. *macropterum* Bak. in Flor. Brit. Ind. II, 259.

ANDAMANS; very common. DISTRIB. JAVA; Burma.

This species is not so closely related to *P. lacerans* R. Br., with which Dr. Miquel has identified it, as it is to *P. indicum* A. Rich. (*P. lacerans* Wall.; W. & A.; Wight, Ic.) of which Mr. Baker treats it as a variety. *P. macropterum* has however quite glabrous flower branches, very different leaflets, and fewer and smaller prickles; while it agees with *P. indicum* in length of pedicels and in style of inflorescence, it has very different pods with a much larger wing.

2. PTEROLOBIUM DENSIFLORUM Prain. A large climber, young branches pubescent, all parts very strongly armed with large recurved prickles. *Leaves* 4–8 in. long, pinnæ 8–16, 3 in. long, with puberulous rachis; leaflets 14–16, rather narrow-oblong, apex obtuse or retuse, base unequal abruptly rounded on both sides, ·6 in. long, ·25 in wide, subcoriaceous, dark-green, glabrous on both surfaces. *Racemes* dense in fastigiate terminal panicles with stout subterete puberulous rachis and branches; 1·5 feet long, 1 foot across, individual racemes 150–200-fld., 6–8 in. long; pedicels puberulous slender spreading, ·25 in. long. *Calyx* sparsely puberulous, thinly coriaceous, lowest sepal ·3 in. long. *Corolla* yellow, ·3 in. long. *Pod* 2 in. long, glabrous; seed-bearing base turgid, reticulate, ·6 in. long, ·5 in. wide, wing ·5–·7 in. wide, the upper margin straight thickened, the lower thin irregularly sinuately convex, the apex narrowly rounded. *P. microphyllum* Kurz, Journ. As. Soc. Beng. XLII, 2, 71 not of Miq. *P. indicum* VAR. *microphyllum* Bak. in Flor. Brit. Ind. II, 259 in part, and excl. the plant of Miquel.

PENANG; Government Hill, 2500 feet, *Curtis* 3093! MALACCA; *Maingay* 535!

Maingay's plant here cited is the same as that of Curtis both as regards flowers and fruits. The description of the leaflets is taken from the Penang plant, the Malacca one at Calcutta having only bare rachises. The Malacca plant is the type

of *P. microphyllum* Kurz; that it cannot possibly be the true *P. microphyllum* Miq. is obvious from the fact that Miquel's plant has linear leaflets smaller than those of his *P. lacerans*—which is the *P. macropterum* of this work—arranged in from 20–22 pairs on 14–16 pairs of pinnæ, whereas *P. densiflorum* has oblong leaflets larger than those of *P. macropterum*, arranged in from only 7–8 pairs on 4–8 pairs of pinnæ. Mr. Kurz's misidentification no doubt arose from the fact that he had not seen the leaves of Maingáy's plant. In style of inflorescence *P. densiflorum* most resembles the Chinese *P. punctatum* Hemsl., but that plant has less dense and less numerously flowered racemes, and has very different leaves.

Suborder III. Mimoseæ.

Trees, shrubs or very rarely herbs. *Leaves* 2-pinnate, very rarely simply pinnate. *Flowers* small, rarely elongated, tubular, sessile in globose heads or cylindric spikes, rarely shortly pedicelled and in globose umbels or slender racemes; bracts small narrow often dilated at the tips, substrobilately imbricate in bud usually deciduous during flowering; bracteoles very rare; perianth regular often in 5-merous, sometimes 4-merous, rarely 3-merous or 6-merous whorls. *Sepals* valvate (except in *Parkieæ*), rarely free, usually connate in a 5-toothed to 5-lobed tube, sometimes 0; disc-tube 0. *Petals* as many as sepals, valvate, free or connate in a lobed tube, hypogynous or obscurely perigynous. *Stamens* as many, or twice or thrice as many, as petals, or indefinite, free or monadelphous, or adnate to base of corolla tube, usually exserted; anthers small, versatile, dehiscing longitudinally. *Ovary* free at base of calyx. *Seeds* usually ovate or orbicular, compressed, with basilar hilum; rarely thick globose or ovoid; testa hard, albumen 0, or scanty; cotyledons flat; radicle straight, shortly exserted or included; funiculus often expanded in a small fleshy arillus.

Anthers gland-tipped; (stamens 5–10):—
- Calyx-teeth short, imbricated (*Parkieæ*); filaments usually either connate or adnate at base; (inflorescence capitate; heads very large; trees) ... ... 58. Parkia.
- Calyx valvate (*Adenantheræ*); filaments free:—
  - Inflorescence elongated; (species all woody):—
    - Flowers sessile; great climbers with opposite leaflets and huge pods and seeds ... . 59. Entada.
    - Flowers short-stalked; trees with alternate leaflets and narrow contorted pods ... ... 60. Adenanthera.
  - Inflorescence capitate; heads small:—
    - Small aquatic or subaquatic herbs with small thin pods opening early by upper suture; seeds small ... 61. Neptunia.
    - Lofty trees with large thick woody pods, late in dehiscing, opening by both sutures; seeds large ... 62. Xylia.

Anthers not gland-tipped; (calyx valvate, rarely 0):—
- Filaments free:—
  - Stamens definite, as many, or twice as many as petals

(*Eumimoseæ*); (inflorescence capitate in Malayan species); shrubs or under-shrubs with thin coriaceous pods:—

Pods straight with continuous valves; dehiscing through sutures .. .. 63. Leucæna.

Pods slightly curved with usually segmented valves and with always indehiscent persistent sutures ... 64. Mimosa.

Stamens indefinite often very numerous (*Acacieæ*); inflorescence spicate or capitate ... ... 66. Acacia.

Filaments more or less connate (*Ingeæ*); (stamens usually indefinite, rarely only 2–3-times as many as petals):—

Pods (indehiscent) septate between the seeds:—

Flowers large; petals adnate below to the staminal tube, otherwise free; pod woody turgid, sutures not thickened ... ... 66. Serianthes.

Flowers small; petals connate below in a tube; pod spongy or fleshy hardly turgid, the sutures thickened 67. Enterolobium.

Pods not septate between the seeds:—

Pods straight with thin valves:—

Sutures thickened; valves elastically revolutely dehiscent from apex to base ... 68. Calliandra.

Sutures thin, pods indehiscent or if dehiscent the dehiscence not elastic ... ... 69. Albizzia.

Pods twisted with coriaceous valves, or if almost straight (*P. bubalinum*) with fleshy valves, (sutures thin) ... ... 70. Pithecolobium.

58. Parkia R. Br.

Tall, unarmed trees. *Leaves* bipinnate with usually very numerous leaflets. *Flowers* in dense long-pedunculed heads, each subtended by a coriaceous persistent ligulate bract with a spoon-shaped tip. *Calyx* tubular, shortly 5-cleft, lobes imbricate. *Corolla* tubular, cleft half-way down, the segments subvalvate. *Stamens* 10, exserted, the filiform filaments united in the lower part with each other and with the corolla-tube; anthers narrow, gland-tipped, the pollen cohering in irregular masses. *Orary* stalked, many-ovuled; style filiform, stigma minute capitate. *Pod* large, flat, strap-shaped, coriaceous, finally dehiscing. Species about 10, cosmopolitan in the tropics, mostly American.

Petioles with two glands; heads subspherical (leaflets very narrow, acute, in 60–100 pairs) ... ... 1. *P. biglandulosa.*

Petioles with one gland only; heads turbinate or clavate:—

Leaflets subfalcate, acute, in 40–80 pairs ... ... 2. *P. Roxburghii.*

Leaflets straight, obtuse or retuse in 20–35 pairs ... 3. *P. speciosa.*

1. Parkia biglandulosa W. & A. Prodr. 279. A lofty tree. *Leaves* 2-pinnate, main-rachis downy 12–15 in. long; pinnæ 20–40 pairs subalternate, secondary rachises also downy about 3 in. long; leaflets

small straight narrow linear-ligulate close-set, 60–100 pairs, with obliquely truncate bases and acute apices, strongly 1-nerved, pubescent along the margins, ·2 in. long, ·05 in. across, petiolar part of main rachis 1–1·5 in. long, with 2 collateral glands at the top of its swollen base, and with 3–9 solitary glands between the bases of as many pairs of pinnæ toward the apex of the rachis. *Flowers* in dense subspherical heads 1·5 in. in diam., peduncle 4–9 in. long. *Calyx* tubular, shortly 5-cleft, ·3 in. long, teeth pilose, elsewhere glabrous. *Corolla* tubular, segments subvalvate. *Stamens* 10, exserted, the filaments connate below and adnate at base to corolla tube; anthers narrow. *Pod* (including stipe 2 in. long) 14–15 in. long, 1·5 in. wide, ·35 in. thick, black, at first downy, ultimately quite glabrous. *Seeds* 10–12, oval, ·75 in. long, ·5 in. wide, ·25 in. thick, dark-brown, smooth with a central ovate-lanceolate pale-brown rugose area. Bak. in Flor. Brit. Ind. II. 289. *Mimosa pedunculata* Roxb. Fl. Ind. II, 551.

Malay Peninsula; *fide* Baker.

Mr. Baker says that this comes from the Malay Peninsula, and on his authority the statement is here repeated. No botanist has, however, hitherto sent it from the Malay Peninsula; the locality given by Roxburgh is not Malaya, but "the islands to the, eastward of the Bay of Bengal;" by this Roxburgh indicates the Andamans and Nicobars. Still, no one has gathered it there in recent years, and the precise habitat must for the present be left doubtful. The specimens at Calcutta are (1) Wight's n. 559, the type of the species, cult. in the Missionary Garden; (2) Specimens from Madras Agri.-Hort. Society's Garden collected by Dr. Cleghorn; (3) Specimens of Roxburgh's plant from the Calcutta Botanic Garden where the tree still grows—these last are exactly like Wight n. 559 and show that the doubts expressed by Wight and Arnott as to the indentity of their plant with Roxbugh's *Mimosa pedunculata* are unfounded; (4) Specimens, no doubt from cultivated examples, sent from Assam by Masters and by Jenkins. This is the only *Parkia* at all generally cultivated in Bengal; the next species, which is also grown, is comparatively uncommon.

P. biglandulosa should then be carefully looked for in the Nicobars and Andamans, and particularly in N. Andaman; it is highly improbable that it will be found, in a wild state, either in Indo-China or in Malaya.

2. Parkia Roxburghii G. Don, Gen. Syst. II, 397. An erect tree 40–60 feet high, stem about 2 feet in diam., young branches pubescent. *Leaves* 2-pinnate, main-rachis puberulous or glabrescent, 12–24 in. long; pinnæ 20–30 pairs, opposite; secondary rachises glabrescent 3–6 in. long; leaflets small, falcately curved forwards, linear-lanceolate, close-set, 40–80 pairs, subequally truncate at base, apex acute, strongly 1-nerved, puberulous along the margins, ·3 in. long, ·1 in. wide, petiolar part of main-rachis 2–3 in. long with 1 solitary gland below the lower pair of pinnæ and with 3–5 solitary glands between the bases of as many pairs of pinnæ towards apex of rachis. *Flowers* in dense turbi-

nate heads, 1·5 in. long, 1 in. in diam., peduncle 10–16 in. long. *Calyx* tubular, shortly 5-cleft, ·25 in. long, teeth pilose, elsewhere glabrous. *Corolla* tubular, pale-yellow, segments subvalvate. *Stamens* 10, exserted, the filaments connate below and adnate to corolla-tube; anthers narrow. *Pod* (including stipe 3–7 in. long) 15–20 in. long, 1·5 in. wide, ·3 in. thick, black, glabrous. *Seeds* 12–20, oval, ·5 in. long, ·35 in. wide, ·2 in. thick, dark-brown and smooth throughout. Bak. Flor. Brit. Ind. II, 289. *P. Brunonis* Grah. in Wall. Cat. 5288. *P. africana* Miq. Flor. Ind. Bat. I, 52 not of R. Br. *P. biglobosa* Benth. in Hook. Journ. IV, 328; Miq. Flor. Ind. Bat. Suppl. 283; Koord. & Val. Bijdr. I, 276. *P. intermedia* Hassk. Cat. Hort. Bog. 289; Pl. Jav. Rar. 414. *Mimosa biglobosa* Roxb. Flor. Brit. Ind. II, 551 not of Jacq.

Singapore; cultivated, *Ridley* 6928! Malacca; Panchor, *Goodenough* 1748! Distrib. Wild in Silhet, Cachar and Chittagong; cultivated sparingly in Indo-China and Malaya.

Mr. Goodenough gives the native name as "*Kada-ong*;" the seeds, he notes, are used as peppermint. This species is said by Koorders and Valeton to be wild in Java; the species cultivated by the Javanese is not, however, the present one, but the next, *P. speciosa* Hassk. And it should be noted besides that the wild tree in Java is *not exactly* the tree that is wild in Silhet, Cachar and Chittagong but is the form that Hasskarl proposed to treat as a distinct species under the name *P. intermedia*. Mr. Ridley's specimens, from the Singapore Gardens, are precisely like those from Cachar and Chittagong (true *P. Roxburghii*); Mr. Goodenough's, on the other had, are absolutely identical with those from Java (true *P. intermedia*). Before definitely deciding that *P. intermedia* and *P. Roxburghii* are the same species, the writer would wish to study the former in the living state; it is often a rash thing to reduce to another, from herbarium material alone, species founded by so competent a botanist as Hasskarl; so far as our Calcutta specimens go, the evidence is altogether in favour of these two trees being quite distinct.

3. Parkia speciosa Hassk. Flora XXV. Beibl. 55. A large tree with spreading branches, 80–100 feet high, stem 2–3 feet in diam., young branches glabrescent. *Leaves* 2-pinnate, main-rachis pubescent, 8–10 in. long; pinnæ 10–16 pairs, subalternate, secondary rachises puberulous, 3 in. long; leaflets small almost straight, linear, close-set, 20–35 pairs, subequally truncate at base, obtuse or retuse at apex, ·25 in. long, ·1 in wide, with strong median and 3–4 pairs of distinct secondary nerves beneath, margins with only a few scattered hairs; petiolar part of main-rachis 1–1·5 in. long, with 1 solitary gland midway between base and lowest pair of leaflets and with 2–6 solitary glands between the bases of as many pairs of pinnæ towards apex of rachis. *Flowers* in dense narrowly clavate heads, 2 in. long, ·75 in. in diam., peduncles slender 16–20 in. long. *Calyx* tubular, shortly 5-cleft, ·25 in. long, teeth pilose, elsewhere glabrous. *Corolla* tubular, white, segments subvalvate. *Stamens* 10, exserted, the filaments connate below and adnate to corolla-tube; anthers

narrow. *Pod* (including stalk 2–5 in. long) 18–20 in. long, 2–2·5 in. wide, ·3 in. thick, black, glabrous. *Seeds* 12–18, oblong-oval, ·9 in. long, ·6 in. wide, ·25 in. thick, dark-brown and smooth throughout. Hassk. Cat. Hort. Bog. 289; Pl. Jav. Rar. 414; Miq. Flor. Ind. Bat. I, 53. *P. macrocarpa* Miq. Flor. Ind. Bat. Suppl. 284. *Acacia graveolens* Jack, Mal. Misc. II, 78. The Pete or Petiek.

Penang; on the coast, cultivated, *Curtis!* Prov. Wellesley; *Kunstler* 1657! Perak; Thaiping, *Scortechini* 504! Larut, in dense jungle from 500–2000 feet elev., local, *Kunstler* 5300! Distrib. Sumatra; Java, (cult. *Hasskarl!*).

It would appear that this is the only species of *Parkia* truly wild in our area. It has been identified by Father Scortechini with *P. macrocarpa* Miq., from Sumatra, of which there is no authentic specimen at Calcutta; it certainly accords admirably with Miquel's description. There is at Calcutta an authentic example of Hasskarl's *P. speciosa*; it proves that the present species is no other than Hasskarl's plant, and as Hasskarl's name has nearly twenty years' priority it is here adopted. In the *Index Kewensis* it is suggested that both *P. intermedia* and *P. speciosa* may be forms of *P. Roxburghii*. To judge by Hasskarl's description this *may* be true of *P. intermedia*; as regards *P. speciosa* the suggestion is obviously an impossible one.

While however, Hasskarl's name *P. speciosa* is long anterior to Miquel's, it does not conserve the oldest specific name. This tree is, as Hasskarl expressly admits, (*Neuer Schluess.* 50) the *Pete* of Rumphius (*Herb. Amb.* III, 51); it is equally the *Petek* of Jack, to which Jack has given the name *Acacia graveolens*. The writer does not propose, in the modern manner, to suggest that *P. speciosa* should therefore be known as *Parkia graveolens*, though doubtless there are those who will seize the opportunity of applying this name and of posing as authorities for the species.

It is strange that though evidently wild so near as in Sumatra and in the Malay Peninsula, this species is only cultivated in Java, and that there, according to Koorders and Valeton, its native country is unknown. These authors indeed (*Bijdr.* I, 268) suggest that it is a native of British India. It certainly is not a native of India proper; it is not even cultivated there. Our Indian species are, *P. Roxburghii* (*P. biglobosa*), wild in Silhet, Cachar and Chittagong; *P. leiophylla*, wild in Pegu; and *P. insignis*, wild in Martaban. We in India also experience a difficulty like that experienced by our Dutch colleagues, since there is a species *P. biglandulosa*, cultivated in India from Madras to Assam, of whose natural habitat we are somewhat uncertain.

59. Entada Adans.

Woody unarmed climbers, with tendrils. *Leaves* bipinnate. *Flowers* in long narrow spikes, minute, yellowish, polygamous. *Calyx* minute, campanulate, equally 5-toothed. *Corolla* oblong in bud, the 5 long equal narrow lobes falcate in expansion. *Stamens* 10, free, shortly exserted, filaments filiform; anthers crowned with a gland. *Ovary* subsessile, many-ovuled; style filiform, stigma concave terminal. *Pod* flat, woody, very large, composed of many discoid one-seeded joints,

the endocarp persisting round the large compressed orbicular seeds. Species 10, the others Trop. African and American.

Entada scandens Benth. in Hook. Journ. Bot. IV. 332. A very large slender creeper; branches woody terete glabrous. *Leaves* with petiole 2–4 in. long, the rachis as long or longer ending usually in a tendril; pinnæ usually 4 with stalks 1·5–2·5 in. long, leaflets oblong or obovate, obtuse or acute, 1–2 in. long, ·6–1·25 in. wide, glabrous, dark-green, rigidly coriaceous, shining above; petiolules ·1 in. *Inflorescence* of peduncled spikes, 6–10 in. long, usually panicled from the nodes of old leafless branches, sometimes simple from the axils of the leaves. *Flowers* ·1–·15 in. long, sessile or very shortly pedicellate. *Calyx* green, 5-toothed, teeth valvate. *Corolla* yellow. *Pod* 1–3 feet long, 3–4 in. wide, 1·5 in. thick, slightly curved, sutures very thick indented between seeds, valves woody depressed sublineate between the seeds, with a tendency to segmentation. *Seeds* 5–15, oblong, somewhat flattened, 2 in. long, 2·25 in. wide, 1·25 in. thick, testa very dark-brown, thick tough polished, slightly oily. Brand. For. Flor. 167; Bak. in Flor. Brit. Ind. II, 287. *E. Pursætha* DC. Prodr. II, 425; Wall. Cat. 5294; W. & A. Prodr. 267; Miq. Flor. Ind. Bat. I, 45; Scheff. in Nat. Tijds. Ned. Ind. XXXII. 412 t. 16, t. 18A. *E. monostachya* DC. Prodr. II, 425; Wall. Cat. 5293. *E. Rheedei* Spreng. Syst. II, 325. *E. Parrana* Spreng. Syst. II, 325. *E. Rumphii* Scheff. Nat. Tijds. Ned. Ind. XXXII, 412 t. 17, t. 18B. *Mimosa scandens* Linn. Sp. Pl. ed. II. 1501; Roxb. Flor. Ind. 5?4. Rumph. Herb. Amboin. V. 5. t. 4; Rheede, Hort. Malab. VIII. t. 32, 33, 34; IX, t. 77.

Andamans; very common on the coasts. Nicobars: *Kurz!* Coco Group; *Prain!* Narcondam; *Prain!* Penang; *Porter* (Wall. Cat. 5293)! *Curtis* 115! Malacca; *Hervey! Derry!* Perak; *Scortechini* 769! *Kunstler* 1018! 6228! *Wray* 1676! 1715! 2866! Distrib. Tropics generally.

Rather variable as to number and size of leaflets; both the forms figured by Scheffer occur in our area. That which he terms *E. Rumphii* is much the commoner in the Malay Peninsula: from the Andamans and Nicobars only the form *E. Pursætha* is reported.

60. Adenanthera Linn.

Erect trees without spines or tendrils. *Leaves* ample, bipinnate. *Flowers* minute, in narrow spike-like racemes, hermaphrodite, usually pentamerous. *Calyx* campanulate, equally toothed. *Petals* valvate, equal, lanceolate, cohering only at the very base. *Stamens* 10, free, equalling the corolla; anthers tipped with a gland. *Ovary* sessile, many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped, torulose, falcate, the coriaceous valves much twisted after they separate.

Seeds small, bright-coloured. Species 4, spread through tropics of Old World.

Leaflets obtuse glabrous beneath; pinnæ 8–12 ...	... 1. *A. pavonina.*
Leaflets acute puberulous beneath; pinnæ 6–8 ...	... 2. *A. bicolor.*

1. Adenanthera pavonina Linn. Sp. Pl. 384. A small unarmed tree 20–50 feet high. *Leaves* with a petiole 2–4 in. long, rachis prolonged 6–10 in. not produced beyond last pair of pinnæ; pinnæ 8–12 opposite, 3–6 in. long with stalk ·5–·75 in. long; leaflets alternate 10–16, ovate or oblong, base wide-cuneate, apex obtuse, papery, ·5–1·5 in. long, ·3–·75 in. wide, dark-green above, pale glaucous beneath, glabrous on both surfaces; petiolule ·15 in. long. *Inflorescence* of narrow short-peduncled racemes 2–6 in. long, axillary or panicled at the ends of branches. *Flowers* small, ·15 in. long, on slender pedicels also ·15 in. long. *Calyx* green, lobes very small. *Corolla* pale-yellow, the petals equal, valvate, narrow-lanceolate, free except at the base, glabrous. *Stamens* 10, free, hardly exserted, anthers tipped by a gland. *Pod* flat, 6–9 in. long, ·6 in. wide, ·3 in. thick, contorted when ripe. *Seeds* 10–15, lenticular, ·35 in. in diam., ·25 in. thick, with a smooth, shining, usually uniformly red testa. DC. Prodr. II, 446; Roxb. Flor. Ind. II, 370; Wall. Cat. 5300; W. & A. Prodr. 271; Wight, Ill. t. 80; Bedd. Fl. Sylvat. t. 46; Miq. Flor. Ind. Bat. I, 46; Bak. in Flor. Brit. Ind. II, 287.

Andamans; very common. Perak; Thaiping, *Scortechini* 80! Inatang Jambu, *Wray* 2515! Kedah; Langkawi, *Curtis!* Tongkah; *Curtis' Collector* 3091! Malacca; *Griffith!* Distrib. Widespread in South-Eastern Asia.

2. Adenanthera bicolor Moon, Cat. Pl. Ceyl. 34. A small slender unarmed tree 20–30 feet high. *Leaves* with a petiole 1·5–2·5 in. long, rachis prolonged 3–5 in., not produced beyond last pair of pinnæ; pinnæ 6–8 opposite, 2·5–4 in. long with stalk ·3 in. long; leaflets alternate 8–10, ovate or elliptic, base rounded, apex acute, rigidly subcoriaceous, ·75–1·5 in. long, ·5–·75 in. wide, bright-green glabrous above, pale-glaucous adpressed-puberulous beneath; petiolule ·15 in. long. *Inflorescence* of narrow short-peduncled racemes 3–5 in. long, axillary or panicled at the ends of branches. *Flowers* small, ·15 in. long, on slender pedicels also ·15 in. long. *Calyx* green, lobes very small. *Corolla* white, the petals equal, valvate, elliptic-lanceolate, free except at the very base, glabrous. *Stamens* 10, free, distinctly shortly exserted, anthers tipped by a stipitate gland. *Ovary* glabrous reddish. *Pod* flat, 4–6 in. long, ·6 in. wide, ·3 in. thick, contorted when ripe. *Seeds* 8–10, lenticular, ·35 in. in diam., ·25 in. thick, with a smooth shining red, or black and red testa. Thwaites Enum. Pl. Zeyl. 98; Bedd. Flor. Sylvat. 94; Bak. in Flor Brit. Ind. II, 287.

Penang; Waterfall, *Curtis* 2840! *King!* Perak; Larut, *Kunstler* 3991! *Scortechini* 197! 1849! Assam Kumbong *Wray* 2124! Pankore; *Scortechini* 1073! Singapore; Bukit Timah, *Hullett* 880! Bukit Mandai, *Ridley* 3636 A! Malacca; *Miller! Griffith! Maingay* 591! *Derry* 522!

The seeds are not always black and red but are sometimes concolorous red just as is usual in *A. pavonina*. The nearest ally of this species is one obtained in Borneo by Mr. Hullett. This Mr. Hullett notes as "a good-sized tree," from Sarawak (*Hullett* 292); Mr. Brace in the Calcutta Herbarium has named it *A. borneensis* Brace. The diagnosis between the two species may be given as follows:—

Pinnæ 3–4 pairs; leaflets 8–10, acute at apex, always under 2 in. long, 1·5 times as long as broad, pale-green above, glaucous and puberulous beneath; flowers not longer than pedicels ... ... 1. *A. bicolor.*

Pinnæ 2 pairs; leaflets 4–5, acuminate at apex, usually over 2 in. long, twice as long as broad, dark-green above, glabrous and not glaucous beneath; flowers twice as long as pedicels... 2. *A. borneensis.*

The flowers of *A. borneensis* are considerably larger than those of *A. bicolor*.

Dr. Griffith has noted that the Malay name of *A. bicolor* in Malacca is "*Bunah Saga*;" Mr. Derry gives it as "*Saga*."

61. Neptunia Lour.

Herbs without prickles. *Leaves* bipinnate, with persistent stipules and numerous small strap-shaped sensitive membranous leaflets. *Flowers* minute, dimorphous, in dense heads on axillary peduncles, polygamous, those of the lower part of the head bearing only protruded flattened staminodia. *Calyx* minute, campanulate, 5-toothed. *Petals* 5, strap-shaped, connate near the base. *Stamens* of the perfect flowers exserted; anthers gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma club-shaped. *Pod* coriaceous, flattened, ligulate or oblong, 2-valved. Species 8; cosmopolitan in the tropics.

Neptunia oleracea Lour. Fl. Cochinch. 654. An unarmed herb with annual wide-creeping softish swollen stems, rarely emitting sub-erect branches, rooting copiously at the leaf and flower-bearing nodes. *Leaves* 2-pinnate, rachis (including petiole 1·5 in.) 2·5–3 in. long, glabrous; pinnæ 4–6, 2–3 in. long, with stalk ·3 in. long; leaflets 8–15-jugate, narrow-oblong, obtuse, glabrous, ·35–·5 in. long, ·2 in. wide. *Peduncles* ascending 3–12 in. long, glabrous; flowers minute, in dense heads ·5–·75 in. long, ·5 in. across, the lower replaced by numerous ligulate yellow staminodes ·25–·3 in. long, bracts small ovate subobtuse. *Corolla* ·05 in. long. *Pod* oblong, oblique, ·5–1 in. long, ·35 in. wide, beaked, dry, dehiscing early by the upper suture. *Seeds* 6–9, transverse, narrow-oval, somewhat pointed towards hilum, obtuse at opposite end, ·2 in. long, ·12 in. wide, ·1 in. thick, testa brown, polished. Benth. in Hook. Journ. IV, 354; Miq. Flor. Ind. Bat. I, 50; Bak. in Flor. Brit. Ind.

II, 285. *Mimosa natans* Roxb. Cor. Pl. t. 119; Hort. Beng. 40; Fl. Ind. 553. *Desmanthus natans* Willd. Sp. Pl. IV, 1044; DC. Prodr. II, 444; Wall. Cat. 5295; W. & A. Prodr. 270. *D. lacustris* DC. Prodr. II, 444. *D. stolonifer* DC. Prodr. II, 444.

Penang; Bagian Jumal, *Curtis!* Prov. Wellesley; Butterworth, *King!*

62. Xylia Benth.

Tall unarmed tree. *Leaves* bipinnate. *Flowers* in round heads, mostly perfect. *Calyx* tubular, 5-toothed at the tip. *Petals* 5, valvate, slightly united at the base, little longer than the calyx. *Stamens* 10, free, exserted; anthers gland-crested in an early stage. *Ovary* sessile, many-ovuled; style filiform, stigma minute terminal. *Pod* large, woody, oblong-falcate, finally dehiscing, flat, septate between the oblong compressed seeds.—A single species.

Xylia dolabriformis Benth. in Hook. Journ. Bot. IV, 417. A tree 80–100 feet high, unarmed. *Leaves* 2-pinnate; pinnæ two, terminal on a rachis or petiole 1–2 in. long; leaflets 2–4 pairs, diminishing downward and with below the last pair on the outside a small unopposed leaflet; rachis of pinnæ 3–4 in. long with a gland on the upper side between the bases of each pair of leaflets; terminal leaflets 3–6 in. long, 1·25–2·5 in. wide, lowest pair 1·25–1·5 in. long; all oblong with acute apex and rounded base, subcoriaceous, glabrous on both surfaces; petiolule ·1 in. long. *Inflorescence* of very dense globose heads ·5–·75 in. in diam.; peduncles puberulous 3 in. long, slender, thickening in fruit, crowded on short puberulous branchlets developed with the young leaves. *Calyx* tubular ·2 in. long; teeth 5, valvate. *Corolla* cream-coloured, ·25 in. long, petals slightly cuneate at base, valvate, lanceolate. *Stamens* 10, filaments free, exserted, ·5 in. long, young anthers very minutely gland-crested. *Ovary* sessile, many-ovuled. *Pods* large woody, oblong-falcate, flat, ultimately dehiscent, 4–6 in. long, 1–2·5 in. wide, ·35 in. thick, septate between the seeds. *Seeds* 6–10, broadly ovate, much compressed, ·65 in. long, ·5 in. wide, ·1 in. thick; testa brown, shining, smooth. Bedd. Fl. Sylvat. t. 186; Miq. Flor. Ind. Bat. I, 42; Bak. in Flor. Brit. Ind. II, 286. *Mimosa xylocarpa* Roxb. Cor. Pl. t. 100; Hort. Beng. 40; Fl. Ind. II, 543. *Inga xylocarpa* DC. Prodr. II, 439; Wall. Cat. 5277; W. & A. Prodr. 269. *I. lignosa* Grah. in Wall. Cat. 5278. *I. dolabriformis* Grah. in Wall. Cat. 5279.

Singapore; *Wallich* 5279. Distrib. India, Indo-China, Philippines.

63. Leucæna Benth.

Unarmed erect trees. *Leaves* bipinnate. *Flowers* sessile, in dense globose heads, 5-merous, usually perfect. *Calyx* cylindrical-campanulate

shortly-toothed. *Petals* valvate, free. *Stamens* 10, free, much exserted; anthers not gland-crested. *Ovary* stalked, many-ovuled; style filiform. stigma minute terminal. *Pod* flat, coriaceous, strap-shaped, dehiscent, Species 8, mostly American.

Leucæna glauca Benth. in Hook. Journ. Bot. IV, 416. A low erect tree or large shrub, 6–20 feet high, without spines. *Leaves* 2-pinnate 4–6 in. long, petiole about 2–3 in.; pinnæ 4–8-jugate, 2–3 in. long, stalk ·35 in. long; leaflets 10–15 pairs, linear-oblong, apex acute, base slightly obliquely cuneate, glaucous, membranous, caducous, finely downy, ·4–·5 in. long, ·1–·15 in. wide. *Inflorescence* of very dense globose heads, ·5–·75 in. in diam.; peduncles often geminate 1–1·25 in. long, slender, in fruit often about 2 in. long and slightly thickened. *Flowers* 5-merous, usually all perfect. *Calyx* cylindric-campanulate, teeth short valvate. *Corolla* white, ·15 in. long, petals free, valvate. *Stamens* 10, exserted, ·25 in. long, anthers without glands. *Ovary* stalked, many-ovuled, softly sparsely pubescent; style filiform, stigma small terminal. *Pod* straight, flat, coriaceous, ligulate, dehiscent; 5–6 in. long, ·4–·5 in. wide; stalk ·25–·5 in. long. *Seeds* 15–20, transverse, narrow-ovate, compressed, apex obtuse, base cuneate, ·3 in. long, ·15 in. wide, under ·1 in. thick, testa brown, shining. Miq. Flor. Ind. Bat. I, 41; Bak. in Flor. Brit. Ind. II, 290. *Acacia frondosa* Willd. Sp. Pl IV, 1076; DC. Prodr. II, 468; W. & A. Prodr. 276. *A. glauca* Willd. Sp. Pl. IV, 1075; DC. Prodr. II, 467. *A. biceps* Willd. Sp. Pl. IV, 1075; DC. Prodr. II, 467. *A. leucocephala* Link. Enum. II, 444; DC. Prodr. II, 467.

Kedah; in open jungle, *Kunstler* 1703! Perak; Lime-stone Hill, Gapis, *Scortechini* 912! Selangor; on hilly ground, *Kunstler* 1130! Pahang; Pulo Tawai, *Ridley* 2642! Penang; Water-fall, etc. *Curtis* 49! Singapore; *Maingay* 583! Distrib. Now cosmopolitan in the tropics but probably originally American.

64. Mimosa Linn.

Shrubs or herbs, with or without prickles. *Leaves* (in the Malayan species) bipinnate; leaflets small, sensitive, ligulate, caducous. *Flowers* minute, in dense globose heads, polygamous, (in the Indian species) mostly tetramerous. *Calyx* campanulate, shortly toothed. *Petals* connate towards the base. *Stamens* as many as, or twice the number of, the petals, much exserted, filaments filiform, free; anthers not gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma minute terminal. *Pod* flat, membranous, made up of 1-seeded joints that separate, when mature, from the sutures. Species 230, mostly confined to Trop. America.

Stamens 4; rachis of leaf bristly, stem bristly and prickly, leaves digitately divided, sutures of pod prickly ... ... 1. *M. pudica.*

Stamens 8–10; rachis of leaf smooth, stem prickly not bristly, leaves pinnately divided, sutures of pod not prickly ... ... 2. *M. sepiaria.*

1. MIMOSA PUDICA Linn. Sp. Pl. 518. A diffusely spreading undershrub rarely over 2 feet high, with stems and branchlets sparsely prickly and copiously beset with deflexed bristles. *Leaves* very sensitive, with usually 4 digitate pinnæ, sessile at the end of a petiole 2 in. or more long, beset with spreading bristles; stipules lanceolate ·35 in. long, striate, subscarious, with margins beset with spreading bristles; pinnæ 2·5–3·5 in. long, the rachis beset with ascending bristles; leaflets 12–20 pairs, glabrous above, sparsely adpressed-bristly beneath, subcoriaceous, narrow-oblong, obliquely acute at apex of upper angle, obliquely rounded at lower side of sub-5-nerved base, main-nerve branching slightly upwards, ·35 in. long, ·15 in. wide; sessile. *Inflorescence* capitate, the heads usually in pairs from axils all along the branches, ·35 in. in diam.; peduncles very slender ·75–1 in. long, beset with spreading prickles. *Calyx* campanulate, teeth short valvate. *Corolla* pink, ·1 in. long, petals connate below valvate above. *Stamens* 4, much exserted, filaments ·3 in. long, filiform, free, anthers without glands. *Ovary* stalked; style filiform, stigma very small terminal. *Pods* flat, slightly recurved, membranous, ·6–1 in. long, ·2 in. across, made up of 3–5 1-seeded joints that fall away when mature from the persistent armed sutures, which are clothed with weak spreading yellowish-white bristles ·15–·2 in. long. DC. Prodr. II, 426; Roxb. Hort. Beng. 41; Wall. Cat. 5292; Roxb. Flor. Ind. II, 564; Miq. Flor. Ind. Bat. I, 43; Bak. in Flor. Brit. Ind. II, 291. The SENSITIVE PLANT.

ANDAMANS; extremely common throughout the settlement. PENANG; overspreading the whole coast-line, *Curtis* 1237! SINGAPORE; *T. Anderson* 32! *Maingay* 584! DISTRIB. Throughout S.-E. Asia, probably originally introduced from America.

This, having been introduced into the settlement at Port Blair in the Andamans, has there spread so much as to have become extremely troublesome; a large labour force has to be constantly told off to try and keep it in check; its complete eradication is apparently hopeless.

2. MIMOSA SEPIARIA Benth. in Hook. Journ. Bot. IV, 395. A woody shrub with puberulous branchlets soon glabrescent, sparingly armed with strong compressed slightly recurved prickles. *Leaves* 2-pinnate, rachis slightly downy 2 in. long (the petiolar part ·75 in long); pinnæ 6–8-jugate, 1·5 in. long, subsessile, upper side pubescent; leaflets 12–20-jugate, rigidly coriaceous, narrow-ligulate, caducous, ·25–·35 in. long, ·1–·15 in. wide, subacute at apex, obliquely truncate at lower side of sub-5-nerved sessile base, main-nerve branching considerably upwards. *Inflorescence* capitate, the heads ·25 in. in diam., arranged in

ample patent terminal panicles with puberulous main-rachis and compound puberulous lower branches; the whole 6–8 in. long, 4–6 in. wide, peduncles of individual heads ·5–·75 in. long. *Calyx* campanulate, teeth short, valvate. *Corolla* ·05 in. long. *Stamens* 8–10, filaments free, ·1 in. long. *Ovary* stalked; style filiform, stigma small terminal. *Pod* with a slender stalk ·2 in. long, flat, almost straight, membranous, 1·5–2 in. long, ·25 in. wide, made up of 6–8 glossy, finely reticulated 1-seeded joints that fall away when mature from the persistent unarmed sutures. Bak. in Flor. Brit. Ind. II, 291. *M. nigrescens* Maingay MSS.

Singapore; *Maingay* 582! *Anderson* 34! *Kurz! King!* Distrib. Occurs also in China and in Borneo, but no doubt is an introduction from America; it is only found near clearings.

65. Acacia Willd.

Spinose or prickly shrubs or trees, erect or climbing. *Leaves* bipinnate, with minute leaflets. *Flowers* in globose heads or cylindrical spikes, hermaphrodite or polygamous, usually pentamerous. *Calyx* campanulate or funnel-shaped, shortly toothed. *Petals* exserted, united in the lower half. *Stamens* free, indefinite, much exserted; anthers minute, not gland-crested. *Ovary* stalked or sessile, many-ovuled; style filiform, stigma minute capitate. *Pod* ligulate or oblong, not jointed, usually compressed and dry, dehiscent or indehiscent, rarely turgid or subcylindrical, sutures straight or wavy, not thickened. Species 430; the leafy groups cosmopolitan in the tropics, the great phyllodineous series, which comprises two-thirds of the genus, almost restricted to Australia. None of the species with spicate inflorescence occur within our area.

Erect shrubs or small trees, with stipular spines, bracteate pedicels and cylindric pods ... ... 1. *A. Farnesiana.*
Climbing shrubs, with non-spinescent stipules, and with prickly branches; pedicels naked; pods flat:—
Flower heads ·4 in. across; leaflets narrow oblong ... 2. *A. pseudo-Intsia.*
Flower heads ·2 in. across; leaflets linear ... ... 3. *A. pennata.*

1. Acacia Farnesiana Willd. Sp. Pl. IV, 1083. A shrub or low tree with slender zig-zag branches marked with grey dots. *Leaves* 2-pinnate; rachis downy 1–1·5 in. long with a minute petiolar gland; pinnæ 8–16, 1–1·5 in. long; leaflets 10–20 pairs, green, subglabrous, rigidly coriaceous, linear-oblong, ·25 in. long, ·05 in. wide; stipules spinescent seldom over ·25–·35 in. long on the branchlets, persisting and on old branches sometimes over 1 in. long, polished, white, straight. *Flowers* in rounded heads ·35 in. in diam., fragrant, bright yellow; peduncles crowded on axillary nodes, slender, puberulous, ·75–1 in. long, with a ring of small bracts at or near the apex. *Calyx* campanulate, minute.

Corolla ·05 in. long, teeth short obtuse. *Pod* thick cylindric, glabrous, 2–3 in. long, ·5 in. thick, dull-brown marked with fine horizontal striæ; mesocarp pulpy enclosing the biseriate seeds. *Seeds* 12–18, ovate, ·3 in. long, ·2 in. wide, ·15 in. thick, smooth, dull-brown with faint lateral areola. DC. Prodr. II, 461; Wall. Cat. 5264 A–F; Bedd. Flor. Sylvat. t. 52; Miq. Flor. Ind. Bat. I, 7; Bak. in Flor. Brit. Ind. II, 292. *Mimosa Farnesiana* Linn. Sp. Pl. 521; Roxb. Hort. Beng. 40; Flor. Ind. II, 557. *Vachellia Farnesiana* W. & A. Prodr. 272; Wight, Ic. t. 300. *Acacia indica* Desv. Journ. Bot. I, 69; DC. Prodr. II, 462. *Farnesia odora* Gaspar. Desc. Nuov. Gen. Legum. (1838) *with plate.*

Planted in some of the provinces:—Andamans; *Kurz!* Penang; *Porter* (Wall. Cat. 5264F)! Pahang; Katapong, *Ridley* 1246! Distrib. Cosmopolitan (perhaps usually planted) in the tropics.

2. Acacia pseudo-Intsia Miq. Flor. Ind. Bat. I, 12. A large scandent shrub 12–20 feet high, the branches and branchlets armed with many small sharp recurved glossy dark-coloured prickles; young branches blackish, puberulous or glabrescent. *Leaves* 2-pinnate, rachis 8 in. long, puberulous or glabrescent, strongly armed with recurved prickles beneath, petiolar portion 2·5 in. long with a large projecting gland close to base on its upper surface; pinnæ 8–12-pairs, 2·5–3·5 in. long, the upper 2–4 pairs with glands between their bases; leaflets 30–35 pairs, sessile, linear-oblong, obtuse, ·4 in. long, ·15 in. wide, rigidly subcoriaceous, glabrous above, adpressed-puberulous or glabrous beneath. *Flowers* in rounded heads, ·4 in. in diam., yellow, peduncles ·5–·75 in. long, slender, puberulous, naked, in clusters of 2–4, rarely solitary along a panicle extending 10–12 in. beyond the leaves; bracts large, ovate-acute or acuminate, ·2–·25 in. long. *Calyx* puberulous, ·07 in. long. *Corolla* ·1 in. long. *Pod* not seen.

Var. *typica;* bracts puberulous, pedicels ·5 in. long, leaflets adpressed-puberulous beneath.

Singapore; Changhi, *Hullett* 835! *Ridley* 3631! Bukit Timah, *Ridley* 6177! Distrib. Sumatra, Java.

Var. *ambigua* Prain; bracts glabrous, pedicels ·75 in. long, leaflets quite glabrous beneath.

Andamans; very common, *King's Collectors!*

In externals the Singapore plant much resembles *A. caesia* W. & A., the Andamans one at the same time resembling *A. Intsia* Willd. except in having the leaflets crowded. Closer examination shows, however, that the natural alliance of the species is rather with the group of forms aggregated under the name *A. pennata;* the large bracts, in particular, make all further comparison with the group to which *A. Intsia* belongs an impossiblity.

Its nearest ally is a species from Northern Indo-China described by Kurz under the name *A. pruinescens* from which this differs in having broader leaflets, in

having no bloom on the young branches, and particularly in having the large petiolar gland very near the base of the petiole; the corresponding gland in *A. pruinescens* is about an inch above the base. The two species *A. pseudo-Intsia* and *A. pruinescens* taken together form a group that is almost exactly intermediate between the *A. Intsia* and the *A. pennata* groups.

3. ACACIA PENNATA Willd.; Bak. in Flor. Brit. Ind. II, 297. A large scandent bush or strong creeper, sometimes extending for 50–60 feet, branches and branchlets armed with many small sharp slightly recurved glossy brown or blackish prickles, young twigs faintly pubescent or glabrous. *Leaves* 2-pinnate; the rachis 6 in. long, glabrous or puberulous, prickly beneath or unarmed, petiolar portion ·75–1 in. long with a projecting large or small gland ·4–·5 in. above the base; pinnæ 20–40 pairs, 1·25–2 in. long, the upper pairs with glands between their bases; leaflets 35–40 pairs, sessile, linear, ·2–·35 in. long, under ·05 in. wide, firm, glabrous. *Flowers* in rounded heads ·2 in. in diam., white or pale-yellow, peduncles ·5–·7 in. long, slender, puberulous, naked, in clusters of from 4–8 along a panicle extending 12–15 in. beyond the leaves; bracts small linear, ·1 in. long. *Calyx* glabrous, ·05 in. long, campanulate. *Corolla* ·07 in. long. *Pod* linear-oblong, acute or acuminate at both ends, 4–6 in. long, ·75–1 in. wide, flat, very thin, with a stalk under ·2 in. long, the sutures slightly thickened. *Seeds* flat, ovate, ·4 in. long, ·2 in. wide, under ·1 in. thick, faintly areolate, dull-brown, smooth.

VAR. *arrophula* Bak. in Flor. Brit. Ind. II. 298; leaf-rachis almost glabrous, prickly beneath, peduncles 4–6-nate; petiolar gland large, inter-pinnular glands 2–3. *A. arrophula* Don. Prodr. Flor. Nep. 247?

ANDAMANS; very common. DISTRIB. India, Indo-China.

VAR. *pluricapitata* Bak. in Flor. Brit. Ind. II, 298; leaf-rachis puberulous, not prickly, peduncles 6–8-nate; petiolar gland small, inter-pinnular glands 10–12. *A. pluricapitata* Steud. Nomencl. ed. II, 1, 7; Benth. Hook. Lond. Journ. I, 516; Pl. Jungh. I, 267. *A. polycephala* Grah. in Wall. Cat. 5255 not of DC.

PENANG; *Porter* (Wall. Cat. 5255)! MALACCA; *Griffith! Maingay* 585! *Derry* 166! *Holmberg* 838! *Hervey*! PERAK; *Scortechini! Kunstler* 482! 3332! 4876! 5504! 10300! DISTRIB. Malay Archipelago.

Following the *Flora of British India* these two very distinct plants are here treated as varieties of *Acacia pennata*. That *A. pluricapitata* is deserving of specific rank seems almost certain, and it is probably equally certain that the plant here termed VAR. *arrophula* should also be separated specifically from *A pennata*. The point can only be satisfactorily settled in a monographic revision of the Indian *Acacias*; pending the preparation of such a revision it seems better to deal with the forms as they have been dealt with by Mr. Baker. The true *A. pennata* of Willdenow is unknown from our area.

66. Serianthes Benth.

Unarmed trees. *Leaves* 2-pinnate. *Flowers* racemose, very large, 5-merous, mostly hermaphrodite. *Calyx* deeply campanulate, deeply toothed. *Petals* adnate to the base of the staminal column, free above. *Stamens* monadelphous, very numerous; anthers minute. *Ovary* sessile, many-ovuled; style filiform, stigma minute capitate. *Pod* large oblong, almost woody, somewhat turgid, indehiscent, septate between the seeds. Species 2, one in Malaya, one in Polynesia.

Serianthes grandiflora Benth. in Hook. Lond. Journ. Bot. III, 225. A large unarmed tree with rusty-puberulous young branches. *Leaves* evenly 2-pinnate, rachis puberulous 7–9 in. long, with a large sessile gland ·25 in. above base and with small glands between the bases of each pair of pinnæ; pinnæ 3–8-jugate, 3–4 in. long, puberulous; leaflets 6–12 pairs, obliquely oblong, subfalcate, obtuse, base obliquely truncate, ·5–1 in. long, ·3–·6 in. wide, rigidly subcoriaceous, glossy-green above, paler dull reticulate-veined beneath, glabrous on both surfaces. *Flowers* few, in axillary corymbose panicles 4–6 in. long, main-rachis puberulous, peduncular portion 2 in. long, the branches puberulous ·5–·7 in. long, each 2–4-fid; pedicels densely tomentose ·2 in. long; buds oblong or globose, ·35 in. across. *Calyx* wide-campanulate, ·5 in. long, ·35 in. wide with triangular teeth one-third the length of tube, uniformly densely felted externally. *Corolla* yellowish-white, 1·5 in. long, the segments densely woolly externally, glabrous within. *Filaments* over 500, 2·5 in. long. *Pod* turgid, 6 in. long, 2·25 in. wide, ·75 in. thick, epicarp thin brittle, endocarp woody; sutures thin, valves septate and slightly depressed between the seeds. *Seeds* 6–8, narrowly ovate, the long axis across the pod, ·75 in. long, ·3 in. across, ·15 in. thick, testa dark-brown, smooth but hardly shining, seed faintly areolate. Miq. Flor. Ind. Bat. I, 40; Bak. in. Flor. Brit. Ind. II, 301. *Inga Finlaysoniana* Wall. Cat. 5284: *I. grandiflora* Wall. Cat. 5285. *I. ventricosa* Grah. in Wall. Cat. 5266 in part.

Singapore; *Wallich! Finlayson.* Malacca; *Griffith! Maingay* 580! Distrib. Malay Archipelago.

67. Enterolobium Mart.

Erect unarmed trees. *Leaves* bipinnate. *Flowers* in globose heads, 5-merous, usually hermaphrodite. *Calyx* campanulate or subcampanulate, shortly toothed. *Corolla* subinfundibuliform, the petals connate to the middle. *Stamens* monadelphous much exserted; anthers small not gland-crested. *Ovary* sessile many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped straight or curved, indehiscent, mesocarp spongy at length hardening, or pulpy and soft, endocarp firm

forming continuous septa between the seeds; the sutures thickened. Species 5 or 6, all American; one introduced and now becoming subspontaneous in S.-E. Asia.

Enterolobium Saman Prain. A large spreading tree 40–60 feet high, stem 3 feet or more thick, branches pubescent. *Leaves* evenly 2-pinnate, rachis 4–6 in. long, pubescent, basal gland none but with glands between the bases of each pair of pinnæ, single in the upper, paired in the lower half of the rachis; pinnæ 4–6-jugate, 2–3 in. long, rachises pubescent with glands between each pair of leaflets; leaflets decreasing downwards, 6–8-jugate in the upper, 3–5-jugate in the lower pinnæ, ovate-oblong rigidly coriaceous, glabrous above, densely pubescent beneath, apex obtuse, base obliquely truncate, main-nerve diagonal, terminal 1·5 in. long, ·8 in. wide; stipules small lanceolate, densly pubescent, deciduous. *Flowers* in dense heads 1·25 in. across, on pubescent pedicels 2·5 in. long, solitary or 2–3 together in the axils of the upper leaves, each with a lanceolate pubescent bract ·15 in. long and a slender puberulous pedicel ·05 in. long. *Calyx* infundibuliform, densely pubescent externally, ·15 in. long, teeth wide-triangular, short. *Corolla* pinkish, infundibuliform, ·3 in. long, tube puberulous outside, teeth ovate, externally pubescent, half as long as tube. *Filaments* pink, 1·25 in. long, connate at base in a tube one-third as long as that of corolla. *Pod* straight, 6–7 in. long, ·6 in. wide, ·35 in. thick, valves slightly depressed between the seeds, sutures thickened, epicarp thinly crustaceous, mesocarp pulpy, endocarp firmly crustaceous and forming continous septa between the seeds. *Seeds* 16–20, transversely ovate, ·4 in. long, ·25 in. wide, ·2 in. thick, testa smooth brown shining with distinct duller darker-brown ovate areola, without arillus. *Inga Saman* Willd. Sp. Pl. IV, 1024. *Pithecolobium Saman* Benth. Hook. Lond. Journ. Bot. III, 216. *Calliandra Saman* Griseb. Fl. W. Ind. 225. The Rain Tree.

Planted in many of the provinces and now appearing subspontaneously, at least in the Andamans and Nicobars. A native of Guiana; introduced in the West Indies whence it has been sent to Asia.

This species, though of much more recent introduction than *Pithecolobium dulce*, is also of some economic importance, owing to its rapidity of growth and the readiness with which it thrives, as compared with most native species, when used in the re-afforestation of abandoned clearings. The sweet pulpy pods, of which it produces an abundant crop, are greedily eaten by cattle.

When Mr. Bentham tentatively placed the species in *Pithecolobium* he explained that the tree was unknown to him. Dr. Grisebach, who had the advantage of studying the tree in the living state, at once recognised that it cannot possibly be a *Pithecolobium* and placed it in *Calliandra*, no doubt owing to the sutures of its pods being thickened as in that genus. That the pods are septate and indehiscent militates however against his proposal, for the crucial test of a *Calliandra* is that its pods, which may *not* be septate, shall dehisce elastically from apex to base. The *Index*

Kewensis has therefore replaced the 'Rain-Tree' in *Pithecolobium*; this, however, is a step which in turn similarly mars the generic limits of that group since the pods of *Pithecolobium* must *not* be septate. The writer places the species with more confidence in *Enterolobium* owing to its possessing the septate pods characteristic of that genus. The pulpy, in place of spongy at length indurated mesocarp, and the shortly pedicelled in place of sessile florets, cannot, in view of the variability of these characters within adjacent genera, be considered more than comparatively trivial deviations from the hitherto recognised characters of *Enterolobium*. The writer is unable, both on academic and on practical grounds, to agree with the proposal, made by some botanists, to amalgamate *Calliandra*, *Pithecolobium*, *Enterolobium* and *Albizzia*.

68. Calliandra Benth.

Shrubs or trees. *Leaves* bipinnate, with small or large leaflets. *Flowers* in globose heads, polygamous, 5-merous. *Calyx* campanulate, toothed. *Corolla* funnel-shaped, deeply 5-cleft. *Stamens* indefinite, monadelphous at the base, filaments filiform much exserted; anthers minute, not gland-crested. *Ovary* stalked, many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped, slightly falcate, flat, rigidly coriaceous, the valves dehiscing with elasticity, bordered by much-thickened sutures, continuous within, narrowed gradually to a short stalk. Species 80, mostly tropical American.

Calliandra umbrosa Benth. in Gen. Pl. I, 597. A tree 20–25 feet high, with slender glabrous branches and sometimes with small suberect stipular spines. *Leaves* 2-pinnate, petiole 1·25 in. long, glabrous; pinnæ 2, terminal, each with rachis 1·25–1·5 in. long, with a pair of large sessile, oblique, oblong, rigidly subcoriaceous end-leaflets, acute at apex, cuneate at base, 6 in. long, 2 in. wide and with an odd similar but much smaller leaflet 1·5–2 in. long, ·5–·75 in. wide, on the outer side below; leaflets all glabrous on both sides, rather distinctly nerved beneath and each with a gland on rachis at base. *Flowers* sessile in small dense globose heads ·4 in. across, with minute bracts, on short ascending slender peduncles ·4–·5 in. long, usually several together from old nodes on the branches; elongating in fruit to 1·5–2 in. *Calyx* campanulate, teeth valvate. *Corolla* ·12 in. long, yellow, inodorous. *Pod* 6–9 in. long, ·75–1 in. wide, smooth, finely veined, the valves with elevated rounded thickened edges. *Seeds* 6–9, ovate, ·5 in. long, ·35 in. wide, long diameter transverse, very much compressed; testa smooth shining thin crustaceous brown. Bak. in Flor. Brit. Ind. II, 302. *Inga umbrosa* Wall. Pl. As. Rar. t. 124; Cat. 5273. *Albizzia umbrosa* Benth. in Hook. Lond. Journ. III, 86.

Penang; *fide* Baker in *Flora of British India*.

There are no Malayan specimens at Calcutta; Mr. Baker, however, alludes to the existence of Penang examples.

69. Albizzia Durazz.

Large trees or, sometimes, (*A. myriophylla*) shrubs usually climbing. *Leaves* bipinnate. *Flowers* (in the Indian species) in globose heads, sessile or pedicellate, usually pentamerous and all hermaphrodite. *Calyx* campanulate or funnel-shaped, distinctly toothed. *Corolla* funnel-shaped, petals firmly united below the middle. *Stamens* indefinite, monadelphous at the base; filaments several times the length of the corolla; anthers minute, not gland-crested. *Ovary* sessile or shortly-stalked; style filiform, stigma capitate minute. *Pod* large, thin, flat, strap-shaped, straight, indehiscent or subindehiscent, continuous within, the sutures not thickened. Distrib. Species 25–30, spread through the Tropics of the Old World.

Shrub, often climbing, the pulvinus below leaf-base enlarging into a firm short recurved hook; the leaflets (numerous) narrowly linear with a median main-nerve ... 1. *A. myriophylla.*

Erect usually large trees, pulvinus not accrescent; the leaflets ovate or oblong, or if linear with the main-nerve nearly marginal :—

Main-nerve close to upper margin; leaflets (numerous) dimidiate-lanceolate; stipules very large; (flowers shortly pedicellate) ... ... 2. *A. stipulata.*

Main-nerve removed one-third to one-half the width of leaflet from upper margin; leaflets ovate or oblong; stipules small :—

Leaflets never more than 2 in. long, rather numerous :—

Glands confined to main-rachis of leaf, leaflets sessile or subsessile :—

Florets pedicellate :—

Pinnæ never more than 4-jugate :—

Umbels small, few-fld., pedicels longer than calyx ... ... 3. *A. littoralis.*

Umbels large, many-fld., pedicels not longer than calyx ... ... 4. *A. Lebbek.*

Pinnæ 6–12-jugate; *indehiscent pod very large and sinuate along the sutures* ... ... 5. *A. pedicellata.*

Florets sessile; *main-nerve nearer upper than lower leaf-margin* ... ... 6. *A. odoratissima.*

Glands on the secondary rachises as well as on the main-rachis, leaflets shortly petiolulate; (florets sessile) ... ... 7. *A. procera.*

Leaflets few, large; the terminal pairs 4 in. long; (main and secondary rachises both gland-bearing, pinnæ normally 1-jugate) ... ... 8. *A. lucida.*

1. Albizzia myriophylla Benth. in Hook. Lond. Journ. Bot. III, 90. An evergreen unarmed shrub or strong climber 15–20 feet long if climbing, 8–12 ft. high if unsupported, the young shoots shortly tawny-

pubescent, bark thinnish, dark-brown, much lenticelled. *Leaves* evenly 2-pinnate; rachis 5–9 in. long, densely tawny-pubescent, with a medium sessile gland very near the base and with 2–4 small glands between the bases of as many pairs of distal pinnæ, stipules subpersistent, subulate, puberulous, ·15 in. long, deciduous; pulvinus hardening into a recurved almost woody hook; pinnæ 12–20-jugate, 1–1·5 in. long, their rachises sparsely pubescent; leaflets 35–50 pairs, crowded, linear, sessile, slightly falcate, apex subacute, base slightly oblique, rigidly chartaceous, ·2–·25 in. long, ·07 in. wide, dark-green and glabrous above, margin ciliolate or glabrous, paler beneath and glabrous or sometimes sparsely adpressed-pubescent; midrib central. *Flowers* in small 10–20-fld. heads ·5 in. across, pale-yellow with greenish-yellow stamens, or white; peduncles slender puberulous, ·4–·5 in. long, solitary or 2–6 together on nodes in the upper half of pubescent corymbose branchlets 1–1·5 in. long, with pubescent ovate-acute bracts ·2 in. long, usually accompanied by 2 subulate stipules like those of the leaves, the branchlets disposed in terminal leafy panicles 4–8 in. long, 2–4 in. wide; pedicels 0. *Calyx* campanulate, teeth small, ovate-acute, tube externally densely pubescent, ·04 in. long. *Corolla* infundibuliform, yellowish or white, ·15 in. long, teeth ovate-lanceolate one-third the tube and like it uniformly externally softly puberulous. *Filaments* few, 12–20, united below in a white tube half as long as that of corolla, free portion greenish or white, ·4 in. long. *Pod* dehiscent, 4–5 in. long, ·8–1·2 in. wide, thin, flexible, bright-brown, smooth and shining; opposite the seeds darker and distinctly reticulated. *Seeds* 6–8, obovate, apex obtuse, base cuneate, ·25 in. long, ·2 in wide, much compressed, testa dull-brown, smooth, distinctly areolate. Bak. in Flor. Brit. Ind. II, 300. *Acacia myriophylla* Grah. in Wall. Cat. 5242. *A. foliolosa* Grah. in Wall. Cat. 5241. *Mimosa microphylla* Roxb. Fl. Ind. II, 549.

Kedah; Langkawi, *Curtis* 2135! 2801! Penang; *Curtis* 718! 1702 *Kunstler* 1444! Perak; *Scortechini* 28! 128!

This does not become a tree. When a climber it has not the assistance, as in climbing *Acacias*, of prickles; it developes however hard recurved hooks, that help to serve as hold-fasts, from the thickening of the pulvini at the leaf-bases.

2. Albizzia stipulata Boiv. Enycl. XIX Siécle II, 33. An unarmed evergreen tree, often 100–120 feet high, young shoots finely grey-downy, bark dark-grey rugose, stem 3–4 feet thick; heart-wood dark-brown. *Leaves* evenly 2-pinnate, rachis 6–18 in. long, pubescent, with a large sessile gland 1 in above the base and with 2–6 small between the bases of as many distal pairs of pinnæ; pinnæ 6–20-jugate, the secondary rachises tawny-pubescent, 2·5–4 in. long; leaflets 20–45-jugate, dimidiately falcate-lanceolate, sessile, apex acute slightly pointed

forward, base obliquely rounded on lower margin, membranous, ·25–·3 in. long, ·1 in. wide, pale-green glabrous above, glaucous finely downy beneath, the midrib very close to the upper margin; stipules very large, usually 1–1·5 in. long, ·4 in wide, obliquely cordate-acuminate, velvety-pubescent beneath, puberulous above. *Flowers* in numerous heads 1·75 in. across, yellowish-white, the stamens often more or less flushed with pink; peduncles pubescent 1·25 in. long, solitary or in fascicles of 2–4 on nodes in the upper half of pubescent racemose branchlets 3–5 in. long, with large pubescent deciduous ovate-acuminate bracts ·5 in. long, the branchlets in panicles 8–12 in. long, 6–8 in. wide, at the ends of leafy branches; pedicels ·05 in. long, pubescent. *Calyx* ·1 in. long, infundibuliform, teeth short acute, densely uniformly pubescent externally. *Corolla* ·2 in. long, teeth lanceolate acute, half as long as tube and like it densely-pubescent outside. *Filaments* connate at the base in a yellowish tube longer than that of corolla, the free portion of filaments yellowish with a pink flush, or white, ·75 in. long. *Pod* indehiscent 5–6 in. long, ·75–1 in. wide, thin, rigid, pale-brown, dull; valves faintly wide-reticulate. *Seeds* 8–10, ovate, ·25 in. long, ·2 in. wide, much compressed, testa dark-brown, smooth, dull, not areolate. Benth. in Hook. Lond. Journ. Bot. III, 92; Bedd. Fl. Sylvat. t. 55; Miq. Flor. Ind. Bat. I, 28; Bak. in Flor. Brit. Ind. II, 300. *Acacia stipulata* DC. Prodr. II, 469; Wall. Cat. 5326; W. & A. Prodr. 274. *A. Smithiana* Wall. Cat. 5237. *A. marginata* Ham. in Wall. Cat. 5243. *Mimosa Smithiana* Roxb. Hort. Beng. 40; Fl. Ind. II, 550. *M. stipulata* Roxb. Hort. Beng. 40. *M. stipulacea* Roxb. Fl. Ind. II, 549. *Arthrosprion stipulatum* Hassk. Retzia I, 212. The White Siris.

Andamans; rare, *E. H. Man!* Nicobars; Kamorta, common, *Kurz!*

Distrib. Throughout South-Eastern Asia.

This was once found by Mr. Man in the forests of South Andaman many years ago; none of the numerous collections made in the group during recent years contain any specimens of the species. It becomes quite common again in the Nicobars and in the Malay Archipelago it seems to be as plentiful as it is in India and Indo-China. But from the intervening Malay Peninsula no collector has ever sent a specimen to Calcutta.

Miquel describes three varieties:—

(*α.*) *typica* with greenish stamens.

(*β.*) *vegeta* with pinkish stamens.

(*γ.*) *stipulis persistentibus* with permanent, more pubescent stipules.

But his varieties (*β.*) and (*γ.*) are only forms of one tree and that tree is what constitutes in reality *typical A. stipulata*. What Miquel treats as var. *typica* is Roxburgh's *Mimosa Smithiana*, which has small stipules, and is, if not a distinct species, certainly a very good variety. The Andamans and Nicobars tree is true *A. stipulata*; the other form has not been met with in our area.

3. Albizzia littoralis Teysm. & Binnend., Nat. Tijds. Ned. Ind. XXIX, 259. An unarmed tree 30–40 feet high, young branches glabrous, lenticelled; with ash-grey bark. *Leaves* evenly 2-pinnate; rachis glabrous, 4–8 in. long, with a large sessile gland near base; pinnæ 2–4-jugate, the distal pair 4–5 in. long with leaflets 5–6-jugate, the proximal 3–4 in. long, leaflets 3–4-jugate; leaflets elliptic-oblong or obovate, obtuse or retuse, base obliquely rounded, or rounded on lower cuneate on upper margin, subsessile, submembranous, glabrous pale-green above, faintly puberulous glaucescent beneath, ·75–1·25 in. long, ·4–·75 in. wide. *Flowers* in small few-fld. umbels, under ·5 in. across, white with pink stamens; peduncles slender the longest 1·5 in. long, glabrous or puberulous, corymbosely arranged on leafless branchlets 1–3 in. long, themselves disposed in a terminal corymbose panicle; pedicels ·2–·25 in. long, very slender, glabrous. *Calyx* ·1 in. long, teeth obscure, tube pubescent. *Corolla* ·2 in. long, teeth ovate-lanceolate, externally closely grey-silky as is the tube. *Filaments* connate at base in a uniform white tube shorter than corolla, the free portion of filaments pink. *Pod* 6–7 in. long, 1 in. wide, linear, tapering at both ends, flat, much compressed, glossy pale greenish-brown, uniformly wide-reticulate. *Seeds* 12–16, transversely oval, much compressed, ·4 in. long, ·2 in. wide, ·1 in. thick, testa smooth brown. Kurz, Journ. As. Soc. Beng. XIV, 2, 129.

Nicobars; Nancowry, *Jelinek! King's Collector!* Great Nicobar, *Jelinek.* Penang; Pulo Jungah, *Curtis!* Distrib. Malay Archipelago.

The Nicobarese name is "*Unjiha*;" the name in the Moluccas is "*Kellor-laut.*"

4. Albizzia Lebbek Benth. in Hook. Lond. Journ. Bot. III, 87. An unarmed deciduous tree 40–70 feet high, young shoots puberulous or almost glabrous; with pale bark. *Leaves* evenly 2-pinnate; rachis 3–9 in. long with a large sessile gland near base; pinnæ 2–3- (less often 4-, rarely 1-) jugate, 4 in. long with a gland on the main-rachis above between the bases of the distal, sometimes of the 2 distal pinnæ; leaflets 5–9-jugate, often with glands between their bases, elliptic-oblong or the upper more oblique and obovate-oblong, very obtuse or retuse, base obliquely rounded, or rounded on lower, cuneate on upper margin, subsessile, glabrous above, glabrous or faintly pubescent beneath, reticulate, pale-green, 1–2 in. long, ·5–·75 in. wide. *Flowers* in globular subcapitate umbels 1·25 in. across, white and fragrant; peduncles 2–4 in. long, glabrous or puberulous, solitary or 2–4 together from axils of upper leaves, or corymbose at the ends of short leafless branches; pedicels ·1–·15 in. long, slender, puberulous. *Calyx* ·15–·2 in. long, teeth short deltoid, tube glabrous or puberulous. *Corolla* ·3 in. long, tube glabrous, the teeth ovate-lanceolate, externally pubescent. *Filaments* connate at base in a uniform tube shorter than corolla. *Pod* 4–12 in. long, 1–2 in.

broad; linear-oblong, blunt at both ends, flat, much compressed, with slightly thickened sutures, smooth, glossy, pale straw-coloured except opposite the seeds, there reticulated, pale-brown. *Seeds* 4–12, transversely oval, much compressed, ·6 in. long, ·3 in. wide, ·1 in. thick, testa smooth, pale-brown. Bedd. Fl. Sylvat. t. 53; Bak. in Flor. Brit. Ind. II, 298. *Albizzia latifolia* Boiv. Encyc. II, 33; Miq. Flor. Ind. Bat. I, 22. *Acacia Lebbek* Willd. Sp. Pl. IV, 1066; DC. Prodr. II, 466. *Acacia speciosa* Willd. Sp. Pl. IV, 1066; DC. Prodr. II, 467; W. & A. Prodr. 275. *Acacia Sirissa* Ham. in Wall. Cat. 5265. *Mimosa speciosa* Jacq. Ic. t. 108. *M. Sirissa* Roxb. Hort. Beng. 40; Flor. Ind. II, 544. The Siris.

Planted in some of the provinces:—Andamans; *Kurz!* Penang; *Curtis* 296! Distrib. Planted throughout the tropics; appears to be wild in the drier regions of Asia and Africa.

5. Albizzia pedicellata Bak. ex Benth. in Trans. Linn. Soc. XXX, 563. A tall erect unarmed tree sometimes over 100 feet high, young shoots dark-coloured, faintly rusty-puberulous, bark dark-coloured; stem 3 feet in diam., heart-wood black. *Leaves* evenly 2-pinnate; rachis 5–8 in. long, with a large sessile gland ·5 in. above base, stipules persisting as two firm recurved thickly coriaceous hooklets; pinnæ 6–12-jugate, 4–6 in. long, the main and secondary rachises alike puberulous; leaflets 12–16-jugate, oblong-obtuse, sessile, with slightly obliquely rounded base, rigidly subcoriaceous, ·5–·75 in long, ·3–·4 in. wide, dark-green above, pale but hardly glaucescent beneath, reticulate-veined, quite glabrous on both surfaces. *Flowers* in many-fld. umbels ·75–1 in. across, yellowish-white with green stamens; peduncles slender finely pubescent, 1–1·25 in. long, panicled in fascicles of 2–8 on nodes towards the apices of numerous axillary main-rachises, the nodes sometimes evolved as branchlets 1–2 in. long so as to form compound umbels; main-rachis puberulous, the peduncular portion beneath the flowers 3 in. long towards ends of branches, to 12–15 in. long in the axils lower down; pedicels rusty-pubescent very slender, ·25–·3 in. long. *Calyx* ·15 in. long, teeth short deltoid, densely pubescent externally. *Corolla* ·3 in. long, teeth ovate-acute externally, densely pubescent as is the tube. *Filaments* connate at base in a white tube shorter than corolla, free portions of filaments over 1 in. long, bright-green. *Pod* indehiscent, 12–18 in. long, 2·25–2·5 in. wide, very thin and brittle, pale yellowish-brown, very faintly reticulated opposite the seeds, sinuate-repand along the unthickened sutures. *Seeds* 6–9, transversely ovate, ·25 in. long, ·2 in. wide, much compressed, testa smooth dark-brown. Bak. in Flor. Brit. Ind. II, 299.

Perak; Goping, Ulu Bubong, etc. *Kunstler* 4474! 7988! 10436!

Penang; Waterfall, *Curtis* 1921! Malacca; *Maingay* 581! 586! *Goodenough*, 1796! Singapore; Kranji Road, *Ridley* 6297!

A very fine species.

6. Albizzia odoratissima Benth. in Hook. Lond. Journ. Bot. III, 88. A tall erect unarmed tree sometimes 100 feet high, young shoots rather dark-coloured, stem 2–2·5 feet in diam., heart-wood black. *Leaves* evenly 2-pinnate; rachis 6–12 in. long, finely-downy, with a large sessile gland ·5 in. above base and 1–2 small ones between the bases of the distal pairs of pinnæ, stipules small quite deciduous; pinnæ 3–4-(rarely 2-) jugate, usually 5–8 in. long, the secondary rachises glabrous or pubescent; leaflets 8–24-jugate, obliquely oblong, sessile, obtuse, with very obliquely rounded base, rigidly subcoriaceous, ·75–1 in. long, ·3–·5 in. wide, dark-green above, glaucescent beneath, recticulate-veined, the midrib removed by one-third from, and parallel to, the upper edge, glabrous or faintly sparsely adpressed-hairy above, more densely adpressed-hairy beneath. *Flowers* in numerous small 10–12-fld. heads, ·75–1 in. across, yellowish-white with pale-yellow stamens; peduncles slender, puberulous, ·75 in. long, solitary or oftener in fascicles of 3–6 on nodes in the upper third of numerous small corymbose branchlets 2–2·5 in. long, themselves in panicles 8–12 in. long at the ends of leafy branches; pedicels 0. *Calyx* ·05 in. long, teeth obsolete, tube campanulate, externally densely pubescent. *Corolla* ·15 in. long, oblong in bud, teeth ovate-lanceolate, externally densely grey-silky as is the tube. *Filaments* connate at the base in a white tube half as long as that of the corolla, free portion of filaments ·4 in. long, pale-yellow. *Pod* indehiscent, 6–9 in. long, 1·2–1·6 in. wide, thin, flexible, warm-brown, glossy or dull, sutures straight or slightly repand; valves uniformly wide-reticulate. *Seeds* 8–12, broadly ovate, ·3 in. long, ·25 in. wide, much compressed, testa smooth, dull greenish-yellow, faintly areolate. Bedd. Flor. Sylvat. t. 54; Bak. in Flor. Brit. Ind. II, 299. *Albizzia micrantha* Boiv. Encyc. II, 34; Miq. Flor. Ind. Bat. I, 24. *Acacia odoratissima* Willd. Sp. Pl. IV, 1063; DC. Prodr. II, 466; Wall. Cat. 5234; W. & A. Prodr. 275. *Acacia lomatocarpa* DC. Prodr. II, 467. *Mimosa odoratissima* Linn. f. Suppl. 437; Roxb. Cor. Pl. t. 120; Hort. Beng. 40; Fl. Ind. II, 546. *Mimosa marginata* Lamk. Encyc. Meth. I, 12. The Black Siris.

Malacca; (*fide* Baker). Distrib. India and Indo-China.

Mr. Baker notes the presence of this in Malacca and the species is therefore included here. It is, however, possible that Mr. Baker's specimens are from planted trees, for no botanist has ever communicated Malayan specimens to the Calcutta Herbarium.

7. Albizzia procera Benth. in Hook. Lond. Journ. Bot. III, 89.

An erect unarmed tree 60–80 feet high, young shoots rather pale, much lenticelled, subrugose, glabrous, bark pale-gray outside reddish within, stem 1·5–2 feet in diam.; heart-wood brown. *Leaves* evenly 2-pinnate; rachis 12–18 in. long, glabrous, with a large gland ·25 in. above the base; pinnæ 2–6-jugate, 5–6 in. long, secondary rachises glabrous, with sessile ovate gland below the last pair of leaflets; leaflets 6–12 jugate, obliquely ovate to ovate-oblong with petiolules ·05 in. long, blunt or subacute, the base obliquely cuneate on upper rounded on lower margin; thinly coriaceous, 1–1·5 in. long, (in young trees sometimes 2 in. long) and ·6–·8 in. wide, dark-green glabrous above, paler beneath and when young densely silvery later sparsely adpressed-pubescent. *Flowers* in numerous small 20–25-fld. heads, ·75 in. across, yellowish-white with pale-yellow stamens; peduncles slender puberulous or glabrous, ·5 in. long, in fascicles of 3–5, less often solitary on nodes in the upper half of numerous racemose branchlets 3–5 in. long at the ends of leafy branches; pedicels 0. *Calyx* ·1 in. long, teeth triangular distinct, glabrous externally as is the tube. *Corolla* ·25 in. long, teeth lanceolate half as long as tube, densely uniformly pubescent externally. *Filaments* connate at base in a yellow tube as long as that of corolla, free portion of filaments ·35 in. long, greenish-yellow. *Pod* at length dehiscent, 4–8 in. long, ·7–·9 in. wide, thin, flexible, bright reddish-brown, glossy, sutures straight, slightly thickened; valves not reticulated. *Seeds* 6–12, broadly ovate, ·35 in. long, ·25 in. wide, much compressed, testa smooth pale-brown. Bedd. Flor. Sylvat. 96; Miq. Flor. Ind. Bat. I, 21; Bak. in Flor. Brit. Ind. II, 299. *Acacia procera* Willd. Sp. Pl. IV, 1063; DC. Prodr. II, 466; W. & A. Prodr. 275. *Acacia elata* Grah. in Wall. Cat. 5233; Voigt, Hort. Suburb. Calcutt. 261 (not *Mimosa elata* Roxb.). *Mimosa procera* Roxb. Cor. Pl. t. 121; Hort. Beng. 93; Flor. Ind. II, 548.

Andamans; Coco Group, common, *Prain!* Distrib. Indo-China, China; Malay Archipelago.

It is strange that though this species extends from Nepal to Central China on the north and from Java to the Philippines on the south, it should never have been collected in the Malay Peninsula. More extraordinary still, though quite common at the north end of the Andamans, it seems to be altogether absent from the southern islands of that group and from the Nicobars.

8. Albizzia lucida Benth. in Hook. Lond. Journ. Bot. III, 86. An unarmed deciduous tree 50–60 feet high, all parts glabrous, bark thin, greyish, pustular, stem 1–1·5 feet in diam.; heart-wood pale-brown. *Leaves* evenly 2-pinnate, rachis 1·5–2·5 in. long, quite glabrous, with a sessile cup-shaped gland ·3–·8 in. above the base and with another near the tip; pinnæ usually 1-jugate with secondary rachis 2–3·5 in. long, with a gland on upper side ·25 in. below the distal pair of leaflets and often with a second ·25 in. below the penultimate pair, the leaflets usually 2-,

sometimes 3-, rarely 1-jugate, (when leaflets 3-jugate on the distal pinnæ, leaves occasionally with a second pair of pinnæ with short eglandular rachis under ·5 in. long, bearing 1 pair of small leaflets); leaflets ovate to elliptic-oblong or oblong-lanceolate, apex rather abruptly acuminate, base obliquely cuneate, glossy dark-green above, dull paler beneath, glabrous on both surfaces, thinly chartaceous, decreasing downwards, the distal pairs 4 in. long, 1·5 in wide, the lowest 1·5 in. long, ·7 in. wide. *Flowers* in small heads ·6–·7 in. across, yellowish; peduncles slender, faintly puberulous, ·75–1 in. long, solitary or in fascicles of 2–3 in corymbs on nodes in the upper fourth, or subumbellate at the tips, of numerous branchlets 1·5–6 in. long, themselves in corymbose panicles 8–10 in. long and nearly as wide, at the ends of leafy branches; pedicels ·05–·1 in. long. *Calyx* ·07 in. long, campanulate, faintly toothed, externally puberulous. *Corolla* ·2 in. long, teeth lanceolate, uniformly sparsely silky externally. *Filaments* connate at base in a white tube slightly shorter than that of corolla, free portion of filaments ·35 in. long, pale-yellow. *Pod* at length dehiscent, 6–10 in. long, 1–1·25 in. wide, thin, flexible, pale-brown, dull, reticulated opposite the seeds, smooth glossy elsewhere. *Seeds* 6–8, orbicular, ·3 in. in diam., much compressed, testa smooth, pale-brown. Benth. Pl. Jungh. 268; Miq. Flor. Ind. Bat. I, 18; Bak. in Flor. Brit. Ind. II, 299. *Mimosa lucida* Roxb. Hort. Beng. 40; Flor. Ind. II, 544. *Inga lucida* Wall. Cat. 5267 mostly.

Singapore: *fide* Baker. Distrib. Eastern Himalaya and Indo-China; also Java (*fide* Miquel).

Like *A. odoratissima* this species is included on the authority of Mr. Baker, who records it from the Malayan Peninsula. Dr. Miquel reports it also from Java, but no British or Dutch botanist has ever sent a Malayan specimen to Calcutta.

70. Pithecolobium Mart.

Erect trees. *Leaves* abruptly 2-pinnate. *Flowers* in globose heads, rarely in small loose spikes or subumbellate corymbs, usually hermaphrodite and pentamerous. *Calyx* campanulate or funnel-shaped, shortly toothed. *Corolla* funnel-shaped, the petals united below from one-half to two-thirds their length. *Stamens* monadelphous, much exserted; anthers without glands. *Ovary* sessile or stipitate, many-ovuled; style filiform, stigma minute capitate. *Pod* strap-shaped, circinate or rarely falcate or nearly straight, usually dehiscent throughout the lower suture and much twisted in a late stage, sutures not or slightly thickened.

Species about 100; cosmopolitan in the Tropics, about 80% American, only 1–2 African.

Armed with spinescent stipules: seeds arillate; (pinnæ of leaves 1-jugate, their rachises gland-bearing; leaflets 1-jugate; pods close-spiral, dehiscent along lower suture, testa of distant seeds thin) ... ... 1. *P. dulce.*

Unarmed; seeds without arillus:—

Pod indehiscent, (horse-shoe shaped), seeds (distant) with a thick leathery testa; (pinnæ 1-jugate, their rachises gland-bearing, leaflets glabrous 2-jugate) ... ... 2. *P. confertum.*

Pods dehiscent, seeds with a thin crustaceous testa:—

Pods straight or slightly falcate, opening along both sutures, valves thick, fleshy, seeds close-set, mutually compressed; (pinnæ 1-jugate, their rachises gland-bearing, leaflets glabrous 1–2-jugate) ... 3. *P. bubalinum.*

Pods spirally twisted, opening only along the lower suture, valves coriaceous, seeds distant:—

Pods deeply lobed between the seeds half-way down to upper suture or further, dehiscing only opposite the seeds; (pinnæ 1-jugate, their rachises gland-bearing, leaflets glabrous 2-3-jugate) ... ... 4. *P. lobatum.*

Pods only faintly sinuate on lower suture between the seeds, dehiscence along lower suture continuous:—

Pinnæ 1-jugate without glands on their rachises; (leaflets glabrous):—

Pods large, ·75 in. broad; seeds somewhat compressed, ·6 in. long; leaflets 2-jugate apex acute 5. *P. nicobaricum.*

Pods small, ·4 in. broad; seeds pisiform, ·2 in. across; leaflets 3–4-jugate, apex caudate-acuminate ... ... 6. *P. microcarpum.*

Pinnæ more than 1-jugate or, if casually 1-jugate then with glands on their rachises; (pods large):—

Pods broad, 1·25 in. wide or more; leaflets very large, glabrous; (pinnæ 2-jugate, distal much exceeding the proximal casually absent pair):—

Rachises of pinnæ with glands between each pair of leaflets; flowers in dense many-fld. heads ·75 in. across; leaflets shining on both surfaces; branches of panicle terete ... 7. *P. affine.*

Rachises of pinnæ with glands between bases of terminal leaflets only; flowers in few-fld. heads ·2 in. across; leaflets dull beneath, branches of panicle subcompressed ... ... 8. *P. ellipticum.*

Pods narrow, ·75 in. wide or less; leaflets medium or small, puberulous or pubescent beneath:—

Flowers large (·5 in. long); pod long-stipitate, seeds with long axis parallel to sutures; (pinnæ 2-jugate or casually 1-jugate, leaflets medium; branches terete) ... ... 9. *P. Kunstleri.*

Flowers small (under ·25 in. long); pod short-stipitate, seeds with long axis transverse:—

Florets sessile, branches terete; leaflets of distal pinnæ 15–20-jugate; (pinnæ 5–8-jugate, leaflets small, all rhomboid, the distal pairs not much exceeding the others) ... 10. *P. contortum.*

Florets pedicellate, branches angled; leaflets of distal pinnæ 5–8-jugate:—

Pinnæ 3-6- (rarely 8–10-) jugate; leaflets small, all trapezoid, the distal pairs not much exceeding the others; glands stipitate ... ... 11. *P. Clypearia.*

Pinnæ 2–4-jugate; leaflets medium, terminal cuneate at base, considerably exceeding the subtrapezoid others; glands sessile ... 12. *P. angulatum.*

1. Pithecolobium dulce Benth. in Hook. Lond. Journ. Bot. III, 199. A tree 25–40 feet high with glabrous branches; stem 2 feet in diam., the ultimate branchlets pendent, armed with stipular thorns. *Leaves* evenly 2-pinnate, rachis 1 in. long glabrous, basal gland 0, with a sessile small cupped-gland at its apex between the bases of the 1-jugate pinnæ, with secondary rachises ·25 in. long also gland-bearing at apices between the bases of the 1-jugate leaflets glabrous on both surfaces, pale-green, approximated, oblique obovate-oblong, rigidly subcoriaceous, obtuse or occasionally subacute, 1–2 in. long, ·3–·7 in. wide; stipules ascending, ·2–·3 in. long, converted into conical smooth thorns, the main and secondary rachises both shortly produced in acute points. *Flowers* in dense heads ·4–·5 in. in diam., on puberulous pedicels ·25 in. long, solitary or 2–3 together in the axils of small lanceolate bracts ·1 in. long, along slender nodiform branchlets slightly zig-zag towards their tips, glabrous or puberulous, striate, from 3–5 in. long, the bracts of the lower two-thirds accompanied by minute stipular spines, those of the lowest fourth often replaced by reduced foliage leaves; the branches arranged in terminal panicles 7–12 in. long, 5–8 in. wide, extending into the upper axils. *Calyx* ·05 in. long, grey-downy, subcampanulate, shortly toothed. *Corolla* white, ·1 in. long, puberulous tube wide-infundibuliform, rather longer than the ovate-acute teeth. *Filaments* united at base in a tube as long as that of the corolla, shortly exserted. *Ovary* puberulous, shortly stipitate. *Pod* turgid, twisted, dehiscent along the lower suture, both sutures slightly indented between the seeds, 4–5 in. long, ·5 in. wide; glabrous, wide-reticulated, the valves coriaceous, claret-red when ripe. *Seeds* 6–8, obovate-oblong, ·5 in. long, ·3 in. wide, ·2 in. thick, testa smooth shining purplish, enveloped in a firm edible pulpy pale arillus. Miq. Flor. Ind. Bat. I, 40; Bedd. Flor. Sylvat. t. 188; Bak. in Flor. Brit. Ind. II, 302. *Mimosa dulcis* Roxb.

Cor. Pl. I. t. 99; Hort. Beng. 40; Flor. Ind. II, 556. *Inga dulcis* Willd. Sp. Pl. IV, 1005; DC. Prodr. II, 436; Wall. Cat. 5282; W. & A. Prodr. 268; Wight, Ic. t. 198.

Cultivated in most of the Provinces; PENANG; *Curtis* 59! SINGAPORE; *Maingay* 579! ANDAMANS: common. NICOBARS; Car Nicobar, *King's Collector!*

A native of America whence it has been introduced, by way of the Philippines, to Malaya generally, and to India.

2. PITHECOLOBIUM CONFERTUM Benth. Trans. Linn. Soc. XXX, 304. An unarmed small tree with glabrous lenticelled branchlets with dark-brown bark. *Leaves* evenly 2-pinnate, rachis glabrous ·75 in. long, with no basal gland but with a long elliptic gland just below the bases of the 1-jugate pinnæ; rachises of pinnæ glabrous, 2 in. long, with glands between the bases of each of the 2 pairs of leaflets glabrous on both surfaces, bright-green shining above, paler dull beneath, rigidly papery, oblong, shortly obtusely pointed, cuneate at base, distal 3·25–3·75 in. long, 1·75–2 in. wide, proximal 2·5 in. long, 1·25 in. wide, lateral nerves 3–4 pairs ascending; petiolules distinct, glabrous, ·2 in. long. *Flowers* in small 5–10-fld. heads ·75 in. across, on pubescent pedicels ·75 in. long, arranged in small axillary and terminal corymbs 2 in. long and broad with pubescent main-rachises, 1 in. long or less. *Calyx* sessile ·05 in. long, puberulous, campanulate, teeth obsolete; bracteoles minute. *Corolla* white, ·25 in. long, tube glabrescent externally, twice as long as the lanceolate teeth, puberulous on the outside. *Filaments* united at base in a tube slightly longer than that of corolla, free portion white, exserted ·35 in. *Ovary* glabrous, subsessile. *Pod* indehiscent, slightly turgid, horse-shoe shaped or loosely spirally twisted, 10–12 in. long, 1·5 in. wide, sutures firm not at all indented between the seeds, valves thinly coriaceous, glabrous, shining, faintly wide-reticulate. *Seeds* 11–13, compressed ovate, ·75 in. long, ·5 in. wide, ·25 in. thick; testa brown, dull, areolate on the outside, thick, tough and leathery. Bak. in Flor. Brit. Ind. II, 304. *Albizzia splendens* Miq. Flor. Ind. Bat. Suppl. 280.

MALACCA; *Griffith* 1951! *Goodenough* 1766! *Hervey!* DISTRIB. Sumatra (*Teysmann* 4228)!

This species is remarkable in having pods that do not twist spirally and that are apparently quite indehiscent. The seeds have no true arillas but have a thick softly coriaceous tough coat which apparently takes the place of an arillate structure.

3. PITHECOLOBIUM BUBALINUM Benth. Trans. Linn. Soc. XXX, 576. An unarmed tree 30 feet high with pale-brown pubescent branchlets and grey bark. *Leaves* evenly 2-pinnate, rachis puberulous ·5 in. long, with no basal gland but with a round gland just below the bases of the

1-jugate pinnæ; rachises of pinnæ ·75–1·75 in. long with glands between the 1–2 pairs of leaflets, the leaflets oftener 1- than 2-jugate, sometimes 1-jugate on one and 2-jugate on the other pinna of the same leaf; leaflets glabrous on both surfaces, bright-green shining beneath as well as above, rigidly papery, oblong-lanceolate, shortly subacutely pointed, cuneate at base, distal 4–5 in. long, 1·75–2·25 in wide, proximal 2·5 in. long, 1·25 in. wide, lateral nerves 4–5 pairs ascending, petiolules distinct, glabrous, ·2 in. long. *Flowers* in small 5–8-fld. heads ·3 in. across, on puberulous very slender pedicels ·4–·6 in. long, fascicled in the axils of small bracts and subumbellate at the tips of puberulous peduncles ·75 in. long, subcorymbosely set on branchlets 2·5 in. long, themselves disposed in terminal and axillary panicles 6–8 in. long, 4–6 in. wide. *Calyx* sessile ·05 in. long, pubescent, campanulate, teeth short, deltoid, bracteoles minute. *Corolla* white, ·12 in. long, teeth lanceolate nearly as long as tube, uniformly puberulous externally. *Filaments* united in a tube longer than that of corolla, free portion white, exserted, ·35 in. long. *Ovary* pubescent, distinctly stipitate. *Pod* dark-green inside, reddish outside, dehiscent along both sutures, oblong, straight or falcate, apex obtuse, base obliquely rounded, 3–4 in. long, 1 in. wide, ·75 in. thick, sutures thin not at all indented, valves thick, fleshy, fœtid, densely shortly velvety externally. *Seeds* 8–10, crowded, ovoid, with sides flattened from mutual compression, ·75 in. long, ·4 in. wide and as thick, testa thin crustaceous smooth shining dark-purple; arillus absent. Bak. in Flor. Brit. Ind. II, 304. *Inga bubalina* Jack, Mal. Miscel. II, 7. 77; Hook. Comp. Bot. Mag. I, 224.

Penang; *fide* Baker. Malacca; *Griffith! Maingay* 576! *Goodenough* 1552! Distrib. Sumatra (*Jack; Forbes* 1801!)

Jack gives the Malay name of this as "*Bua Karbau*" in Sumatra; Forbes does not give any native name. In Malacca the name given by Griffith is "*Ingria*," that noted by Goodenough is "*Gerdas Padi*." The fleshy pod is eaten, in spite of its offensive odour.

4. Pithecolobium lobatum Benth. in Hook. Lond. Journ. Bot. III, 208. A tree 60–80 feet high with spreading crown, stem 15–20 in. thick; branchlets glabrous; bark grey. *Leaves* evenly 2-pinnate; rachis glabrous ·6–1 in. long, with a gland near the middle but none at base or between the bases of the 1-jugate pinnæ; rachises of pinnæ glabrous 4–6 in. long, with gland between the bases of the 2–3-jugate leaflets; leaflets oblong to oblong-lanceolate, acute, base cuneate, firmly papery, flexible, glabrous and shining on both sides, medium-green, distal pair 5–8 in. long, 2–3 in. wide, proximal 3 in. long, 1·5 in. wide; petiolules glabrous, ·25 in. long. *Flowers* in small 3–5-fld. heads ·25 in. across, on glabrous slender pedicels ·2–·3 in. long, solitary or 2–3 together on nodes with small glabrous bracts along glabrous branchlets 1–4 in. long,

the larger paniculately branched; fascicled in leaf-axils and on nodes below the leaves near and at the ends of branches. *Calyx* sessile, glabrous or sparsely puberulous, ·05 in. long, tube campanulate, teeth short deltoid ciliate, bracteoles minute glabrous. *Corolla* white, glabrous, ·15 in. long, tube infundibuliform one and a half times the length of the lanceolate teeth. *Filaments* united at base in a tube rather shorter than that of corolla, free portion white, exserted, ·25 in. long. *Ovary* glabrous, stipitate. *Pod* 9–10 in. long, horse-shoe shaped or loosely spirally twisted, valves firmly coriaceous, glabrous, deeply lobed along the lower suture half-way or more towards the entire upper, indehiscent in the sinuses, but dehiscing along the convexities of the one-seeded suborbicular rudely umbonate lobes 2 in. in diam., 1 in. thick. *Seeds* 3–6, (usually some of the lobes are abortive, occasionally two may be confluent), orbicular, ·75 in. in diam., ·35 in thick, testa dark-brown, thin, rather dull, crustaceous; arillus absent. Hassk. Retzia I. 222; Miq. Flor. Ind. Bat. I, 33; Bak. in Flor. Brit. Ind. II, 305. *Mimosa Koeringa* Roxb. Hort. Beng. 40. *M. Djiringa* Roxb. Hort. Beng. 93. *M. Kaeringa* Roxb. Flor. Ind. II, 543. *M. Jiringa* Jack, Mal. Miscell. I, 1. 14; Hook. Bot. Misc. I, 282. *Inga Jiringa* Jack, Mal. Miscell. II, 7. 78. *Inga attenuata* Grah. in Wall. Cat. 5276. *Inga lobata* Grah. in Wall. Cat. 5280A. *Inga bigemina* Bl. Cat. Buitenz. 88; Hassk. Cat. Bog. 291, not of Willd. *Acacia Koeringa* Royle, Ill. Him. Pl. 183. *Pithecolobium Koeringa* Kuntze MSS. in Herb. Kew.

Penang; *Curtis* 105! 711! 720! 2916! Perak; *Wray* 499! *Kunstler* 5665! 7116! 8651! 10841! Malacca; *Griffith* 1954! *Maingay* 572/2! Singapore; *Kunstler* 1163! *Hullett* 47! Distrib. Tenasserim; Sumatra, ("wild," *Forbes* 1519! 3051!); Java, cultivated (*Kurz* 2110! *Koorders* 4199! 11514!); Philippines, (*fide* Baker).

Curtis gives the Malay name in Penang as "*Jereng*;" Jack gives "*Bua Jiring*" as the name in Sumatra; Roxburgh uses this name and, perhaps, also the name "*Koeringa*."

Specimens issued by Javanese botanists as *P. bigeminum* always belong to this species; *P. bigeminum* does not occur anywhere in the Malayan countries. Hasskarl states that the name "*Tjering*" is, in Java, limited to the eastern parts of the island where alone the tree occurs uncultivated. The cultivated tree in West Java is termed "*Djenkol*." This last is the only name cited by Koorders and Valeton (*Bijdr.* I, 268) who say that, though occurring as an escape, the tree is nowhere wild in Java.

Roxburgh, it is to be noted, published two names:—*Mimosa Koeringa* (Hort. Beng. 40)—this he afterwards described as having seeds covered with edible fleshy pulp; and *M. Djiringa* (Hort. Beng. 93)—this he never did describe. It is to the former alone that Royle adverts under the name *Acacia Koeringa*, and it is the latter alone that Jack is careful to cite as synonymous with his *Inga Jiringa*. Of *Inga Jiringa* Jack does *not* say that the seeds are enveloped in pulp; he is careful, however, to imply that, like *I. bubalina*, its seeds *have no arillus*, but that the legume

is fleshy and esculent. When therefore Bentham and, following him, Miquel describe the seeds of their *Pithecolobium lobatum*, for which they cite both of Roxburgh's names, as enveloped in edible pulp, they give a character derived from Roxburgh's description of *M. Koeringa* only.

On Burmese specimens Sir D. Brandis has noted "fruit sold;" Gallatly says "edible.....common in the bazars;" Kurz has said nothing about the fruits or seeds and has not described the latter; Baker too has refrained from describing them. Hasskarl in describing the use of the fruits does not say whether it is the pod or the seed that is employed; he *does* say that the pulp of the seed disappears when the fruit is ripe!* Koorders and Valeton say that the fœtid seeds are eaten *cooked*. Watt in the *Dictionary of the Economic Products of India* only quotes Roxburgh. What the actual facts may be it is for Malayan botanists to declare. Is it the succulent pod, a fleshy pulp, or the seed itself of *Jiring* that is eaten? And has *Jiring* any pulp at all? If so, is this pulp an arillus?

Roxburgh, though he laboured under the double disadvantage of working in the East, and of dealing largely with living plants, was nevertheless remarkably given to being accurate; in spite of the fact that systematists in Europe, whose labours have been simplified by being confined to dried specimens, propose to unite the two, the writer thinks it should be left an open question whether there may not be a *Pithecolobium Koeringa* whose seeds have an edible pulp, and a *Pithecolobium Jiringa* without a pulp enveloping the seeds. If this be so, these are the names that should be used to designate the two trees, since the name *P. lobatum*, though the best to employ so long as the point is in dubiety, must obviously be discarded should it be found that Roxburgh was right.

5. Pithecolobium nicobaricum Prain. A small tree with slender glabrous zig-zag branchlets with dark greenish-brown bark. *Leaves* evenly 2-pinnate; rachis ·75 in. long, glabrous, with a gland just above the middle but none at base or between the 1-jugate pinnæ; rachises of pinnæ 1·5–2 in. long, glabrous, glandless; leaflets 2- (very rarely 3-) jugate, ovate-lanceolate, gradually tapering to the acute apex and cuneate base, bright-green, glabrous on both surfaces, shining above, duller beneath, distal pair 3–4 in. long, 1·4–1·8 in. wide, others 1–2·5 in. long, ·5–1·25 in. wide; petiolules distinct, glabrous, ·1 in. long. *Flowers* in small few-fld. heads on puberulous pedicels ·25 in. long, in terminal and axillary racemes ·75–2 in. long. *Calyx* pubescent, campanulate, ·05 in. long, teeth deltoid, small. *Corolla* and *stamens* not seen. *Pod* dehiscent along lower suture, 5–6 in. long, ·75 in. wide, spirally twisted, valves thickly coriaceous, glabrous, dull, purplish-red, sinuate between the seeds along the upper margin. *Seeds* 8–10, orbicular-ovate, somewhat compressed, ·6 in. long, ·5 in. wide, ·25 in. thick, testa thin, crustaceous, dark-purple smooth shining; arillus absent. *Albizzia bubalina* (*Pithecolobium bubalinum*) Kurz, Journ. As. Soc. Beng. XLV, 2. 129 not of Benth. *Pithecolobium oppositum* Kurz, *loc. cit.*, not of Miq.

* There is no pulp visible in any of our specimens at Calcutta *in any stage of the pod*, whether the specimens come from Burma, the Malay Peninsula, or the Archipelago.

Nicobars; Nancowry, *Jelinek!* Kamorta, *Kurz!*

The Nicobarese name for this tree is "*Kaucas*." Kurz has erred in identifying it with *P. bubalinum* Bth., which it does not much resemble as regards leaves and which it is totally unlike as regards fruits. He has erred still further in identifying it with *P. oppositum* Miq. which he supposed to be identical with *P. bubalinum*. In reality *P. oppositum* has 2-jugate leaves, with leaflets more like those of *P. microcarpum* than like those of either *P. bubalinum* or *P. nicobaricum*, and with the gland on the main-rachis similarly situated. In spite of the fact that Miquel's specimens have neither flowers nor fruits, the writer thinks they belong to a tree that, though a member of the same group as, is probably quite distinct from, all three species mentioned.

6. Pithecolobium microcarpum Benth. in Trans. Linn. Soc. XXX, 576. An unarmed tree 30–70 feet high, with slender pubescent branches with red anastomosing wrinkles, stem 10–15 in. thick, bark greyish-brown. *Leaves* evenly 2-pinnate, rachis puberulous ·5–·75 (rarely 1·25–1·5) in. long, with a gland just below the middle but none at base or between the 1-jugate pinnæ; rachises of pinnæ 2–4 in. long, puberulous, glandless; leaflets 3–4- (rarely only 2-) jugate, firmly chartaceous, ovate, apex rather long obtusely caudate-acuminate, base of distal leaflets cuneate of the others rounded, dark-green shining above, glaucescent beneath, glabrous on both surfaces, distal pair 4–6 in. long, 2–3 in. wide, proximal 3 in. long, 1·5 in. wide; petiolules distinct, glabrous, ·15 in. long. *Flowers* in small 5–8-fld. heads ·4 in. across, on puberulous slender pedicels ·4–·6 in. long, fascicled in the axils of small bracts and subumbellate at the tips of puberulous peduncles 1 in. long, subcorymbosely set on branchlets 2–3 in. long, themselves disposed in terminal and axillary panicles 6–8 in. long, 4–6 in. wide. *Calyx* sessile glabrescent, ·05 in. long, tube campanulate, teeth short deltoid, bracteoles short lanceolate. *Corolla* white, ·15 in. long, teeth ovate-lanceolate equalling the tube, uniformly glabrous externally. *Filaments* united in a tube shorter than that of corolla, free portion white, exserted, ·35 in. long. *Ovary* glabrous subsessile. *Pod* dehiscent along lower suture, spirally twisted, 1·75–2 in. long, ·3–·4 in. wide, sutures thin, the upper very faintly sinuate between the seeds, the valves thinly coriaceous, waxy bright-red. *Seeds* 8–10, pisiform, ·2 in. in diam., testa thin, crustaceous, smooth, shining, dark-purple; arillus absent. Bak. in Flor. Brit. Ind. II, 304. *Inga bubalina* Wall. Cat. 5272 not of Jack. *Pithecolobium bigeminum* var. *bubalina* Benth. in Hook. Lond. Journ. Bot. III, 207; Miq. Flor. Ind. Bat. I, 33 *and* Suppl. 281, *as to the Wallichian synonym only.*

Perak; *Scortechini* 64! 1978! *Kunstler* 1297! 5492! 5842! 10354! 10729! 10802! Penang; *Porter* (Wall. Cat. 5272)! *Curtis* 1093! Malacca; *Griffith* 1947! *Maingay* 567! 574! *Goodenough* 1413! *Derry* 1161! *Hervey!* Singapore; *Ridley* 1634! 6666! *T. Anderson* 40! *Kurz!* Distrib. Sumatra (*fide* Miquel); Borneo.

This very common species has been compared with *P. bubalinum*; in reality the resemblance is very superficial; the leaves differ in having glandless secondary rachises, the leaflets are quite different in shape and the flowers are also very different; in inflorescence the two species are, however, remarkably similar. The nearest ally is undoubtedly *P. oppositum* Miq., of which neither flowers nor fruits are yet known. The leaflets of the two species are of the same shape and have the same caudate tips but those of *P. oppositum* are rather thinner in texture and have puberulous instead of glabrous petiolules besides being arranged on 2 pairs of pinnæ whereas none of our numerous examples of *P. microcarpum* have more than 1 pair of pinnæ.

Goodenough gives "*Kradus*" as the Malay name in Malacca.

7. PITHECOLOBIUM AFFINE Bak. ex Benth. in Trans. Linn. Soc. XXX, 577. A small unarmed tree 15–25 feet high, stem 6–8 in. in diam., young branches rusty-puberulous to pubescent. *Leaves* evenly 2-pinnate, rachis glabrous or puberulous 4–6 in. long, with a large sessile gland ·35 in. above the base, and with similar glands between the bases of the 1–2-jugate pinnæ; secondary rachises of distal pinnæ 6 in. long, with leaflets 4-, (less often 3-) jugate, of proximal pinnæ when present 1·5–2·25 in. long with leaflets 2- (sometimes only 1-) jugate, both with glands between the bases of each pair of leaflets; leaflets papery, glabrous on both surfaces, bright-green, glossy, obovate-acute with subequal cuneate bases, diminishing downwards, distal pair 6–7 in. long, 3–3·25 in. wide, proximal 3 in. long, 1·5–1·75 in. wide; lateral nerves 4–6 pairs ascending; petiolules distinct, glabrous, ·15 in. long. *Flowers* in dense heads ·75 in. across, on slender peduncles ·6 in. long, arranged singly or in fascicles of 2–3 together along branchlets 3–8 in. long, themselves forming an ample terminal panicle 10–15 in. long and broad. *Calyx* subsessile, minutely bracteolate at the base, ·15 in. long, tube funnel-shaped, teeth very short, uniformly brown-silky externally. *Corolla* white, ·25 in. long, uniformly grey-silky externally, teeth ovate-lanceolate, half as long as tube. *Filaments* united in a tube as long as that of corolla, exserted ·35 in., pure white. *Ovary* puberulous, shortly stipitate. *Pod* dehiscent along lower suture, spiral, 8 in. long, 1·25 in. wide, hardly sinuate along upper suture, valves thinly coriaceous, glabrous, shining, faintly wide-reticulate, dark-green externally, bright orange-red within. *Seeds* 6–8, transverse, ovate-oblong, 1 in. long, ·5 in. wide, ·4 in. thick, testa thin crustaceous dark-purple smooth shining; without arillus. Bak. in Flor. Brit. Ind. II, 304.

MALACCA; *Maingay* 577! *Hervey!* PERAK; *Kunstler* 3406! 3957! 5560! SINGAPORE; Tanjong Bunga, *Ridley* 6408! DISTRIB. Burma (*Brandis!*); Borneo.

The pod is given in the *Flora of British India* as ·25 in. wide; this may be a misprint for 1·25 in. At all events the fruit of the species of which Maingay n. 577 forms the basis is as now described. The Borneo locality is given doubtfully

by Mr. Bentham; the pod which he describes, and which belonged to his Borneo specimens, evidently agrees very closely with that of the Peninsular plant.

8. Pithecolobium elliptícum Hassk., Retzia I, 225. A tree 15–30 feet high (occasionally higher) branchlets tawny-puberulous soon glabrescent, bark grey. *Leaves* evenly 2-pinnate, rachis glabrous 3–4 in. long, with a large gland above base and another between the bases of the distal pinnæ; pinnæ 2-jugate, rachises of distal pair 4–7 in. long, with small glands between each pair of leaflets except the lowest, of proximal pair often only subopposite always within an inch of base of main-rachis ·75–1 in., with gland between the end pair of leaflets; leaflets very large, of upper pinnæ 3–4-jugate, distal 6–8 in. long, 2·5–3 in. wide, of proximal 3 in. long, 2 in. wide; leaflets of lower pinnæ usually 2-jugate, distal 4 in. long, 1·5 in. wide, lowest 2 in. long, 1 in. wide, the leaflets often unequally-jugate on the corresponding pinnæ of the same leaf, elliptic-oblong, apex rather abruptly pointed, base rounded, glabrous on both surfaces, bright green shining above, paler dull beneath; petiolules glabrous, ·25 in. long, lateral nerves 5–8 pairs, ascending. *Flowers* in very small 2–5-fld. heads ·2 in. or less across, on short tawny-puberulous peduncles ·25–·35 in. long, solitary or 2–3 vertically superposed above the axils of bracts with a large gland, on subcompressed branchlets 1·5–6 in. long, also 2–3 vertically superposed above the axils of larger bracts ·25–·6 in. long with a large sessile gland and small rudimentary leaflets; the branches of each axil diminishing downwards; branches themselves similarly disposed on a subcompressed tawny-pubescent main-rachis as a terminal panicle 16–20 in. long, 6–12 in. wide. *Calyx* campanulate, tawny-pubescent, ·05 in. long, teeth short obtuse. *Corolla* yellow, silky, ·15 in. long, teeth ovate-lanceolate nearly as long as tube. *Filaments* united at base in a thick short ring, yellowish, ·2 in. long, shortly exserted. *Ovary* with a short stipe as long as staminal tube. *Pod* spirally twisted, 3–7 in. long, dehiscent along the lower suture, 1·25 in. wide, valves firmly coriaceous, glabrous, dull, dark-green, at length becoming yellow externally, orange within. *Seeds* 3–7, oblong, ·8 in. long, ·6 in. wide, ·4 in. thick, testa thin, crustaceous, dark-purple, smooth, shining; without arillus. *Inga elliptica* Bl. Cat. Gew. Buitenz. 88; Ind. Kew. I, 1216. *Inga Jiringa* Wall. Cat. 5268 not of Jack. *Inga Clypearia* Wall. Cat. 5270 B. not of Jack. *Pithecolobium fasciculatum* Benth. Hook. Lond. Journ. Bot. III, 208?; Miq. Flor. Ind. Bat. I, 33; Bak. in Flor. Brit. Ind. II, 304. *Albizzia fasciculata* Kurz, Journ. As. Soc. Beng. XLV, 2. 129, excl. syn. *Pithecolobium macrophyllum* Teysm. & Binnend.

Nicobars; Kamorta, *Kurz!* Kedah; Pulo Songsong, *Curtis* 2604! Pahang; Pulo Chugu, *Ridley* 2637! Malacca; *Griffith! Goodenough* 1894! *Maingay* 571! 578! Perak; *Wray* 542! 2666! 4171! *Scortechini*

1159! 1790! *Kunstler* 2326! 3331! 3771! 4799! 4822! 5674! 6637! 10104! PENANG; *fide* Baker. SINGAPORE, *fide* Baker. DISTRIB. Borneo (*fide* Miquel); Java! and Sumatra!

A very common species for which none of our English collectors have cited a Malay name; Hasskarl and Miquel give the Javanese name as "*Kitjang.*"

This is certainly the *P. fasciculatum* alike of Baker and of Miquel and is the *Albizzia fasciculata* of Kurz. Mr Baker moreover quotes Wall. Cat. 5268—the basis of Bentham's species, and Wall. Cat. 5270 B. from Singapore as the same. There is unfortunately no example of either of these Wallichian numbers at Calcutta though there are examples both of the Griffithian and the Maingayan Malacca sheets named *P. fasciculatum* by Mr. Bentham himself. The original description given by Mr. Bentham states that the pinnæ of *P. fasciculatum* are 1-jugate, and the account of the species being incomplete in other respects it seems better to treat the identity of Bentham's plant with Hasskarl's one as doubtful. As regards Hasskarl's plant no dubiety is possible; his description is very complete and accurate and there is besides an authentic example of his species in the Calcutta Herbarium. Since in any case Hasskarl's name conserves the oldest specific epithet, it may be better to continue its use even if it should turn out that Bentham's *P. fasciculatum* is really the same thing.

Mr. Kurz's identification of *P. macrophyllum* T. & B., with this species cannot be sustained, for Teysmann's tree is a very distinct one with pods lobed as in *P. lobatum* though with leaves very different from those of *P. lobatum*; the leaflets while much larger than, considerably resemble those of *P. ellipticum*. Mr. Kurz's notice of *P. macrophyllum* T. & B., in 1876, appears to be the earliest mention of the plant. As another species from America, *P. macrophyllum* Spruce, was published in 1875, it is necessary to re-name Teysmann's plant *P. Teysmanni*.

By a *lapsus calami* the *Index Kewensis* gives *Inga elliptica* Bl. as the name, *Pithecolobium ellipticum* Hassk. as a synonym, for our species; the reverse is the actual state of affairs. The tree has not been sent to Calcutta from Penang or from Singapore during recent years.

9. PITHECOLOBIUM KUNSTLERI Prain. A tree 20–30 feet high, with spreading branches; branchlets slightly pubescent, stem 8–12 in. thick, bark brown. *Leaves* evenly 2-pinnate, rachis puberulous 1·5–2·5 in. long, with 1 or 2 large elliptic glands some distance below the bases of the 1 or 2 pairs of pinnæ; rachises of terminal pinnæ 4 in. long with large glands some distance below the bases of the 3 pairs of leaflets, basal rachises when present ·5 in. long with a gland some distance below the 1-jugate leaflets; leaves in the inflorescence sometimes small with short 1-jugate pinnæ and small 1-jugate leaflets; leaflets ovate with rounded bases and rather long caudate-acuminate blunt apices, pale yellowish-green, glabrous shining above, dull uniformly sparsely adpressed-puberulous beneath, distal pair 3–4·5 in. long, 1–2 in. wide, proximal 1–2 in. long, ·5–1 in. wide; those of the basal pinnæ 1·5–2·5 in. long, 1–1·5 in. wide; petiolules puberulous, ·15 in. long. *Flowers* in 4–8-fld. heads ·5–·75 in. across, on puberulous pedicels ·5 in. long, sparsely racemose, singly or 2–3 together in axils of bracts or subumbellate or

corymbose at the ends of branchlets 1–2 in. long, disposed in lax terminal panicles extending into the upper leaf-axils, 6–12 in. long, 4–8 in. wide. *Calyx* sessile, tubular, ·15 in. long, densely pubescent externally, teeth short triangular; the bracteoles small spathulate, pubescent. *Corolla* white, ·5 in. long, densely silky externally, tube narrowly funnel-shaped, teeth lanceolate ·12 in. long. *Filaments* at base united in a white tube puberulous outside, as long as that of corolla, free portion glabrous bright-yellow, 1·25 in. long. *Ovary* very long, stipitate, pubescent. *Pod* with a puberulous stipe ·75 in. long, dehiscent along the lower suture, spirally twisted, 8–10 in. long, ·6 in. wide; valves thinly coriaceous puberulous, not sinuate between the seeds. *Seeds* 8–10, ovate, their long. axis parallel with sutures, ·7 in. long, ·4 in. wide, compressed, testa pale-brown, crustaceous, shining.

Perak; at low elevations, *Kunstler* 7875! *Scortechini* 178! Johore; *Lake & Kelsall* 4072! Distrib. Borneo.

A very distinct species; more nearly related to the Indian *P. bigeminum* than to any Malayan species but easily distinguished by its large florets and its long-stipitate pod.

10. Pithecolobium contortum Mart. in Flora XX, 2. Beibl. 115. A tree 15–30 feet high, with spreading grey-pubescent terete or slightly compressed branches, stem 4–6 in. thick, bark dark-brown. *Leaves* evenly 2-pinnate; rachis terete, pubescent, 4–8 in. long, petiolar portion 2 in. long with a large gland below the middle, foliar portion with 1–4 small glands below as many pairs of pinnæ; pinnæ usually 5–8-jugate, sometimes as few as 3-jugate, rarely as many as 15-jugate, rachises with 1–2 small sessile glands below bases of end-pairs of leaflets, diminishing downwards, the distal 4–6 in. long, the basal 1·5–2 in.; leaflets of upper pinnæ 15–20-jugate, of lowest 9–10-jugate, oblong or trapezoid, obtuse or subacute at upper angle, base obliquely unilaterally truncate, upper and lower margins subparallel, main nerve diagonal; rigidly papery, pale-green puberulous above, pubescent beneath, ·5–·75 in. long, ·25–·35 in. wide, petiolules 0. *Flowers* in terminal and axillary simple deltoid panicles 1 foot across, with slender main-rachis 8–20 in. long, the filiform pubescent branches 3–8 in. long, bracts small lanceolate, pedicels puberulous ·25–·4 in. long, the sessile florets scattered or subaggregated near their tips in the axils of small acute puberulous bracteoles. *Calyx* ·05 in., campanulate, puberulous, teeth triangular. *Corolla* greenish-white, glabrous, ·15 in. long, teeth lanceolate spreading, almost as long as tube. *Filaments* united below in a tube as long as that of corolla, free portion cream-coloured, ·35 in. long. *Ovary* faintly puberulous, stipitate. *Pod* 6–8 in. long, 5–7 in. wide, spirally twisted, dehiscing along the lower suture; valves firmly coriaceous, finely pu-

berulous externally, bright orange, within smooth, vermilion, stipe ·2 in. long; slightly sinuate between seeds on lower margin. *Seeds* 8–10, ovate, with long axis across the pod, ·35 in. long, ·25 in. wide, ·2 in. thick, testa dark-purple, thin, crustaceous. Benth. in Hook. Lond. Journ. Bot. III, 210; Bak. in Flor. Brit. Ind. II, 305. *Inga contorta* Grah. in Wall. Cat. 5283. *Inga Finlaysoniana* Grah. in Wall. Cat. 5284.

Kedah; *Ridley* 5223! Penang; *Porter* (Wall. Cat. 5283)! *Stolizka! Curtis* 19! 264! Malacca; *Griffith* 1941! *Maingay* 573! *Hervey! Derry* 149! Perak; *Scortechini* 1658! 1899! *Wray* 2636! 4249! *Kunstler* 1010! 3775! 3889! Singapore; *Finlayson.*

Nearest *P. Clypearia* but very easily distinguished by its terete branches and its sessile glands, as well as by its sessile florets.

11. Pithecolobium Clypearia Benth. in Hook. Lond. Journ. Bot. III, 209. A tree 25–30 feet high with spreading brown-pubescent angular branches, bark dark-brown. *Leaves* evenly 2-pinnate; rachis angular, puberulous, 2–7 in. long, petiolar portion 1–1·5 in. long with a large shortly stipitate gland just above base, foliar portion with small distinctly stalked glands just below each pair of pinnæ except the lowest, pinnæ usually 3–6- (rarely 8–10-) jugate, their rachises with small stipitate glands between each pair of leaflets except the lowest, diminishing downwards, distal 5–6 in. long, basal 1·5–2 in. long; leaflets of upper pinnæ 5–7-jugate, of lowest 3–4-jugate, trapeziform, wide-triangular at upper angle, base obliquely unilaterally truncate or rounded, upper and lower margins subparallel, main nerve diagonal; rigidly papery, dark-green glabrous or faintly puberulous shining above, glaucous with scattered adpressed hairs beneath, terminal 1·5 in. long, ·75 in. wide, lowest ·5 in. long, ·3 in. wide; petiolules 0. *Flowers* in small subumbellate corymbs ·35–·4 in. across, on short peduncles ·3–·5 in. long, solitary or 2–3 vertically superposed above the axils of bracts with a large gland, on angular branchlets 3–4 in. long similarly disposed on the angular main-rachis but with the bracts reduced to an angled petiolule bearing a large bract at its tip; pedicels of florets ·1 in. long, slender, puberulous, their bracteoles minute or obsolete; the whole inflorescence forming a large terminal panicle extending into axils of upper leaves, 15–18 in. long, 10–15 in. wide. *Calyx* campanulate, ·05 in. long, puberulous externally, teeth short deltoid. *Corolla* white, glabrous, ·1 in. long, teeth lanceolate half as long as tube. *Filaments* united at base in a tube shorter than that of corolla, free portion white, ·35 in. long. *Ovary* puberulous stipitate. *Pod* spirally twisted, 4–5 in. long, ·4 in. wide, dehiscing along the lower suture, valves thinly coriaceous, orange outside, red within, glabrous; stipe ·15 in. long; distinctly sinuate between

the seeds on lower margin. *Seeds* 8–10, ovate, with long axis across the pod, ·25 in. long, ·2 in. across, ·15 in. thick, testa dark-purple, thin, crustaceous. Pl. Jungh. 268; Miq. Flor. Ind. Bat, I, 35; Bak. in Flor. Brit. Ind. II, 305. *Mimosa trapezifolia* Roxb. Hort. Beng. 93; Fl. Ind. II, 546. *Inga dimidiata* Hook. & Arn. Bot. Beech. Voy. 181. *Inga Clypearia* Jack, Mal. Miscell. II, 7. 78?; Hook. Comp. Bot. Mag. I, 224; Wall. Cat. 5270A. *Clypearia rubra* Rumph. Herb. Amboin. III, 176 t. 112?

PENANG; *Porter* (Wall. Cat. 5270 A)! *Curtis* 209! PROV. WELLESLEY; *Kunstler* 1612! PAHANG; *Ridley* 1476! SINGAPORE; *T. Anderson* 38! *Hullett* 58! 5698! MALACCA; *Griffith!* *Maingay* 570! *Hervey!* PERAK; *Scortechini* 481! 2024! *Wray* 1889! 2643! DISTRIB. Sumatra, Java, Moluccas.

This is apt, when its leaflets are unusually small, to simulate *P. contortum* from which it is, however, easily distinguished by its smaller fruits, its pedicelled florets, and its terete branchlets. It is also apt, when its leaflets are unusually large, to simulate *P. angulatum*; as both have angular branches and pedicelled florets the only safe diagnostic character is the nature of the glands, especially those on the partial rachises of the pinnæ; these glands are stipitate in *P. Clypearia*, sessile in *P. angulatum*.

There is just a trace of doubt as to whether this is Rumphius' *Clypearia rubra* since that author figures no glands, or even that it is *Inga Clypearia* Jack, since Jack says there is no petiolar gland on the leaf of his species. Jack's plant is, he says, known in Sumatra as "*Jiring muniet*."

12. PITHECOLOBIUM ANGULATUM Benth. in Hook. Lond. Journ. Bot. III, 306. A tree 25–30 feet high with spreading shortly puberulous angular branches, bark dark-brown. *Leaves* evenly 2-pinnate; rachis angular, puberulous, 3–8 in. long, with a large sessile gland ·5–·75 in. above the base and near the middle of the petiolar portion, foliar portion with smaller sessile glands below the bases of all but the last pair of pinnæ set obliquely on the upper truncate ends of sharp-edged ridges; pinnæ 2–4-jugate, their rachises with similar but small glands just below each pair of leaflets, the distal 6–7 in., the lowest 1–1·5 in. long; leaflets of upper pinnæ 5–8-jugate, of lowest 2–3-jugate, all diminishing downward; terminal leaflets of most of the pinnæ 3·5–6 in. long, 1·25–2 in. wide, ovate-lanceolate, gradually tapering to an acute tip, the base wide-cuneate, the midrib central, the bases of the remainder progressively more obliquely rounded and the midribs progressively more diagonal, proximal leaflets 1 in. long, ·75 in. wide; all membranous, sparsely puberulous above, softly pubescent beneath when young; thinly subcoriaceous, dark-green glabrous shining above, dull puberulous beneath when mature, lateral nerves 5–7 pairs rather prominent beneath; petiolules ·07 in. long. *Flowers* in small subumbellate corymbs ·5 in. across, on short peduncles ·75 in. long, fascicled

in axils of small gland-bearing bracts on angular branchlets 4–10 in. long, themselves fascicled in axils of bracts with a large basal gland and a foliar simply-pinnate rudimentary lamina, so as to form a terminal panicle extending into axils of upper leaves, 15–20 in. long, 12–18 in. wide; pedicels of florets ·2–·25 in. long, bracteoles minute or obsolete. *Calyx* puberulous, campanulate, ·05 in. long, teeth short acute. *Corolla* pale-yellow or white, ·2 in. long, tube infundibuliform, teeth lanceolate half as long; uniformly sparingly silky. *Stamens* united in a tube nearly as long as that of corolla, filaments white or faintly tinged with pink, ·5 in. long. *Ovary* puberulous, shortly stalked. *Pod* spirally twisted, 7–8 in. long, ·7 in. wide, dehiscing along the lower suture, valves firmly coriaceous, red opposite the seeds elsewhere orange and puberulous externally, red and glabrous within; distinctly sinuate between the seeds on the lower margin, stipe very short. *Seeds* 8–10, ovate-oblong, ·5 in. long, ·35 in. wide, 2 in. thick, testa dark-purple, dull, thin, crustaceous. Miq. Flor. Ind. Bat. I, 34; Bak. in Flor. Brit. Ind. II, 306. *Mimosa heterophylla* Roxb. Hort. Beng. 40; Flor. Ind. II, 545. *Inga acutangula* Grah. in Wall. Cat. 5271. *Pithecolobium acutangulum* Miq. Flor. Ind Bat. Suppl. 282.

Andamans; very common. Nicobars; *King's Collector!* Penang; *Wallich* 5270 C! *Curtis* 489! Malacca; *Derry* 552! 971! *Maingay* 569! Perak; *Scortechini! Wray* 1102! Selangor; *Kunstler* 8669! Singapore; *Hullett* 802! *Ridley* 5576! 6407! *Goodenough* 289! Distrib. Eastern Himalaya, Assam, Burma, Sumatra.

A rather variable species, with two leading types, hardly, however, to be distinguished even as varieties owing to the number of intermediate forms that occur. Of these, (α.) *heterophylla*—the original plant of Roxburgh with large terminal leaflets—extends from the Himalaya to Chittagong, the Andamans and Sumatra. This is very uniform in character and constitutes both *Inga acutangula* Grah. (*Wall. Cat.* 5271), and *Pithecolobium acutangulum* Miq., although it happens that Miquel when describing *P. acutangulum* conceived it to be different from *Inga acutangula*. The other plant, (β.) *intermedia*—with smaller terminal leaflets and usually more numerous pinnæ and leaflets—extends from Upper Burma east of the Irrawaday though the Shan Plateau to Tenasserim, the Malay Peninsula and Java. This is less uniform than the preceding and often has leaflets so like those of *P. Clypearia* that it can only be safely distinguished by its longer pedicels and sessile glands. This is the plant of *Wall. Cat.* 5270 C, from Penang, and is the *Pithecolobium angulatum* of Miquel as opposed to that author's *P. acutangulum*. *P. angulatum* Benth., like *P. angulatum* as defined in this paper, includes both plants.

Order XXXIX. ROSACEÆ.

Herbs, shrubs or trees. *Leaves* stipulate, rarely opposite, simple or compound. *Flowers* usually bisexual and regular (very irregular in *Chrysobalaneæ*). *Calyx-tube* free or adnate to the ovary, limb usually

5-lobed, often bracteolate, imbricate or valvate. *Petals* 5, or 0, inserted under the margin of the disc, deciduous, usually imbricate. *Disc* lining the calyx-tube or forming a ring at its base. *Stamens* perigynous, indefinite (rarely 1, 5 or 10) in one or many series, often connate and unilateral in *Chrysobalaneæ*; filaments subulate or filiform, usually incurved in bud; authers small, didymous. *Ovary* of one or more free or connate carpels, with free or connate basal lateral or subterminal styles; stigmas simple, penicillate or capitate; ovules 1 or more in each carpel. *Fruit* variable, consisting of achenes or berries or drupes, rarely capsular. *Seeds* erect or pendulous, testa membranous or coriaceous, albumen 0; cotyledons large, plano-convex; radicle short.—Distrib. About 1,200 species, found in all climates and countries, but chiefly in the temperate.

Of the ten tribes into which this order is subdivided by Messrs. Bentham and Hooker in their *Genera Plantarum*, only four are (as yet) represented by specimens from the Provinces within our area, and these four tribes are represented by only six genera which Sir Joseph Hooker (in his Flora of British India) distinguishes as follows:—

Tribe I. Chrysobalaneæ. *Flowers* usually irregular. *Carpel* 1; style basal; ovules 2, ascending. *Fruit* a drupe. *Radicle* inferior.—Trees or shrubs with simple quite entire leaves.

Calyx-tube elongate. Stamens many, united in a phalange. Ovary 2-locellate	1.	Parinarium.
Calyx-tube short. Stamens 2. Ovary 1-celled	2.	Parastemon.

Tribe II. Pruneæ. *Flowers* regular. *Carpel* 1, rarely 2; style subterminal, rarely basal; ovules 2, pendulous. *Radicle* superior.—Trees or shrubs with simple usually serrated leaves.

Calyx 5-lobed. Petals 5, large, glabrous. *Carpel* solitary, fruit drupaceous	3.	Prunus.
Calyx 5–10-toothed. *Petals* 5 and minute, or absent. *Carpel* 1. *Drupe* coriaceous, usually elongated transversely ...	4.	Pygeum.

Tribe III. Rubeæ. *Flowers* regular. *Calyx* ebracteolate. *Stamens* very numerous. *Carpels* many; styles sub-basal or ventral; ovules 2, collateral, pendulous. *Fruit* of many dry or fleshy carpels, not included in the calyx-tube. *Radicle* superior.—Usually shrubs, often with compound leaves ... ... 5. Rubus.

Tribe IV. Pomeæ. *Flowers* regular. *Calyx-tube* (or the apex of the peduncle) becoming fleshy after flowering, and enclosing the carpels. *Stamens* numerous. *Ovules* 2 or more, ascending. *Fruit* a pome or berry, with 2–5 bony or coriaceous 1-seeded stones; shrubs or trees ... ... 6. Pyrus.

1. Parinarium, Juss.

Trees. *Leaves* simple, alternate, evergreen, quite entire. *Flowers* hermaphrodite, in panicles or corymbose racemes, 2-bracteolate, white or pink. *Calyx-tube* oblong, campanulate, turbinate, or funnel-shaped;

lobes 5, thick, subequal, imbricate. *Petals* 5, sessile or clawed, deciduous. *Stamens* 6–30, the filaments united into an incomplete ring at the base, or connate into an unilateral bundle, all perfect or some without anthers. *Carpel* 1, adnate to one side of the calyx-tube, 2-celled, rarely 2-seeded; style basal, filiform; ovules 2 collateral, or 1 erect. *Drupe* spherical, oblong, obovoid or ovoid, with a 1–2-celled, 1–2-seeded, woody or bony or rarely coriaceous pericarp. *Seeds* erect, testa membranous, cotyledons large fleshy, radicle small inferior. DISTRIB. About 50 species, natives of the tropics of both worlds.

Calyx-tube villous inside. Fruit 2-celled, more than ·5 in. long; the pericarp woody, bony or crustaceous.
- Leaves rusty-grey or dirty white beneath, with numerous spreading parallel stout nerves; stamens 8–10, not united in a phalange.
  - Leaves with 10–12 pairs of main nerves, rusty-pubescent beneath ... ... 1. *P. costatum.*
  - Leaves with 15–18 pairs of main nerves, pale, areolate and puberulous beneath ... ... 2. *P. polyneurum.*
  - Leaves with 25–30 pairs of main nerves, pale, obliquely areolar and puberulous on the nerves beneath... 3. *P. oblongifolium.*
- Leaves glabrous beneath or with only a few strigose hairs on the midrib near its base; main nerves 10–16 pairs, always spreading.
  - Flowers in spikes, sessile, solitary.
    - Stamens about 10; fruit about 1 in. in diam. ... 4. *P. spicatum.*
    - Stamens 12–16; fruit several inches in diam. ... 5. *P. Maingayi.*
  - Flowers in racemes or panicles.
    - Leaves subsessile with broad bases; main nerves 12–14 pairs; fruit ovoid, not compressed ... 6. *P. elatum.*
    - Leaves distinctly petiolate.
      - Leaves oblong-lanceolate, narrowed at the base; stamens 10 ... ... 7. *P. asperulum.*
      - Leaves elliptic-oblong, broad at the base; stamens 12–16 ... ... 8. *P. scabrum.*

Leaves quite glabrous on both surfaces; main nerves 5–7 (rarely 10) pairs, obliquely ascending, never spreading.
- Flowers straight; petals subequal.
  - Main nerves of leaves 6 or 7 pairs; fruit covered with crustaceous scurf, its cells glabrous inside ... 9. *P. Kunstleri.*
  - Main nerves 7–10 pairs; fruit quite glabrous, its cells sericeous inside ... ... 10. *P. Griffithianum.*
- Flowers much curved; sepals and petals very unequal 11. *P. heteropetalum.*

Calyx-tube glabrous and lined by the glabrous staminal tube; fruit less than ·5 in. long, quite glabrous; the pericarp thin, leathery... ... ... 12. *P.? nitidum.*

1. PARINARIUM COSTATUM, Blume Mel. Bot. (1855) Pt. I. A small tree; young branches slender, deciduously puberulous, the bark pale

and minutely lenticellate. *Leaves* coriaceous, ovate-elliptic or ovate-lanceolate, shortly and obtusely acuminate, the base rounded or cuneate; upper surface glabrous and shining except the pubescent midrib, the lower pale brown when dry, reticulate and covered, except the 10 or 12 pairs of conspicuous slightly ascending glabrous main nerves, with a thin layer of cobwebby hair; length 1·5–3 in., breadth ·75–1·25 in.; petiole ·25 in., pubescent. *Panicles* axillary, longer than the leaves, with a few distant short few-flowered branches, tawny-tomentose. *Flowers* nearly ·25 in. long, on short pedicels, solitary or in cymes of three. *Calyx-tube* densely puberulous outside, internally with a line of subulate processes at the throat and a broad belt of deflexed silky hair, the ovate lobes shorter than the tube. *Petals* thin, obovate, clawed, longer than the calyx-lobes, sparsely pubescent. *Stamens* about 8, half of them anantherous, the filaments villous. *Pistil* 1, the ovary villous. *Fruit* oblong, blunt, slightly compressed, with many pale scurfy patches, slightly more than 1 in. long and ·65 in. broad. Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 354; Hook. fil. Fl. Br. Ind. II, 311 (excl. syn. *P. sumatranum*, Benth. and Kurz's *Petrocarpa sumatrana*); Jack Mal. Misc. II, VII, 67. *Elæocarpus? punctatus*, Wall. Cat. 2676.

Malacca; *Maingay* 621, 621/2. Penang; *Curtis* 259, 2163. Perak; *King's Collector* 5227. Singapore; *Ridley* 398.

2. Parinarium polyneurum, Miq. Fl. Ind. Bat. Suppl. 306. A tree 60 to 100 feet high; young branches slender, pale brown, profusely lenticellate, puberulous. *Leaves* coriaceous, oblong or ovate-oblong, rather bluntly acuminate; the base rounded, eglandular; upper surface glabrous, shining; the lower pale, areolate, puberulous; main nerves 15 to 18 pairs, spreading, prominent beneath; length 3 to 5 in., breadth 1·35 to 2 in. *Panicles* axillary and solitary, or terminal and in clusters of 2–4, rather shorter than the leaves when in flower, longer in fruit, hoary-tomentose; the branches short, rather crowded, the ultimate branchlets cymosely 3-flowered; bract shorter than the calyx-tube, oblong, obliquely acute, tomentose. *Flowers* ·25 in. long, on very short pedicels. *Calyx* infundibuliform, tomentose outside, deflexed-villous inside; the lobes lanceolate, acuminate, pubescent on the inner face. *Petals* as long as the calyx-lobes, oblong, slightly dilated upwards, obtuse, not clawed at the base, glabrous. *Stamens* 10, shorter than the petals, all bearing anthers. *Ovary* sericeous. *Style* glabrous. *Fruit* oblong, compressed, obtuse, slightly tapered to the base, covered with a dense layer of tawny scurf, about 2 in. long when ripe and 1·2 in. across, 2-celled; pericarp crustaceous, very hard, ·25 in. thick.

Malacca; *Griffith*, *Maingay* 622. Perak; *King's Collector* 4624, 6087. Distrib. Sumatra.

3. Parinarium oblongifolium Hook. fil. Fl. Br. Ind. II, 309. A tree 50–70 feet high; young branches lenticellate, deciduously puberulous. *Leaves* very coriaceous, oblong- or oblong-elliptic, the apex subacute, the base rounded; upper surface glabrous and shining, the lower pale with oblique areolae, puberulous on the nerves and midrib; main nerves 25–30 pairs, stout, oblique, rather straight; length 5·5–8·5 in., breadth 1·85–3 in.; petiole ·35–·65 in., stout. *Panicles* axillary and terminal, solitary, many-flowered, spreading, minutely tawny-tomentose, 3–6 in. across. *Flowers* ·2 in. long, on very short pedicels; bracts ovate-rotund, concave, acute, tomentose. *Calyx-tube* infundibuliform, subgibbous, minutely tomentose outside, deflexed-villous inside, lobes broadly ovate, acute. *Petals* not longer than the calyx-lobes, spathulate, glabrous. *Stamens* 8, about as long as the petals. *Ovary* villous; style sparsely pubescent. *Fruit* elliptic-ovoid, obtuse, compressed, densely coated with grey hard scurf, 2·75 in. long and 1·5 in. in diam.

Malacca; *Griffith, Maingay* 623. Pahang; *Ridley* 5026. Perak; *King's Collector* 10369, 10422.

A species readily distinguished by its large oblong fruit, large leaves with numerous parallel nerves prominent on the lower surface, and small flowers with the stamens and petals not longer than the calyx-lobes. It approaches *P. sumatranum*, Miq. in its leaves, but the under-surface in that species is uniformly and minutely tomentose, whereas in this the under surface has very peculiar oblique areolae and there is no tomentum. The fruits of the two differ also in size.

4. Parinarium spicatum, King, n. sp. A tree 60 to 80 feet high; branches slender, dark-coloured, puberulous. *Leaves* coriaceous, elliptic-ovate, shortly and broadly acuminate, the base rounded but slightly produced along the sides of the upper half of the petiole; both surfaces reticulate when dry; the upper glabrous, shining; the lower slightly dull and paler, minutely pustulate, glabrous except the sparsely strigose midrib; main nerves about 12 pairs, spreading, faint; length 2–3 in., breadth ·85–1·6 in., petiole ·1 in. *Spikes* axillary and terminal, about as long as the leaves, in clusters of 2 or 3, everywhere tawny-pubescent with many adpressed hairs intermixed. *Flowers* ·5 in. long, solitary, rather distant, sessile, bibracteate at the base; the bracts much shorter than the flower, oblong, subacute, tomentose. *Calyx-tube* narrowly funnel-shaped, slightly gibbous, tomentose outside, deflexed-villous in its upper part inside; its lobes broadly oblong, obtuse, deflexed. *Petals* longer than the calyx-lobes, broadly elliptic, very obtuse, glabrous. *Stamens* about 10, longer than the petals, shorter than the pistil; the filaments glabrous, united at the very base. *Ovary* sericeous; style sparsely hairy in its lower half, otherwise glabrous. *Fruit* about 1 in. in diam., suborbicular, slightly compressed, densely covered with a yellowish crustaceous scurf, 2-celled; the pericarp ·2 in. thick, tomentose inside.

Perak; *King's Collector* 6145, 10326.

This approaches *P. costatum*, Bl. in the shape and nervation of its leaves; but is distinguished from that species by its spicate inflorescence and solitary flowers. Its fruit also is more orbicular than that of *P. costatum*.

5. Parinarium Maingayi, King n. spec. A tree; young branches with dark bark bearing a few oblong lenticels, glabrous. *Leaves* very coriaceous, elliptic-oblong, very shortly and obtusely acuminate, the base rounded; both surfaces glabrous and with minutely papillate reticulations, the upper shining, the lower dull and rather pale; main nerves 10–12 pairs, spreading, curving, rather prominent beneath; length 3–4·5 in., breadth 1·35–2 in.; petiole ·3 in., stout. *Spikes* usually in pairs, axillary, shorter than the leaves, pedunculate, minutely tomentose. *Flowers* sessile, ·3 in. long, or (to the apex of the stamens) ·6 in.; bracts shorter than the calyx-tube, broadly ovate-obtuse, tomentose. *Calyx-tube* infundibuliform, tomentose outside, deflexed-villous inside; the lobes short, broad, rounded very obtuse. *Petals* longer than the calyx-lobes, obovate, sessile, glaberulous. *Stamens* 12–16, much longer than the petals, decurved. *Ovary* densely wooly; style long, slender. *Drupe* spherical, the size of a small apple (Hooker); the pericarp thick and bony, smooth on the inner surface, furrowed on one side. *Seed* large, with a thin testa. *P. asperulum*, Hook. fil. in Fl. Br. Ind. II, 310 (*not of Miq.*)

Malacca; *Maingay* 618, and probably also *Griffith* 2049.

This in some respects resembles *P. asperulum* and *P. scabrum*, but differs from both in its much larger fruit and sessile flowers, and from the former also in the venation of its leaves.

6. Parinarium elatum, King n. spec. A tree 60–120 feet high; young branches as thick as a quill, blackish-cinereous, lenticellate. *Leaves* thickly coriaceous, subsessile, elliptic to ovate-elliptic, acute or shortly acuminate; the base broad, rounded or minutely cordate; upper surface glabrous, shining, the main nerves and midrib slightly prominent; lower surface darker and duller than the upper when dry, glabrous except a few strigose hairs at the base of the very prominent midrib; the 12–14 pairs of spreading curved main nerves very prominent; length 4·5–7·5 in., breadth 1·5–3·25 in.; petiole only about ·15 in., strigose. *Panicles* axillary, solitary or several together, shorter than the leaves, with few short rather distant branches, or unbranched, minutely tomentose, few-flowered; bracts 2 at the base of each flower, slightly shorter than the calyx-tube, elliptic, acute, adpressed-pubescent. *Calyx-tube* funnel-shaped, adpressed-tomentose outside, deflexed-villous inside at the mouth; the lobes unequal, nearly as long as the tube, broadly ovate, subacute, very tomentose on both surfaces. *Petals* longer and

more narrowed than the calyx-lobes, subacute, glabrous. *Stamens* longer than the petals, glabrous. *Ovary* sericeous, the style glabrous in its upper half. *Fruit* ovoid, not compressed, crustaceous-scurfy outside, pale-brown, 2-celled, 1·15 in. long and ·8 in. in diam.; the pericarp crustaceous, ·2 in. thick, minutely hairy inside.

Perak; *King's Collector*, 3436, 3711.

A species resembling *P. oblongifolium*, Hook. fil. in its leaves which however have fewer nerves; but differing greatly from that species both in its inflorescence and flowers.

7. Parinarium asperulum, Miq. Fl. Ind. Bat. Suppl. 307. A tree 50–80 feet high; young branches slender, with dark-coloured bark and a few scanty deciduous pale flexuous hairs. *Leaves* thinly coriaceous, oblong-lanceolate, tapering gradually to the obtusely acuminate apex; the blade narrowed slightly to the base and continued along the sides of the upper half of the short petiole; both surfaces glabrous and with minute pitted papillæ, the lower paler and more reticulate; main nerves 10–16 pairs, faint, spreading; length 3–5·5 in., breadth 1–1·65 in., petiole ·25 in. *Racemes* or panicles axillary or terminal, solitary, half as long as the leaves, minutely tomentose; the flowers about ·3 in. long, (·6 in. to the apex of the exserted stamens); the pedicels ·1 in. long; bracts at the base of the flower 2, obtuse, tomentose. *Calyx* densely tomentose; the tube clavate, deflexed-pilose inside; the lobes broadly ovate, subacute, imbricate. *Petals* longer than the calyx-lobes, obovate-oblong, not clawed, glabrous. *Stamens* about 10; the filaments glabrous, united at the base. *Ovary* densely and the style sparsely villous. *Fruit* sub-ovoid, compressed, very obtuse, with a vertical groove along the two sides, minutely rugulose and densely covered with hard pale-brown scurf, nearly 1 in. long and ·6 in. broad, 2-celled; pericarp thick, bony, hairy inside.

Penang; *Curtis*, 203. Pahang; *Ridley*, 2603. Perak; *King's Collector*, 3537, 7568. Distrib. Sumatra.

There is an original and authentic specimen of *P. asperulum* in the Calcutta Herbarium collected by Teysmann in Sumatra, and it agrees absolutely with the Penang and Perak specimens above quoted. The species is near to *P. scabrum*, Hassk., but has fewer stamens and smaller and differently shaped leaves. The ripe fruit is also presumably much smaller, for specimens of unripe fruit of *P. scabrum* are as large as specimens of ripe fruit of this species.

8. Parinarium scabrum, Hassk. Cat. Hort. Bot. Bogor. (1844), 269. A tall tree; young branches dark-coloured and with a few scattered hairs. *Leaves* coriaceous, elliptic-oblong, shortly and bluntly acuminate; the base broad, rounded or very slightly cuneate, eglandular; both surfaces glabrous, shining, strongly but minutely reticulate, and with numerous small perforate-topped papillæ especially on the reticulations; main

nerves 13–15 pairs, slender, spreading, with a few shorter intermediate; length 4–6 in., breadth 1·75–2·75 in., petiole ·2 in. *Panicles* (sometimes reduced to racemes) axillary and terminal, often two or three together, much shorter than the leaves, adpressed-pubescent; the flowers not numerous, collected near the ends of the branches; bracts oblong, obtuse, pubescent, shorter than the calyx-tube. *Flowers* (from the point of insertion) ·5 or ·6 in. long; the calyx-tube merged in the pedicel, clavate, pubescent outside, deflexed-villous inside. *Calyx-lobes* ovate-rotund, undulate, subacute, imbricate, minutely tomentose on both surfaces. *Petals* larger than the calyx-lobes, obovate, clawed, glabrescent. *Stamens* 12–16; the filaments united at the base into a tube open at one side, much curved, deflexed. *Ovary* lanate, 2-celled. *Style* sparsely pubescent, shorter than the stamens. *Fruit* ovoid, obtuse, slightly compressed, vertically grooved, rough and covered with pale scurf; pericarp bony, thick, 2-celled, the cells pubescent, 1 in. long and ·6 in. broad (not ripe). Hassk. in Flora (1844), p. 585. Miq. Fl. Ind. Bat. Vol. I, pt. I, 354 t. V.

PERAK; *Scortechini* 1981.

Only once collected in Perak. This species is very closely allied to *P. glaberrimum*, Hassk. and I greatly doubt whether the two should be kept separate. The latter species is described at great length by Hasskarl in the volume of Flora for 1844, p. 533; but I have seen only one authentic specimen, and that consists only of leaves. *P. scabrum*, on the other hand, is described by Hasskarl in nine words: but of it there are in the Calcutta Herbarium several excellent authentic flowering specimens. And with these Scortechini's specimens numbered 1981 agree absolutely.

9. PARINARIUM KUNSTLERI, King n. spec. A tree 50–80 feet high; young branches slender, cinereous, glabrous. *Leaves* coriaceous, oblong-lanceolate, tapering from about the middle to each end, the apex acuminate; the base acute, eglandular; both surfaces glabrous and rather dull, the lower with wide slightly conspicuous reticulations and minute papillæ; main nerves 6 or 7 pairs, curving upwards, only slightly conspicuous on the lower surface; length 3·25–4·5 in., breadth 1·15–1·65 in., petiole ·25–·3 in.,; lobes of the *calyx* oblong, obtuse, tomentose on both surfaces. *Petals* longer than the calyx-lobes, obtuse, glabrous. *Stamens* about 20 or 30, glabrous; the filaments united by their bases, longer than the petals. *Style* as long as the stamens, villous. *Fruit* oblong, ovoid, slightly compressed, obtuse, tapering slightly to the base, 1·25 in. long and about ·9 in. broad, 2-celled, densely covered with pale-brown crustaceous scurf; pericarp crustaceous, smooth inside.

PERAK; *King's Collector* 3715, 3745, 6917.

I have seen no specimens of this in flower. The description of the parts of the flower above given has been taken from withered remains found persisting at the base of some of the ripe fruits. In its leaves this resembles *P. asperulum*,

Miq., but there are only 6 or 7 pairs of nerves as against 10–16 pairs in that species. The fruits of this are moreover slightly larger and much more globular, and the interior of the cells is glabrous; whereas in those of *P. asperulum* the cells are hairy inside.

10. PARINARIUM GRIFFITHIANUM, Benth. in Hook. Niger Flora, 334. A large tree (Curtis); young branches rather stout, with dark lenticellate bark. *Leaves* coriaceous, oblong-lanceolate or elliptic-lanceolate, caudate-acuminate, narrowed at the base to the short petiole; both surfaces glabrous, the upper very polished, the lower duller; main nerves 7–10 pairs, curving upwards, faint; length 3·5–6 in., breadth 1·2–2·25 in., petiole ·25–·35 in. *Panicles* axillary and terminal, pedunculate, longer than the leaves, pyramidal, nearly glabrous, the branches sparsely-flowered; bracts, if any, deciduous (not seen). *Flowers* ·5 in. long, on short pedicels. *Calyx-tube* narrowly funnel-shaped, hoary-pubescent, the lobes rotund. *Petals* broadly oblong, concave, subglabrous, about as long as the calyx-lobes. *Stamens* 20–30; the filaments longer than the petals, united at the base into a short tube. *Ovary* very tomentose; the style longer than the stamens, glabrous. *Fruit* narrowly ellipsoid or slightly obovoid, blunt, glabrous, 2-celled, about 1·5 in. long and ·75 in. in diam.; pericarp crustaceous, ·15 in. thick, lined with dense silky pubescence. Hook. fil. Fl. Br. Ind. II, 310. *P. multiflorum*, Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 356. *Maranthes multiflora*, Korth. Verh. Nat. Gesch. Bot. 259, t. 70.

MALACCA; *Griffith* 2047/2; *Maingay* 620. PAHANG; *Ridley* 1354. KEDAH; *Curtis*. SINGAPORE; *Ridley* 4792. PENANG; *Curtis* 1514, 2416.

Griffith's specimen 2047/2, which is the type of the species, has more polished leaves and an opener panicle than the other specimens quoted above. But I can detect no difference in the flowers. Griffith's specimen has no fruit, and the whole material is imperfect. It may turn out that there are really two species included under *P. Griffithianum*.

11. PARINARIUM HETEROPETALUM, Scortechini MSS. A tree 60–80 feet high; young branches rather slender and with rather rough cinereous glabrous bark. *Leaves* coriaceous, eglandular, oblong-lanceolate, tapering from the middle to both ends, the apex acuminate, the base acute; both surfaces glabrous, rather dull when dry, the lower very minutely punctate; main nerves faint on both surfaces, 5 or 6 pairs, oblique, ascending; length 3·5–4·5 in., breadth 1–1·6 in., petiole ·35 in., stout. *Panicles* axillary and terminal, about one-third to one-half as long as the leaves, with short branches, everywhere rusty-pubescent; bract at the base of the flowers solitary, lanceolate, tomentose. *Flowers* ·5 in. long, sessile. *Calyx-tube* curved, narrowly tubular below the bend and suddenly expanded above it; the lobes thick, concave, reflexed, unequal, from oblong to suborbicular or obovate, everywhere pubescent

or tomentose, the hairs inside the tube not deflexed. *Petals* 5, pink, glabrous, longer than the calyx-lobes, very unequal; the two posterior erect, broadly elliptic, concave, clawed; the three anterior narrowly oblong, revolute, imbricate, flat. *Stamens* 25–30, in a single semi-tubular phalange, as long as the petals, glabrous; the anthers small. *Ovary* villous, 2-celled. *Style* curved, longer than the stamens, villous in the lower, glabrous in the upper half. *Fruit* unknown.

Perak; *Scortechini*, 240, 2040. *King's Collector*, 664, 6899.

A species easily recognised by its curved flowers and very unequal sepals and petals.

12. Parinarium? nitidum, Hook. fil. Fl. Br. Ind. II, 310. A tree 15–40 feet high; young branches very slender, with pale-brown glabrous shining bark. *Leaves* elliptic to elliptic-lanceolate, shortly and bluntly acuminate, the blade much narrowed to the base and continued along the sides of the upper half of the petiole; both surfaces quite glabrous, the upper very shining; the lower slightly dull, paler, almost glaucous when young; main nerves 7–9 pairs, ascending, faint; length 2·25–3·5, rarely 4 in., breadth ·8–1·75, rarely 2 or 2·5 in.; petiole below the winged part ·1–·2 in. *Panicles* slightly shorter or longer than the leaves, hoary-tomentose, axillary and terminal, with short sub-horizontal cymosely 3-flowered branches; bracts oblong, shorter than the flowers, broadly ovate, acute, concave. *Flowers* ·15 in. long and about the same in width at the mouth, subsessile. *Calyx* widely funnel-shaped, the lobes broadly triangular, acute; the exterior hoary-tomentose; the interior lined by the subglabrous tube formed by dilated bases of the filaments, and with a thickened hairy process on the side opposite the 8–10 anthers. *Petals* longer than the calyx-lobes, oblong-obtuse, incurved. *Ovary* densely sericeous, the style short. *Fruit* obovoid-rotund, glabrous, 1-celled, ·35 in. long and about ·25 in. in diam.; the pericarp thin, leathery, densely woolly inside.

Malacca; *Griffith* 2047/1, *Maingay* 619. *Derry* 189, 1180. Perak; *King's Collector* 8599, 8680, 8711. Penang; *Curtis* 147, 853; *King's Collector* 1274, 1472.

Very few of the specimens which I have seen of this have fruit, and of these not one has a seed. When the material has been fully completed by the receipt of seeds, I think a new genus might with advantage be formed for this plant; for it differs from the other species of *Parinarium* here described in having a cushion-like process in its calyx-tube the other parts of which are lined by the tube formed by the lower part of the dilated filaments. It also has a small 1-celled fruit with a thin leathery pericarp.

2. Parastemon, A. DC.

A shrub or small tree. *Leaves* simple, alternate, evergreen, quite

entire. *Flowers* polygamo-dioecious, minute, racemose, minutely bracteolate. *Calyx-tube* shortly campanulate; lobes 5, imbricate. *Petals* 5, (or 6), oblong, deciduous. *Stamens* 2 perfect unilateral, and several imperfect. *Carpel* 1, adnate to one side of the calyx-tube, 1-celled; style basilar; ovules 2, erect. *Fruit* oblong, coriaceous, 1-celled, 1-seeded, indehiscent. *Seed* solitary, erect; testa membranous, pubescent; cotyledons fleshy, radicle inferior, plumule hairy.

Parastemon urophyllum, A. DC. in Ann. Sc. Nat. Ser. 2. XVIII, 208. A tall tree with pendulous habit, young branches very slender, glabrous. *Leaves* coriaceous, ovate-lanceolate to lanceolate, sometimes slightly oblanceolate, obtusely caudate-acuminate, the base much narrowed; both surfaces glabrous, the lower minutely lepidote; main nerves very faint, 4–6 pairs, oblique, the intermediate almost as distinct; length 2·5–3 in., breadth ·85–1·5 in., petiole ·25 in. *Racemes* nearly as long as the leaves, slender, axillary, glabrous, usually solitary but sometimes 2 together. *Flowers* ·15 in. long to the apex of the stamens, on short pedicels each with a minute concave ovate bracteole at its base. *Fruit* cylindric, tapering a little to each end, glabrous, ·45 in. long, and ·25 in. in diam.

In all the provinces, except the Andamans.

3. Prunus, Linn.

Shrubs or trees. *Leaves* alternate, simple, quite entire, or serrate or crenate or glandular-serrulate; petiole often 2-glandular. *Flowers* white or red, solitary, fascicled, corymbose or racemed. *Calyx* deciduous in fruit; lobes 5, imbricate. *Petals* 5. *Stamens* 15–60, perigynous, inserted in the mouth of the calyx-tube, filaments free. *Carpel* 1; style terminal; ovules 2, collateral, pendulous. *Drupe* with an indehiscent or 2-valved, 1-seeded, smooth, or rugged stone. *Seed* pendulous, testa membranous or coriaceous, albumen scanty or 0. Distrib. N. temp. regions, rare in the tropics; species about 80.

Prunus martabanica, Kurz For. Flora Burma, I, 434. A tree 40–60 feet high; all parts, except the inflorescence, quite glabrous; young branches rather slender, lenticellate. *Leaves* membranous, elliptic-oblong to ovate-oblong, acuminate, suddenly slightly and often unequally narrowed to the base, with minute black dots on the lower surface; main nerves 5–7 pairs, spreading, very faint; length 3–6 in., breadth 1·65–2·5 in.; petiole ·4–·75 in., eglandular. *Racemes* solitary or in pairs, from the axils of fallen leaves and about as long as the leaves, pubescent. *Flowers* rather distant, about ·35 in. in diam. on puberulous pedicels ·3–·35 in. long. *Calyx-tube* campanulate, tomentose; the lobes erect, ovate, subacute. *Petals* orbicular, about ·1 in. long, deciduous.

Stamens 60–80. *Ovary* ovoid, glabrous, the style much longer than the stamens, the stigma dilated. *Drupe* cylindric, with a pointed apex and rounded base, glabrous, 1–1·25 in. long; pericarp thin, woody, smooth inside. *Seed* minutely hairy. Hook. fil. Fl. Br. Ind. II, 316. *Cerasus? martabanica*, Wall. Cat. 4902.

ANDAMAN ISLANDS; *Kurz, King's Collectors.* DISTRIB. Burma.

VAR. *Scortechinii*, King, bases of leaves rounded, main nerves 9-12 pairs; racemes less than half the length of the leaves; flowers ·25 in. in diam.; stamens 30–40, fruit about ·6 in. long.

PERAK; *Scortechini* 1782; *King's Collector* 5638.

This variety may possibly prove to be a distinct species. Although differing from the Andamanese and Burmese specimens in the points noted above, the Perak specimens have the same general *facies*.

4. PYGEUM, Gærtn.

Evergreen trees or shrubs. *Leaves* alternate, usually quite entire; stipules minute, fugacious, (large and persistent in one species) basal glands 2 or 0. *Flowers* small, racemose or paniculate, sometimes unisexual by want of the ovary. *Calyx-tube* obconic urceolate or campanulate, deciduous; limb 5–15-toothed, often unequally. *Petals* minute, 5–6 in the 5–6-toothed calyx, 0 in the 10–15-toothed, villous or tomentose, rarely glabrous, often undistinguishable from the calyx-lobes. *Stamens* 10–50, in one or more series at the orifice of the calyx-tube; filaments slender, incurved; anthers small. *Carpel* 1, basal in the calyx-tube, ovoid or subglobose; style terminal, slender, exserted from the bud, stigma capitate; ovules 2, collateral, pendulous. *Fruit* a transversely oblong, obscurely didymous, rarely subglobose drupe; pericarp thin, dry or juicy. *Cotyledons* very thick, hemispheric; radicle minute, superior. DISTRIB. Species about 30, tropical Asiatic and one African.

Edges of leaves entire:—
- Stipules large and persistent ... 1. *P. stipulaceum.*
- Stipules small and fugaceous:—
  - Flowers ·5 in. in diam. ... 2. *P. grandiflorum.*
  - Flowers much less than ·5 in. in diam.:—
    - Ovary glabrous:—
      - Racemes not much longer than the petioles:—
        - Leaves 4 or 5 in. long and 2 in. broad, lower surface puberulous; main nerves 7 pairs ... 3. *P. intermedium.*
        - Leaves 1·5–2 in. long and ·65–1·1 in. broad, lower surface deciduously pubescent and rugulose beneath; main nerves 4–6 pairs ... 4. *P. Maingayi.*
        - Leaves 3–3·5 in. long, 1–1·4 in. broad, glabrous beneath and subglaucous; main nerves 4 or 5 pairs ... 5. *P. lanceolatum.*

Racemes 2 or 3 inches long :—
Flowers ·15 in. long, 6-merous, stamens 30; leaves with 6 or 7 pairs of nerves, their apices much tapered ... ... 6. *P. acuminatum.*
Flowers ·25 in. long, 5-merous; stamens 40 or 50; leaves with 7–10 pairs of nerves, their apices slightly and obtusely acuminate ... ... 7. *P. polystachyum.*
Ovary villous or hirsute :—
Racemes much longer than the petioles (from ·75–1·5 in. long) :—
Leaves glabrous on the lower surface ... 8. *P. Scortechinii.*
Leaves rugulose, the lower surface glabrous except for a few scattered adpressed hairs ... 9. *P. persimile.*
Leaves with short adpressed hairs on the lower surface, not glabrous or rugulose ... ... 10. *P. parviflorum.*
Racemes very little longer than the petioles :—
Lower surfaces of leaves with short adpressed hairs; bases of leaves cuneate, their apices caudate-acuminate ... ... 10. *P. parviflorum*, VAR. *densa.*
Lower surfaces of leaves minutely pubescent with adpressed bristles intermixed with the hairs; bases of leaves rounded, their apices obtuse and emarginate ... ... 11. *P. ovalifolium.*
Lower surfaces of leaves minutely rusty-pubescent, the hairs partly deciduous; leaves with rounded bases and acuminate apices ... 12. *P. Hookerianum*
Leaves glabrous on the under surface ... 13. *P. brevifolium.*
Edges of leaves sinuate-dentate ... ... 14. *P. Griffithii.*

1. PYGEUM STIPULACEUM, King n. sp. A tree; young branches stout, densely rusty-tomentose. *Leaves* very coriaceous, broadly elliptic, acute, the base broad and slightly cordate, the edges revolute; upper surface glabrous, the nerves and midrib deeply depressed, the latter pubescent; lower surface rusty-pubescent especially on the midrib, main and transverse nerves; main-nerves 10–12 pairs, spreading, curving upwards; length 5–7 in., breadth 2·5–3·75 in., petiole ·5 in., very stout and densely rusty-tomentose; stipules persistent, broadly ovate, or caudate, acute, boldly ribbed, puberulous, persistent. *Racemes* in fascicles from the branches below the leaves, 1·25–2 in. long, rusty-tomentose; bracts broadly elliptic, concave, tomentose outside, glabrous inside. *Flowers* ·15 in. long, on pedicels about as long as themselves. *Calyx-tube* campanulate, with 10 short obtuse teeth, tomentose outside. *Petals* 0. *Stamens* about 15, exserted, glabrous. *Pistil* longer than the stamens; ovary villous; style stout, erect, subglabrous; stigma capitate, discoid. *Fruit* unknown.

PERAK; *Scortechini* 11020.*

2. Pygeum grandiflorum, King n. spec. A tree 50–70 feet high; all parts, except the inflorescence, glabrous; young branches rather stout. *Leaves* thinly coriaceous, elliptic to oblong-elliptic, sometimes slightly obovate, with an abrupt short blunt point; the base cuneate, eglandular; upper surface shining, smooth, the lower less shining and minutely pustulate; main nerves 8 or 9 pairs, spreading but curving upwards, prominent on the lower surface; length 5–8 in., breadth 2·75–3·5 in., petiole ·75 in. *Panicles* solitary, axillary, nearly as long as the leaves, with a few lax corymbose branches, almost glabrous below, rusty-tomentose towards the apex; bracts broadly ovate, concave, blunt, puberulous. *Flowers* ·5 in. across, on pedicels ·15 in. long; bracteoles near the apex of the pedicels 1 or 2, minute. *Calyx-tube* widely campanulate, short, with 5 broad blunt subreniform lobes tomentose outside. *Petals* 5, much larger than the calyx-teeth (·2 in. long), subrotund to broadly oblong, blunt, reflexed. *Stamens* very numerous, glabrous. *Pistil* slightly longer than the stamens, the ovary pubescent, style puberulous; stigma small, capitate. *Fruit* unknown.

Perak; *King's Collector* 7425.

A very distinct species with large glabrous leaves, and larger flowers than any here described.

3. Pygeum intermedium, King n. spec. A tree 30–40 feet high; young branches dark-coloured, lenticellate, subglabrous. *Leaves* coriaceous, broadly elliptic to oblong-elliptic, the apex acute or shortly acuminate, the base rounded or slightly cuneate; upper surface minutely punctulate, not shining when dry, glabrous except the broad, depressed, pubescent midrib; lower surface puberulous, pubescent on the nerves and midrib; main-nerves 7 pairs, oblique, curved, prominent beneath; length 4–5 in., breadth about 2 in., petiole ·35 in. *Racemes* about ·5 in. long, from the axils of fallen leaves, solitary or several together, densely tawny-tomentose; bracts shorter than the very short pedicels, ovate-obtuse, concave. *Flowers* less than ·15 in. long. *Calyx-tube* widely infundibuliform, with 6 oblong blunt hairy teeth. *Petals* none. *Stamens* about 20, glabrous, exserted. *Pistils* as long as the stamens, glabrous; stigma capitate. *Fruit* subglobular, compressed, crowned by the style, glabrous, ·3 in. long and about ·2 in. thick.

Malacca; *Maingay* 626. Perak; *King's Collector* 3791.

4. Pygeum Maingayi, Hook. fil. Fl. Br. Ind. II, 319. A tree; young branches slender, with dark-coloured glabrous bark. *Leaves* coriaceous, elliptic-lanceolate, acuminate, with slightly cuneate rather broad bases and often with 2 small glands a little above the petiole; the upper surface glabrous, smooth but not shining (when dry); the lower dark-brown in colour and rugulose, deciduously pubescent; main-nerves

4-6 pairs, spreading, curving upwards, rather prominent on the lower, obsolete on the upper surface; length 1·5–2 in., breadth ·65–1·1 in., petiole ·2 in. *Racemes* axillary and extra-axillary, about as long as the petioles, rusty-tomentose; bracts solitary at the base of the pedicels, ovate-acute, concave, tomentose outside, glabrous inside. *Flowers* ·15 in. in diam., on pedicels shorter than themselves. *Calyx-tube* funnel-shaped, its mouth with 6 obtuse villous teeth. *Petals* none. *Stamens* about 16, glabrous, much exserted. *Ovary* small, often abortive; style slender, glabrous. *Fruit* transversely oblong with a sharp mucronate apex, ·25 in. long, and ·35 in. broad.

Malacca; *Maingay* 625. Perak; *King's Collector* 5336; *Scortechini* 217.

This species comes very near *P. lanceolatum*, Hook. fil. It has, however, no petals, whereas *P. lanceolatum* has. The leaves of this in the young state are moreover pubescent, while those of the latter are glabrous at all stages.

5. Pygeum lanceolatum, Hook. fil. Fl. Br. Ind. II, 319. A tree 30 or 40 feet high; young branches slender, dark-coloured, adpressed-puberulous. *Leaves* thinly coriaceous, elliptic-lanceolate, obtusely acuminate; the base cuneate, with 2 narrow glands just above it; both surfaces glabrous, the lower subglaucous and with a few adpressed hairs on the main nerves and midrib; main nerves 4 or 5 pairs, curved, ascending, slightly prominent and dark-coloured on the lower surface; length 3–3·5 in., breadth 1–1·4 in., petiole ·25–·3 in. *Racemes* only about ·5 in. long, axillary and extra-axillary, tomentose; the bracteole at the base of each pedicel sub-orbicular, acute, glabrous inside. *Flowers* on pedicels as long as themselves, ·15 in. in diam. *Calyx-tube* widely campanulate, tomentose externally, glabrous inside and with 10 broad short teeth. *Petals* (if any) deciduous. *Stamens* about 20, much exserted. *Ovary* glabrous, compressed; *style* stout, glabrous, longer than the petals; stigma compressed. *Fruit* transversely oblong, with a slight vertical groove, glabrous, ·3 in. long, and ·4 in. broad, 2-seeded.

Singapore; *Lobb* 328. Penang; *Curtis* 216, 735.

The racemes of this are often very short, almost sessile, and subglobular. It is a very distinct species. I have not been able to discover any petals.

6. Pygeum acuminatum, Colebr. in Trans. Linn. Soc. XII, 360, t. 18. A tall tree; young branches cinereous, glabrous, rough. *Leaves* coriaceous, elliptic to elliptic-oblong, shortly and obtusely caudate-acuminate; the base rounded or slightly cuneate and unequal, often with 1 or 2 obscure glands; upper surface glabrous, shining, the midrib and nerves depressed; lower surface brown when dry, subrugulose, glabrous, dull; main nerves 6 or 7 pairs, curving upwards, prominent (almost winged)

beneath; length 4–6·5 in., breadth 1·75–3·25 in., petiole ·35–·5 in. *Racemes* from the axils of fallen leaves, solitary or several together, 2 or 3 inches long, slender, tawny-pubescent. *Flowers* ·15 in. long, on pedicels ·1 in. long; bracts narrowly oblong, sub-acute, very deciduous. *Calyx-tube* broadly campanulate, ·15 in. wide at the mouth; teeth about 6, narrowly lanceolate. *Petals* 6, oblanceolate, obtuse, sericeous outside. *Stamens* about 30, long-exserted, glabrous. *Pistil* as long as the stamens; ovary glabrous; style slender, straight; stigma discoid-capitate. *Fruit* transversely oblong, slightly compressed, minutely apiculate, glabrous, but slightly rough, ·5 in. long and ·8 in. broad.

Andaman Islands. Distrib. Burma, Chittagong, Assam Range, Eastern Tropical Himalaya.

7. Pygeum polystachyum, Hook. fil. Fl. Br. Ind. I, 320. A tree 30–60 feet high; young branches with dark-coloured glabrous lenticellate bark. *Leaves* very coriaceous, elliptic-oblong, usually with an abrupt obtusely acuminate apex; the base broad or slightly and suddenly cuneate and with 2 large thick glands on its upper surface just above the petiole; upper surface glabrous, shining, pale greenish-brown when dry; the lower brown when dry, dull, minutely rugulose, glabrous; main nerves 7–10 pairs, oblique, rather straight, depressed on the upper and prominent on the lower surface; length 4·5–7 in., breadth 2·5–4 in., petiole ·5 in., stout. *Racemes* (occasionally racemoid panicles) axillary, shorter than the leaves, slender, covered with short scanty rusty pubescence. *Flowers* about ·2 in. long and ·25 in. in diam., on pedicels varying from ·1–·2 in. long; bracts (if any) deciduous. *Calyx-tube* campanulate, ribbed and tomentose externally, glabrescent within; lobes 5, oblong, obtuse, rufous-tomentose. *Petals* 5, like the calyx-lobes. *Stamens* 40–50, much exserted. *Ovary* glabrous; style as long as the stamens, glabrous; stigma dilated, compressed laterally. *Drupe* sub-globular or transversely oblong, bluntly apiculate, ·65 in. long and from ·6–·75 in. broad, glabrous. *Seeds* glaucous.

Malacca; *Maingay* 627. Singapore; *Ridley* 3830, 4453, 4666. Perak; *Scortechini* 2045, 2063. *King's Collector* 5676, 6603, 5676, 6847, 10942; *Wray* 3113, 3384.

This species is very near *P. acuminatum*, Colebr., of which I believe it to be probably only a southern form.

8. Pygeum Scortechinii, King n. sp. A slender tree 40–50 feet high; young branches puberulous, the bark dark-coloured. *Leaves* coriaceous, elliptic to oblong-lanceolate, acute or shortly acuminate; the base cuneate, eglandular; upper surface shining, glabrous except for occasionally a few scattered hairs on the depressed midrib near its base; lower surface pale, not shining, glabrous, minutely rugulose; main nerves

6 or 7 pairs, slender, spreading; length 2–3 in., breadth ·8–1·35 in., petiole ·25–·35 in. *Racemes* solitary, axillary, 1–1·25 in. long, coarsely adpressed rusty-pubescent, bracts (if any) deciduous. *Flowers* ·15 in. long, their pedicels ·1 in. *Calyx-tube* narrowly campanulate, with 6 oblong subacute hirsute lobes. *Petals* none. *Stamens* about 12, exserted. *Pistil* shorter than the stamens, ovary with long white hairs; style glabrescent. *Fruit* transversely oblong, glabrous, minutely pubescent, ·3 in. long and ·4 in. broad.

Perak; *Scortechini* 357.

9. Pygeum persimile, Kurz in Journ. As. Soc. Bengal Vol. XLI, 306. A tree; young branches slender, deciduously rusty-pubescent. *Leaves* thinly coriaceous, elliptic to elliptic-lanceolate, shortly and obtusely acuminate; the base rounded or slightly cuneate, eglandular; upper surface glabrous or glabrescent, very minutely punctate, dull, the midrib coarsely pubescent; lower surface brown, rugulose, with few scattered adpressed bristles, the nerves (but especially the midrib) strigose-pubescent; main nerves 7 or 8 pairs, spreading, very prominent (almost winged) on the lower surface; length 2·5–4 in., breadth 1·3–1·6 in.; petiole ·25–·3 in., slender, pubescent. *Racemes* usually in fascicles of 2 or 3 (sometimes united near the base), rarely solitary, from above the scars of fallen leaves, ·75–1·75 in. long, densely tawny-tomentose; bracts broadly ovate, acute or obtuse, longer than the pedicels. *Flowers* ·1 in. long and ·15 in. wide at the mouth, their pedicels less than ·1 in. *Calyx-tube* campanulate, tomentose outside, glabrous inside, the mouth with 6 distant obtuse teeth. *Petals* none. *Stamens* about 12 or 18, glabrous, spreading, exserted. *Pistil* erect, as long as the stamens, the ovary tawny-sericeous; the style glabrous above, sericeous below; stigma obliquely discoid. *Fruit* transversely oblong, with a deep vertical groove, scarcely apiculate, glabrous except for a few adpressed hairs in the groove, ·25 in. long and ·35 in. broad. Kurz For. Flora Burma, I, 436; Hook. fil. Fl. Br. Ind. II, 320.

Malacca; *Griffith.* Singapore; *Ridley* 4452.

Mr. Kurz inadvertently referred to this Griffith's No. 2056 from Tenasserim which he says is closely allied to *P. Lampongum*, Miq. In my own opinion Griffith's No. 2056 *is* P. *Lampongum*. Kurz's description of his *P. persimile* exactly agrees with Griffithian specimens from Malacca (without any number), and on some of these he has written the name *P. persimile* with his own hand. This species must therefore henceforth be considered as Malayan and not as Burmese.

10. Pygeum parviflorum, Teysm. & Binn. in Nat. Tijds. Ned. Ind. II, 309. A tree 50–70 feet high; young branches dark-coloured, minutely rusty-pubescent. *Leaves* coriaceous, elliptic to elliptic-oblong, shortly caudate-acuminate, the base cuneate, upper surface shining,

glabrous except sometimes the midrib pubescent; lower surface with sparse short adpressed hairs, the midrib and main nerves pubescent; main nerves 5 or 6 pairs, oblique, not curved, very prominent on the lower, faint on the upper surface; length 2·5–3·5 in., breadth 1·5–2 in., petiole ·3–·4 in. *Racemes* from ·85–1·5 in. long, solitary or several together from the axils of fallen leaves, tomentose; bracts broad, obtuse, tomentose, (subglabrous in VAR. *densa*). *Flowers* ·1 in. long, sub-sessile. *Calyx-tube* campanulate, with 6 obtuse short villous teeth. *Stamens* about 18, exserted, glabrous. *Pistil* as long as the stamens, ovary villous. *Style* sparsely pubescent especially towards the base; stigma capitate, discoid, grooved. *Fruit* slightly broader than long, compressed, sparsely adpressed-pubescent, subglabrous when old, ·25 in. long and ·3 in. broad. Miq. Flor. Ind. Bat. Vol. I, pt. I, 361; Hook. fil. Fl. Br. Ind. II, 320. *P. arboreum*, Endl. Gen. Pl. 1250, *in part*. *Polydontia arborea*, Blume Bijdr. 1105. *Polystorthia*, Blume Fl. Javae Praef. VIII, in part.

MALACCA; *Ridley* 1872. PENANG; *Curtis* 162. PERAK; *King's Collector* 7236, and 10827; *Curtis* 1293. DISTRIB. Java, Borneo.

VAR. *densa*; racemes not much longer than the petioles, the flowers much crowded and quite sessile, densely covered with pale tomentum; bracts very broad, subglabrous.

PERAK; *King's Collector* 6986, 10195, 10396, 10753.

It is possible that this variety ought to be treated as a species.

11. PYGEUM OVALIFOLIUM, King n. spec. A small tree 15–20 feet high; young branches with rather rough cinereous bark, deciduously rusty-pubescent. *Leaves* oval or broadly ovate; the apex obtuse, obliquely and minutely emarginate; the base rounded and eglandular; upper surface shining, minutely punctate and rugulose, the midrib convex and rusty-pubescent; lower surface dull, minutely pubescent, with adpressed bristles intermixed, the midrib tomentose; main nerves 7 or 8 pairs, spreading, slightly depressed on the upper and slightly prominent on the lower surface when dry; length 1·75–2·15 in., breadth 1–1·5 in., petiole ·3–·4 in. *Racemes* axillary, stout, from 3–5in. long, few-flowered, densely rusty-tomentose; bracts obliquely ovate, very concave, glabrous inside, densely tomentose outside. *Flowers* ·2 in. long, and ·3 in. wide at the mouth, sessile. *Calyx-tube* campanulate, densely tomentose outside, glabrous inside except at the base; the mouth with 10 oblong obtuse teeth. *Petals* none. *Stamens* about 30 or 40, glabrous, much exserted, spreading. *Pistil* shorter than the stamens; the ovary narrowly ovoid, sericeous; style stout, subglabrous; stigma obliquely discoid. *Fruit* subglobose with a slight vertical groove and shortly apiculate apex, sparsely strigose, ·35 in. in diam.

PERAK; at an elevation of about 5000 feet, *King's Collector* 7329.

12. Pygeum Hookerianum, King n. spec. A shrub or small tree; young branches dark-coloured, glabrous. *Leaves* thinly coriaceous, more or less broadly ovate, sometimes ovate-oblong, shortly acuminate, the base broad and rounded or sometimes slightly narrowed to the petiole; upper surface glabrous, the lower minutely rusty-pubescent especially on the midrib and nerves, the hairs partially deciduous; main nerves 6 or 7 pairs, spreading, slightly oblique, interarching rather far from the edge; length 2–4 in., breadth 1–1·8 in., petiole ·25 in. *Racemes* axillary and extra-axillary, sometimes crowded, usually less than ·5 in. long, densely rufous-tomentose. *Flowers* ·2 in. in diam., on very short pedicels each with a broadly ovate concave bracteole at its base. *Calyx-tube* tomentose outside, glabrous inside, widely campanulate, with 6 obtuse teeth. *Petals* 6, about as long as the calyx-teeth, lanceolate, pubescent externally. *Stamens* from the mouth of the calyx-tube, about 20, glabrous, much exserted. *Ovary* sericeous; style longer than the stamens, puberulous, stigma obliquely discoid. *Fruit* sub-globular, 1-seeded and ·25 in. in diam., or transversely elongate with a shallow vertical groove and often 2-seeded, ·25 in. long and ·4 in. broad, always glabrous and slightly apiculate, black or dark purple; seed when ripe covered with white down.

Perak; *Scortechini* 1234; *Wray* 3969; *King's Collector* 1970, 2083, 2753, 4789, 6425.

To this species I believe belongs No. 628 of the Maingay Herbarium referred to by Sir Joseph Hooker in a note on p. 322, Vol. II of the *Flora of British India*, but left undescribed by him for want of sufficiently good material.

13. Pygeum brevifolium, Hook. fil. Fl. Br. Ind. II, 321. A shrub 3 or 4 feet high; young branches dark-coloured, glabrous. *Leaves* coriaceous, broadly oblong, shortly and obtusely acuminate, sometimes minutely emarginate, both surfaces quite glabrous; the upper olivaceous brown, the lower brown; main nerves 4 or 5 pairs, spreading and interarching, faint beneath; length 2–2·5 in., breadth 1·1–1·3 in., petiole ·25–·3 in. *Racemes* axillary, only about ·3 in. long, sub-globose, tomentose, 6–10-flowered, bracts small. *Calyx-tube* urceolate, with 5 or 6 obtuse unequal teeth. *Petals* none. *Stamens* 10–16, filaments short. *Ovary* villous; style rather short, glabrous. *Fruit* unknown.

Malacca; Summit of Mount Ophir, *Griffith* 2051.

14. Pygeum Griffithii, Hook. fil. Fl. Br. Ind. II, 322. A tree? Young branches stout, densely tomentose. *Leaves* coriaceous, oblong or oblong-lanceolate, obtuse or obtusely cuspidate; the edges ciliate and obscurely sinuate-toothed; the base rounded or acute, with 2 small basal glands; both surfaces very minutely dotted; the upper glabrous, the midrib and main nerves impressed and puberulous; lower

surface minutely puberulous; main nerves 8–10 pairs, spreading, interarching; length 5 or 6 in; petiole ·2 in., very stout. *Racemes* axillary, solitary, stout, ·5 in. long, few-flowered, densely tomentose. *Flowers* sessile. *Calyx-tube* obconic, with 6 oblong teeth. *Petals* none. *Stamens* 12. *Ovary* globose, hairy. *Fruit* unknown.

MALACCA; *Griffith* 2050.

This species is very imperfectly known, the only specimens of it being Griffith's which are quite fragmentary. The above description is taken entirely from Sir Joseph Hooker, who in turn took the description of the flowers from Griffith's MSS. It may be distinguished by its sinuate-toothed leaves.

5. RUBUS, Linn.

Sub-erect or sarmentose shrubs, always prickly. *Leaves* alternate, simple or compound; stipules free or adnate to the petiole. *Flowers* in terminal and axillary corymbose panicles, rarely solitary, white or red. *Calyx-tube* broad; lobes 5, persistent. *Petals* 5. *Stamens* many. *Disc* lining the calyx-tube. *Carpels* many, on a convex receptacle; style subterminal; ovules 2, collateral, pendulous. *Drupes* many, 1-seeded, crowded upon a dry or spongy conical or cylindric receptacle. *Seed* pendulous. DISTRIB. Abundant in the northern hemisphere, rare in the southern; species about 200.

Leaves simple:—	
Leaves palmately 5–7-lobed; terminal panicle shorter than the leaves; young branches tomentose, woolly or villous.	1. *R. moluccanus.*
Leaves ovate or ovate-triangular, with 2 or 4 shallow lobes at the base only; terminal panicle as long as the leaves; young branches with thin cobwebby pubescence.	2. *R. glomeratus.*
Leaves broadly ovate, not lobed; terminal panicle much longer than the leaves; young branches puberulous at first but speedily glabrous	3. *R. elongatus.*
Leaves pinnate	4. *R. rosæfolius.*

1. RUBUS MOLUCCANUS, Linn. Spec. Pl. 707. A powerful subscandent shrub; the young branches, under surfaces of the leaves and inflorescence densely tawny or rusty-tomentose, villous or woolly; prickles short (·1 in. or less) and recurved on the branches, petioles and lower surfaces of the midribs, often absent on the main nerves. *Leaves* coriaceous, usually broader than long, broadly ovate or orbicular, deeply cordate; palmately 5–7-lobed, the lobes often lobulate; 2–10 in. in diam., the petioles 1–2·5 in. long; upper surfaces of leaves rugulose, sparsely hispid, the edges irregularly dentate or serrate. *Stipules* varying in size, oblong, toothed, pinnatifid or laciniate. *Panicles* axillary and terminal, much shorter than the leaves, few-flowered. *Flowers* from ·5–1 in. in diam., bracts like the stipules not with glandular hairs. *Calyx-*

lobes ·2–·4 in. long, more or less triangular, sometimes deeply toothed. *Petals* obovate, white, shorter than the calyx-lobes; ovaries numerous, glabrous. *Fruit* globose, succulent, the individual carpels red, the receptacle hairy. Roxb. Flor. Ind. II, 518; Miq. Flor. Ind. Bat. I, part 1, 382; Wall. Cat 743; Kurz For. Flor. Brit. Burm. I, 437. *R. rugosus*, Smith in Rees Cyc. XXX, Rubus 34; Don Prodr. 234; Wight et Arn. Prodr. 299; Dalz. & Gibs. Bomb. Flor. 89; Thwaites' Enum. 101; Wight Ic. t. 225; Wall. Cat. 748. *Rubus Hamiltonianus*, Wall. Plant. As. Rar. III, 19, t. 234. *R. micropetalus, R. macrocarpus, and R. Fairholmianus*, Gardner in Calc. Journ. Nat. Hist. VIII, 6. *R. cordifolius*, Don Prodr. 233. *R. reflexus*, Ker in Bot. Reg. 461; Benth. Hong-Kong Flor. 104. *R. Hamiltonianus*, Seringe in DC. Prodr. II, 566. Rumph. Amboin. V, 88, t. 47, f. 2.

In all the Provinces except the Andaman and Nicobar Islands; common on the hilly parts. Distrib. British India, Malayan Archipelago.

Var. *alcæifolia*; pubescence very soft and velvety, leaves 4·5–10 in. in diam., prickles often ·2 or ·25 in. long, stipules and bracts pectinate, terminal panicle often 6 in. long, calyx-teeth spreading. *R. alcæifolius*, Poir. Encycl. VI, 247; Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 379.

Perak; elevation 2000 feet, *Wray* 1463. Distrib. Malay Archipelago.

2. Rubus glomeratus, Blume Bijdr. 1111. A semi-scandent shrub; young branches slender, with pale deciduous cobwebby pubescence. *Leaves* thinly coriaceous, ovate or ovate-triangular, with 2–4 shallow lobes near the cordate base only, the upper half tapering to the acuminate apex, not lobed, the edges everywhere dentate; upper surface glabrous except the pale-pubescent midrib and sometimes the nerves, minutely rugulose; lower surface minutely rusty- or tawny-tomentose or sparsely pubescent, reticulate; length 3–4 in., breadth 1·75–2·5 in.; petiole 1–1·5 in. long, with minute prickles which extend sometimes to the midrib. *Stipules* ovate, pinnatifid, deciduous. *Panicles* axillary and shorter than the leaves, or terminal and as long as the leaves, few-flowered, tawny-tomentose. *Flowers* ·35 in. in diam. *Calyx-lobes* triangular, entire, acute, tomentose. *Petals* as long as the calyx-lobes, obovate. *Carpels* of the fruit numerous, red. *R. Hasskarlii*, Miq. Flor. Ind. Bat. Vol. I, Pt. 1, 381. *R. acerifolius*, Wall. Cat. 744.

Penang; Singapore; Perak. Distrib. Malay Archipelago.

Var. *gracilis*, King; terminal panicles twice as long as the leaves; pedicels of the flowers ·4–·6 in. long.

In its long terminal panicles this variety resembles *R. elongatus*, but the flowers have longer pedicels; moreover the venation of the leaves is quite that of *R. glomeratus*.

3. Rubus elongatus, Smith Icon. Ined. III, t. 62. A scandent

shrub; young branches at first pubescent but speedily glabrous, the bark dark-coloured and with minute deflexed prickles. *Leaves* coriaceous, broadly ovate, deeply cordate at the base, the apex acute; the edges sinuate and remotely dentate, not lobed; upper surface smooth, glabrous except the pubescent midrib; under surface pale, and (except 3 or 4 on the midrib) without prickles; the nerves and veins glabrous and chestnut brown, the areolæ minutely pale-tomentose; length 3·5–5·5 in., breadth 2·5–3·5 in., petiole 1·35–2 in., with a few small prickles. *Stipules* ovate, pinnatifid, deciduous. *Panicles* pubescent and with small scattered prickles, a few axillary and shorter than or as long as the leaves; the terminal one much longer than the leaves (often 15 in. long) with distant branches; the flowers mostly clustered at their extremities, subsessile or shortly pedicelled, ·3 in. in diam. *Calyx-lobes* triangular, blunt, tawny-tomentose. *Fruit* with numerous red carpels. DC. Prodr. II, 567; Blume Bijdr. 1112. *R. Lobbianus*, Hook. Ic. Pl. t. 741–742.

Perak; *Wray* 421, 1849; *King's Collector* 3465, 5732; *Scortechini* 1468. Distrib. Sumatra.

4. Rubus rosaefolius, Smith Ic. Ined. III, t. 60. A subscandent woody shrub; branches, petioles leaf-rachises and inflorescence with long stiff usually glandular hairs, with shorter softer hairs intermixed and a few sharp polished hooked spines. *Leaves* pinnate, 2–5 in. long; leaflets 3–7, membranous, lanceolate or ovate-lanceolate, unequally incised-serrate, rarely with 1 or 2 basal lobes, the apex acuminate, the base rounded; upper surface sparsely strigose, the midrib and nerves villous; lower surface less strigose than the upper, minutely reticulate, never white or glaucous; length of leaflets 1–3 in., breadth ·35–1·2 in.; petiolules of the lateral leaflets ·1–·2 in., those of the terminal ones ·5–1 in. *Stipules* linear-lanceolate, acuminate. *Flowers* ·75–1 in. in diam., on pedicels much longer than themselves, solitary or in lax few-flowered panicles. *Calyx-lobes* lanceolate, acuminate, not prickly, woolly or glabrous. *Petals* usually larger than the calyx-lobes, broadly obovate, white. *Fruit* elongated, rarely subglobose, the numerous red carpels on a glabrous receptacle. Roxb. Flor. Ind. II, 518; Wall. Cat. 728; Kurz For. Flora Brit. Burm. I, 439; Hook. Ic. Pl. t. 349; Hook. fil. Fl Br. Ind. II, 341. *R. pinnatus*, Willd. *R. asper*, Don Prodr. 234; Wall. Cat. 741.

Perak; at 3900 feet. *Wray*, at 4500 feet, No. 4187. Distrib. British India, Java.

6. Pyrus, Linn.

Trees or shrubs. *Leaves* deciduous, simple or pinnate; stipules deciduous. *Flowers* white red or pink, in terminal cymes or corymbs; bracts subulate or linear. *Calyx-tube* urceolate turbinate or obconic,

lobes 5, erect or reflexed, persistent or deciduous. *Petals* 5, quincuncially imbricate in bud. *Stamens* 20 or more, filaments sometimes connate at the base. *Disc* annular, or lining the calyx-tube. *Carpels* 2–5, connate and adnate to the calyx-tube; styles 2–5, free or connate below, stigmas truncate; ovules 2 in each cell, basal, collateral, ascending. *Fruit* (a pome) fleshy, 2–5-celled; cells with a membranous or cartilaginous often 2-valved endocarp, 1–2-seeded. *Seeds* when in pairs plano-convex, testa coriaceous; cotyledons amygdaloid. Distrib. N. temp. and cold regions; species about 100.

Pyrus granulosa, Bertol. in Mem. Acad. Sc. Bolog. Ser. II, IV, 312. A small glabrous tree. *Leaves* coriaceous, ovate, usually acuminate, the base cuneate or rounded, the edges serrate or sinuate-serrate; upper surface shining, the lower dull-brown when dry; main nerves 7–9 pairs, prominent on the lower surface, oblique. *Fruits* globose-pyriform, minutely rugulose, glabrous, the calyx-lobes not persistent, ·75 in. long and ·6 in. in diam., 4-celled, in lax terminal glabrous corymbs longer than the leaves; fruit pedicels from ·4–1·5 in. long, endocarp of large granules. Hook. fil. Fl. Br. Ind. II, 378. *P. sikkimensis*, Wenzig in Linnæa, 1874, 58, *in part*; Kurz For. Flor. Brit. Burm. I, 442. *P. Karensium*, Kurz in Journ. As. Soc. Beng. 1872, II, 306; 1873, II, 232.

Perak; at an elevation of 2000–2500 feet; *Scortechini*. Distrib. Burma; Khasia Mountains; Sumatra, *Forbes* 2050! 2376.

Order XL. SAXIFRAGACEÆ.

Trees shrubs or herbs. *Leaves* alternate and exstipulate, or stipules adnate to the base of the petiole, or opposite and exstipulate. *Inflorescence* various; flowers hermaphrodite or polygamo-dicœcious; the sepals, petals and stamens symmetrically regular. *Calyx* more or less adnate to the ovary, sometimes nearly free, sometimes quite inferior; lobes imbricate or valvate. *Petals* 5 or 4, rarely 0, perigynous or epigynous, rarely sub-hypogynous, imbricate or valvate. *Stamens* inserted with the petals, equalling or double their number, rarely numerous. *Ovary* of 2 or 3–5 united carpels; usually 2- or 3–5-celled with axile placentas, occasionally 1-celled with parietal placentas; styles as many as the carpels, distinct or combined nearly to the summits, stigmas capitate or lateral and subcapitate; ovules numerous, anatropous, erect or pendulous. *Fruit* capsular or berried. *Seeds* numerous or several (solitary in *Polyosma*) albuminous; the albumen rarely scanty or nearly wanting. Distrib. Species 580; in the cold or temperate regions of the whole world and in the mountains of the tropics; together with a few genera of tropical trees.

A sub-herbaceous shrub, with simple exstipulate leaves, and succulent fruits with numerous small seeds	1. Dichroa.
Woody shrubs or trees with pinnate (rarely simple) stipulate leaves; fruits small, dry, capsular, dehiscent, 2-celled; seeds few hairy	2. Weinmannia.
Trees or large woody shrubs with simple leaves, 4-merous flowers, and dry fruit with a single large smooth seed ...	3. Polyosma.

1. Dichroa, Lour.

A sub-herbaceous shrub. *Leaves* opposite, more or less serrate, lanceolate, persitent, exstipulate. *Panicle* terminal. *Calyx-tube* adnate to the ovary; limb 5–6-toothed. *Petals* 5 or 6, thick, valvate, blue or purplish. *Stamens* 10 or 12, epigynous. *Ovary* $\frac{3}{4}$-inferior, 1-celled; styles 3–5; ovules numerous, on 3–5 parietal placentas formed by the inflexed margins of the carpels. *Berry* $\frac{3}{4}$-inferior, blue. *Seeds* numerous, small, obovoid; testa with large reticulations.

Dichroa febrifuga, Lour. Fl. Cochinch, 301. A shrub 3–6 feet high; branches terete, nearly glabrous. *Leaves* membranous, caudate-acuminate, the base cuneate, the edges more or less distinctly serrate in the upper three-fourths, entire in the lower fourth; main nerves 8 or 9 pairs, ascending; length 4–5 in., breadth 1·4–1·8 in.; petioles unequal, from ·6–1·75 in. *Panicles* adpressed-pubescent. Hook. fil. Fl. Br. Ind. II, 406; Benth. Fl. Hongk. 128; Maxim. in Mem. Acad. Petersb. X 16, p. 2. *D. cyanitis* and *D. latifolia*, Miq. Fl. Ind. Bat. I, 721, 722. *Adamia versicolor*, Fortune in Journ. Hort. Soc. I, 298; Lindl. & Paxt. Fl. Gard. I, t. 5. *A. cyanea*, Wall. Cat. 441; Tent. Fl. Nep. t. 36; Pl. As. Rar. t. 213; Bot. Mag. t. 3046; DC. Prodr. IV, 16; H. f. & T. in Journ. Linn. Soc. II, 76. *A. chinensis*, Gardn. & Champ. in Kew Journ. Bot. I, 311. *Cyanitis sylvatica*, Reinw. in Blume Bijd. 921; DC. Prodr. IV, 16.

Perak; on the Central Range; *Scortechini* 266. Distrib. On the higher parts of the Malayan Archipelago; China; Philippines; Temperate Himalaya from Bhotan to Nepal; Khasia Mountains.

2. Weinmannia, Linn.

Trees or shrubs, usually with terete opposite branches. *Leaves* stipulate, opposite, coriaceous, unequally pinnate, 3-foliolate or simple, leaflets usually glandular-serrate. *Flowers* hermaphrodite or polygamo-dioecious. *Calyx-tube* short, the lobes 4 or 5, imbricate, persistent or deciduous. *Petals* 4 or 5, sessile, imbricate, spathulate or obovate, inserted under the lobed margin of the perigynous disc. *Stamens* 8 or 10, inserted with the petals, the filaments often elongated and exserted; the anthers small, 2-celled. *Ovary* free, ovoid or conical, 2-celled, 2-beaked;

styles 2, subulate, persistent, the stigmas simple. *Capsule* small, coriaceous, 2-celled, septicidally 2-valved, the valves boat-shaped, few- or many-seeded. *Seeds* oblong, reniform or subglobose; the testa membranous, often hairy. *Embryo* terete, in the axis, or towards the apex, of the fleshy albumen. Distrib. Species about 80; Malayan, Mascarene, Australasian, and American.

Weinmannia Blumei, Planch. in Hook. Lond. Journ. Bot. Vol. 6, (1847), p. 470. A small tree; young branches with sparse black stiff hairs and many lenticels. *Stipules* obovate-rotund, adpressed-pubescent, ·2 in. in diam. *Leaves* 2–3·5 in. long, pinnate; leaflets 9–11, opposite, sessile, narrowly oblong-lanceolate with acute apices and slightly narrowed and oblique bases, their edges remotely glandular-serrate, the upper surfaces glabrous, the lower glabrous but for a very few scattered black hairs; main nerves 6 or 7 pairs, dark-coloured; length ·75–1 in., the terminal one longer, breadth ·2–·3 in. *Racemes* clustered at the apices of the branches, about as long as the leaves, puberulous, many-flowered. *Flowers* less than 1 in. long, their pedicels shorter. *Capsules* narrowly elliptic, glaberulous, crowned by the 2 divergent styles. *Seeds* elongated, very comose at one end, less so at the other. Miq. Fl. Ind. Bat. Vol. I, pt. 1, 718. *Spiræa pinnata*, Blume, Cat. Hort. Bot. Bogor. *Arnoldia pinnata*, Blume Bijdr., 868.

Malacca; on Mount Ophir, *Griffith*. Perak; on Gunong Bubu, at an elevation of 5000 feet, *Wray* 3814; on Gunong Idjau at 5000 feet, *Scortechini* 446.

3. Polyosma, Blume.

Evergreen trees or shrubs. *Leaves* opposite or subopposite, petioled, acute or acuminate. *Flowers* in terminal racemes (in some non-Indian species solitary) 3-bracteolate. *Calyx-tube* entirely adnate to the ovary; lobes 4, small, persistent. *Petals* 4, epigynous, linear, valvate, white, yellowish or greenish, much recurved when expanded, fugacious, usually hairy within. *Stamens* 4, epigynous, filaments hairy. *Ovary* inferior, 1-celled; style columnar, stigma simple; ovules numerous, ascending, on two parietal placentas which project considerably into the cavity of the ovary. *Fruit* sub-baccate, 1-seeded. *Seed* ascending, subbasal. Distrib. Species 18; Malayan, British Indian and tropical Australasian.

Leaves quite glabrous on both surfaces:—
Leaves sharply sinuate-dentate, membranous; flowers ·2 in. long ... ... 1. *P. parviflora.*
Leaves quite entire, coriaceous, flowers ·3 or ·35 in. long:—
Leaves elliptic to elliptic-rotund, or obovate; calyx strigose ... ... 2. *P. coriacea.*

Leaves oblong or oblong-lanceolate, calyx nearly glabrous 3. *P. Scortechinii.*
Leaves glabrous on the upper surface, the midrib and nerves, often with the intervening spaces on the lower surface also adpressed-pubescent :—
Fruit truncate at the base and with 4 deep vertical grooves; flowers not more than ·3 in. long; leaves entire ... 4. *P. mutabilis.*
Fruit not truncate at the base and not vertically ridged :—
Fruit subglobular; flowers ·35 in. long; leaves entire ... 5. *P. fragrans.*
Fruit ovoid, tapering at the base; flowers ·45 in. long; leaves entire or remotely serrate ... ... 6. *P. integrifolia.*
Leaves glabrous on the upper surface, the lower surface always in the young leaves, and usually in adult leaves covered with dense yellowish tomentum :—
Fruit sub-globular, not ridged, ·25 in. long ... ... 7. *P. læte-virens.*
Fruit ovoid with a truncate base, and with 4 deep vertical ridges, ·4 in. long ... ... 8. *P. velutina.*

Imperfectly known species near *P. velutina*, Bl. ... ... 9. *P. Ridleyi.*

1. Polyosma parviflora, King n. spec. A small tree; young branches slender, glabrous. *Leaves* membranous, narrowly elliptic, shortly caudate-acuminate, the edges sinuate-dentate in the upper three-fourths, entire in the lower fourth, the base cuneate; both surfaces glabrous, dull and dark-coloured when dry, the lower slightly paler than the upper; main nerves 10–12 pairs, sub-horizontal, slightly prominent on the lower surface only; length 2·5–3·25 in., breadth 1–1·5 in.; petiole ·3–·5 in., sparsely pubescent, channelled. *Racemes* terminal, shorter than the leaves, puberulous. *Flowers* ·2 in. long, their pedicels ·05 in., adpressed-pubescent; the bracteoles linear, longer than the pedicel. *Calyx-tube* narrow, nearly glabrous, the mouth with triangular acuminate teeth. *Petals* only twice as long as the calyx, linear, obtuse, pubescent externally, longer than the anthers. *Fruit* flask-shaped, the apex crowned by the calyx-teeth and the pointed base of the style, the base rounded and slightly gibbous, glabrous, ·5 in. long, and ·3 in. in diam.

Perak; on Gunong Inas, at 5000 feet, *Wray* 4143.

A species somewhat resembling *P. ilicifolia*, Blume in the shape of its leaves; but having much shorter racemes and smaller flowers, and an almost glabrous calyx.

2. Polyosma coriacea, King n. spec. A shrub or small tree; young branches glabrous, sparsely lenticellate. *Leaves* coriaceous, elliptic to elliptic-rotund, rarely sub-obovate, the apex acute or shortly acuminate, the edges entire and slightly revolute when dry, the base cuneate; both surfaces glabrous, the upper shining, the lower dull and paler; main nerves 9–11 pairs, spreading, interarching freely, slightly prominent on the lower surface only; length 2·75–4 in., breadth 1·5–2 in., petiole about ·75 in. *Racemes* terminal, about as long as or longer than

the leaves, sparsely adpressed-pubescent. *Flowers* ·35 in. long; their pedicels ·1 in., bearing 3 unequal linear-acuminate strigose bracteoles. *Calyx-tube* shorter than the pedicel, slightly constricted under the mouth; the teeth triangular, acute, strigose like the tube. *Petals* much longer than the calyx and slightly longer than the stamens, linear, obtuse, minutely strigose outside, sub-villous inside. *Fruit* (very young) ovoid, glabrous, crowned by the calyx-teeth.

Perak; on Gunong Bubu at an elevation of 5000 feet; *Scortechini* 805; *Wray* 3819, 3855, 4131. Ridley's 5219 from Kedah Peak possibly belongs to this species. Its leaves, however, are thinner, and their nerves more distinct.

3. Polyosma Scortechinii, King n. spec. A medium-sized tree (*fide* Scortechini); young branches slender, with pale almost polished bark, all parts except the inflorescence glabrous. *Leaves* coriaceous, oblong or oblong-lanceolate, sometimes oblanceolate, acute, much narrowed to the base; the edges entire, slightly revolute when dry; both surfaces shining, glabrous, except sometimes a few hairs on the midrib beneath; main nerves 10–12 pairs, spreading, interarching, faint on both surfaces; length 4–6·5 in., breadth 1·5–2 in., petiole ·35–·6 in. winged. *Racemes* terminal, shorter than the leaves, sparsely puberulous. *Flowers* ·3 in. long, their pedicels about ·05 in.; the bracteoles small, lanceolate, hairy. *Calyx-tube* nearly glabrous; its lobes shallow, triangular. *Petals* linear, subacute, pubescent outside, only slightly so inside, about as long as the almost glabrous stamens. *Fruit* unknown. *P. integrifolia*, Herb. Scortechini (not of Blume).

Perak; *Scortechini* 1900.

Readily distinguished by its perfectly glabrous leaves and nearly glabrous flowers.

4. Polyosma mutabilis, Blume, Mus. Bot. Lugd. Bat. I, 261. A tree 20-40 feet high; young branches lenticellate, deciduously rusty-pubescent. *Leaves* narrowly elliptic, tapering gradually from about the middle to each end, not caudate-acuminate, the edges quite entire; upper surface black when dry, glabrous, shining; the lower deep-olivaceous, very sparsely pubescent, the midrib and nerves adpressed-pubescent; main nerves 8–10 pairs, spreading, slightly prominent on the lower and slightly depressed on the upper surface, length 3·5–6 in., breadth 1·25–1·75 in.; petiole ·5–1·1 in., slender. *Racemes* terminal, much longer than the leaves, with short rather sparse pubescence. *Flowers* ·3 in. long, their pedicels about ·05 in. long with 2 adpressed bracteoles. *Calyx-tube* about as long as the pedicel, pubescent; its lobes short, triangular. *Petals* many times longer than the calyx, linear, sub-obtuse, pubescent, slightly longer than the stamens. *Fruit* ovoid from a

broad truncate base, the apex pointed and crowned by the small persistent calyx-teeth; length ·45 in.; breadth at the base ·25 in.; puberulous, black when ripe, the pedicel ·25–·3 in. long, pubescent. Miq. Flor. Ind. Bat. Vol. I, pt. 1, 724; Suppl. 336.

PERAK; *King's Collector* 2596, 4344, 8332; *Wray* 925. JOHORE; *Lake and Kelsall* 4057. MALACCA; *Goodenough* 438.

This species is closely allied to *P. integrifolia*, Blume; but has flowers only ·3 in. long on pedicels only ·05 in. long, while the flowers of *P. integrifolia* measure ·45 in. and its pedicels ·1 in. The best distinction between the two species lies however in the fruit which is in this truncate at the base and vertically ridged, while in *P. integrifolia* the fruit has a tapering base and is not ridged.

5. POLYOSMA FRAGRANS, Benn. Pl. Jav. Rar. 196. A shrub 5 or 6 feet high; young branches slender, deciduously pubescent. *Leaves* elliptic, tapering much to each end, the apex abruptly acuminate; the base cuneate, the edges entire; the upper surface quite glabrous; the lower sparsely adpressed-pubescent especially on the midrib and 7–10 pairs of subhorizontal faint main-nerves; length 2·5–3 in., breadth 1·1–1·35 in.; petiole ·4 in., slender, pubescent. *Raceme* terminal, erect, rather longer than the leaves, tawny-pubescent. *Flowers* ·35 in. long, rather crowded, their pedicels under ·1 in. long with 2 adpressed bracteoles. *Calyx-tube* short, sericeous; the mouth with 4 small triangular teeth. *Petals* many times longer than the calyx, linear, acute, adpressed-pubescent. *Stamens* shorter than the petals. *Anthers* linear, elongate; filaments broad, sparsely villous on the inner side. *Fruit* sub-globular, apiculate, glabrous, ·2 in. in diam. H. f. & T. in Journ. Linn. Soc. II, 77; Miq. Fl. Ind. Bat. 1, pt. I, 724; Suppl. I, 336; Clarke in Hook. fil. Flor. Br. Ind. II, 408. *Itea fragrans*, Wall. in Roxb. Flor. Ind. II, 420; Wall. Cat. 8472, *partly*.

PERAK; *Scortechini* 520. SINGAPORE; *Wallich*. DISTRIB. Sumatra.

6. POLYOSMA INTEGRIFOLIA, Blume Bijdr. 659. A tree 20–40 feet high; young branches lenticellate, deciduously rusty-pubescent. *Leaves* oblanceolate, the apex shortly and abruptly caudate-acuminate, gradually narrowed from the middle or above it to the petiole, the edges entire or remotely serrate, drying of a rather dark-brown colour; upper surface glabrous or with a few hairs on the midrib; the lower paler, with adpressed hairs on the midrib and sometimes also on the nerves; main nerves 8–12 pairs, spreading, interarching, slightly prominent on the lower surface only; length 3·5–8 in., breadth 1·35–3 in.; petiole ·5–1 in., rather stout, pubescent. *Racemes* terminal, often longer than the leaves, subadpressed-sericeous. *Flowers* ·45 in. long, rather crowded; their pedicels ·1 in. long, pubescent, with 2 linear-lanceolate bracts. *Calyx-tube* about as long as the pedicel, pubescent; the mouth with 4

spreading triangular teeth. *Petals* linear, subacute, longer than the stamens and much longer than the calyx, slightly pubescent; anthers elongate, filaments slightly pubescent. *Fruit* ovoid, tapering to each end, the apex crowned by the persistent calyx-teeth and base of the style, puberulous, black when dry, ·4 in. long and ·25 in. in diam.; the pedicel ·15 in. long, puberulous. Benn. Pl. Jav. Rar. p. 196; DC. Prodr. IV, 276; Blume Mus. Bot. I, 260; H. f. & T. in Journ. Linn. Soc. II, 77; Miq. Fl. Ind. Bat. I, pt. I, 724; Suppl. I, 335. Clarke in Hook fil. Fl. Br. Ind. II, 409. *Itea fragrans*, Wall. Cat. 8472, *partly*.

Var. 1. *typica;* leaves entire.

Malacca; *Griffith* 2510 (Kew Distrib.); *Maingay* 632. Perak; *Wray* 508; *King's Collector* 3802. Penang; *Curtis* 1081. Andaman Islands; *King's Collectors*, *Prain*.

Var. 2. *Wallichii*, Clarke in Hook fil. Fl. Br. Ind. II, 409; leaves remotely serrate. *P. Wallichii*, Benn. Pl. Jav. Rar. p. 196; Wall Cat. 8471; H. f. & T. in Journ. Linn. Soc. II, 77; Kurz For. Flora Burma, I, 444.

Andaman Islands. Distrib. Khasia Hills, Assam.

As I have noted under *P. mutabilis*, Bl., the only tangible distinction between that plant and this is that the former has fruit truncate at the base and with 4 bold vertical grooves, while this has smooth fruit. Many of the specimens above-quoted as belonging to this are not in fruit, and I accept them as *P. integrifolia* in deference to the authority of the Flora of British India.

7. Polyosma læte-virens, Griff. MSS. in Herb. Kew. A tree 20–50 feet high; young branches yellowish-tomentose. *Leaves* drying of a yellowish-green, coriaceous, oblanceolate or narrowly-elliptic, shortly acuminate, much narrowed to the base; the edges entire, slightly revolute when dry; upper surface glabrous, shining, the midrib minutely tomentose, lower surface yellowish-tomentose; main nerves 8 or 9 pairs, spreading, interarching, prominent on the lower surface only; length 3·25–5·5 in., breadth ·8–2·25 in., petiole ·35–·5 in. *Raceme* solitary, terminal, tomentose, rather longer than the leaves. *Flowers* ·3 in. long, on pedicels ·1 in. long. *Calyx-tube* slightly longer than the three narrowly oblong adpressed bracteoles, its mouth with 4 broad triangular obtuse teeth, yellowish-tomentose. *Petals* much longer than the calyx and slightly longer than the stamens, linear, tapering to the obtuse apex, villous in front, tomentose behind. *Filaments* nearly as long as the anthers, villous in front. *Fruit* ovoid or globular-ovoid, crowned by the calyx-teeth, deciduously adpressed-sericeous and lepidote, ·25 in. long, the pedicel ·1–·2 in. *P. mutabilis*, Clarke in Hook. fil. Fl. Br. Ind. II, 469 (not of Blume).

Malacca; *Griffith* 2508, 2509; *Maingay* 633. Perak; *King's Collector* 8775. Penang; *Curtis* 377, 758.

Griffith's original specimens, to which he gave the MSS. name *P. laxe-virens*, have smaller leaves and more ovoid fruit on shorter pedicels than any specimens subsequently collected. But in other respects they agree with specimens more recently collected in Perak and Penang.

8. Polyosma velutina, Blume Mus. Bot. Lugd. Bat. I, 261. A small tree; young branches stout, deciduously tomentose. *Leaves* coriaceous, elliptic to elliptic-oblong, sometimes slightly obovate, sub-acute or obtuse, the base cuneate; the edges entire, revolute when dry; upper surface at first with a few scattered adpressed hairs, glabrous when old except the pubescent depressed midrib and main nerves; lower surface covered with soft velvety yellowish tomentum; main nerves 9–12 pairs, prominent on the lower surface only; length 4–7·5 in., breadth 1·75–3·25 in., petiole ·6–1·5 in. *Raceme* terminal, about one and a half times as long as the leaves, stout, densely yellowish-tomentose like the calyx. *Flowers* ·4 in. long, their pedicels rather over ·1 in., with 3 narrow unequal adpressed bracteoles. *Calyx-tube* tomentose; its teeth triangular, acute. *Petals* narrowly linear, sub-acute, slightly longer than the stamens, much longer than the calyx; the filaments slightly villous in front, about equal to the anthers. *Fruit* ovoid, with a broad sub-truncate base, and with an apiculus formed by the remains of the base of the style, boldly 4-ridged, sparsely and deciduously strigose, ·4 in. long and ·3 in. in diam. at the base; the pedicel ·2 in.; endocarp woody, deeply 4-grooved.

Penang; *Curtis* 1165; *King's Collector* 1352. Perak; *Scortechini* 2111; *King's Collector* 3685, 4362. Distrib. Sumatra, Java.

I identify the Penang and Perak plants with Blume's *P. velutina* by description only; for I have seen no authentic specimen of that species. The deep vertical ridging of the endocarp is noted of no other described species except *P. mutabilis*, Bl., and I think my identification is correct.

9. Polyosma Ridleyi, King n. spec. A tree; young branches densely and minutely tomentose. *Leaves* coriaceous, narrowly-elliptic, caudate-acuminate, the edges entire and slightly revolute when dry, the base cuneate; upper surface when young sparsely adpressed-pubescent, when adult glabrous and shining; lower surface covered with dense yellowish tomentum; main nerves 9–11 pairs, spreading, curving and interarching, rather prominent on the lower surface, the intermediate nerves almost as prominent; length 6–6·5 in., breadth 2–2·5 in.; petiole 1–1·75 or even 2 in., tomentose. *Raceme* terminal, stout, shorter than the leaves, densely covered with pale yellowish or whitish tomentum like the calyx and petals. *Flowers* ·4 in. long, their pedicels ·1 in., with 3 equal lanceolate bracteoles on the same level. *Calyx-tube* shorter than the pedicel, wide; the teeth broad, shallow. *Petals* much longer than the calyx, linear, blunt, villous in front. *Stamens* nearly as long

as the petals; the filaments flat, villous in front, scarcely so long as the anthers. *Style* subglabrous. *Fruit* unknown.

Singapore; *Ridley* 3972.

A very distinct species in the neighbourhood of *P. velutina*, Bl., but with narrower leaves, much more tomentose flowers and inflorescence, and a wider calyx-tube.

Note.—I here take the opportunity of describing a very distinct new species from Sumatra.

Polyosma longe-pedicellata, King n. spec. A shrub or tree 15 feet high; young branches coarsely adpressed-pubescent. *Leaves* elliptic or obovate-elliptic, abruptly and shortly acuminate; the edges slightly sinuate and very obscurely and minutely toothed, slightly recurved when dry; the base cuneate; upper surface glabrous, finely reticulate; the lower with short coarse adpressed hairs especially on the midrib, finely reticulate; main nerves 14–16 pairs, almost horizontal, slightly curved and interarching towards the edge of the bade, slightly prominent on the lower surface only when dry, the intermediate nerves almost as distinct; the reticulations minute, distinct on both surfaces; length 5·25–7 in., breadth 2·2–3·25 in.; petiole ·75–1·25 in., puberulous. *Raceme* solitary, terminal, rather longer than the leaves, with pubescence like the young branches. *Flowers* ·5 in. long, on slender adpressed-pubescent pedicels ·3–·35 in. long, and bearing three adpressed bracteoles towards their apices. *Calyx-tube* ·1 in. long, adpressed-pubescent, its teeth broadly triangular. *Petals* ·4 in. long, linear, obtuse, adpressed-pubescent outside. *Fruit* ovoid, tapering to each end, crowned at the apex by the very short calyx-lobes and by the sharp base of the style, minutely adpressed-pubescent, ·5 in. long, and ·3 in. in diam. *Fruit* pedicels ·5–·7 in. long, sometimes deflexed.

Eastern Sumatra; at elevations of 3200 and 3700 feet, *Forbes* 2037, 2250.

Order XLI. DROSERACEÆ.

Herbs; catching insects by means of glandular viscid hairs, or by means of petioled leaves with automatically closing laminæ. *Flowers* hermaphrodite, regular. *Calyx* 4–5- (rarely 8-) partite; or sepals free, imbricate, persistent. *Petals* and *stamens* as many as the sepals, hypogynous or nearly so. *Ovary* nearly free, globose or ovoid, 1–3-celled; styles 5–3, capitate, fimbriate or bifid; ovules numerous, on parietal placentas equal in number to the styles. *Capsule* membranous, 5–3-valved, many-seeded. *Seeds* with fleshy albumen; embryo cylindric or minute. Distrib. Species 110; spread over nearly all temperate and tropical lands except the islands of the Pacific.

1. Drosera, Linn.

Perennial herbs, scapigerous or with a leafy stem, glandular-pilose. *Leaves* radical or alternate, usually circinate in vernation; stipules 0, or scariose and adnate to the petiole. *Calyx* free from the ovary, 4–8-partite, sepals persistent. *Petals* 4–8, hypogynous or scarcely perigynous, white or rose-coloured, withering, persistent. *Stamens* as many

as the petals, hypogynous or scarcely perigynous. *Ovary* 1-celled with 2–5 styles; ovules parietal, numerous. *Capsule* loculicidally 2–5-valved. *Seeds* numerous; in the Indian species obovoid-ellipsoid, with the testa black, smooth, reticulate, not lax. Distrib. Species 100; scattered throughout the world except Polynesia; very numerous in Australia.

Leaves cauline; linear	1. *D. indica.*
Leaves all radical, spathulate-cuneate ...	2. *D. Burmanni.*

1. Drosera indica, Linn. Sp. Pl. 282. *Stems* suberect, from 1–6 in. high. *Leaves* cauline, alternate, linear, elongate, very glandular-pubescent, hardly broader than the glabrous petiole; the stipules much shorter than the petioles. *Racemes* leaf-opposed; flower-pedicels ·25 in. or more in length, glandular-hairy. *Styles* 3, bifid to near the base. DC. Prodr. I, 319; Roxb. Fl. Ind. II, 313; Wall. Cat. 1244; Wight Ill. t. 20; W. & A. Prodr. 34; Planch. in Ann. Sc. Nat. Ser. III, Vol. IX, 204; Miq. Fl. Ind. Bat. I, Pt. II, p. 120; H. f. & T. in Journ. Linn. Soc. II, 82; Thwaites Enum. 21; Dalz. & Gibs. Bomb. Fl. 12; Kurz in Journ. As. Soc. 1876, Pt. II, 310; Clarke in Hook. fil. Fl. Br. Ind. II, 424. *D. Finlaysoniana*, Wall. Cat. 3752. *D. serpens*, Planch. l. c. 204. *D. hexagyna*, Blanco Fl. Filip. 139; Rheede Hort. Mal. X, t. 20.

In swampy places in all the Provinces, except the Andaman and Nicobar Islands. Distrib. The southern part of British India, Ceylon, Burma, the Malayan Archipelago, China, tropical Australia, Africa.

2. Drosera Burmanni, Vahl Symb. III, 50. *Stem* very short; the leaves all radical, spathulate-cuneate, glandular-pubescent; the stipules nearly as long as the petioles. *Scapes* 1–3, two to eight inches high, the raceme occupying the upper fourth only, glabrescent. *Flower-pedicels* less than ·25 in. long, glabrous. *Styles* 5, not bifid. Don Prodr. 212; DC. Prodr. I, 318; Roxb. Fl. Ind. II, 113; Wall. Cat. 1242; Wight. Ill. t. 20; Wight Ic. t. 944; W. & A. Prodr. 34; Planch. in Ann. Sc. Nat. Ser. III, Vol. IX, 190; Miq. Fl. Ind. Bat. I, Pt. II, p. 120; H. f. & T. in Journ. Linn. Soc. II, 82; Clarke in Hook. fil. Fl. Br. Ind. II, 424; Thwaites Enum. 21; Dalz. & Gibs. Bomb. Fl. 12; Kurz in Journ. As. Soc. 1876, Pt. II, 310.

In swampy places in all the Provinces, except the Andaman and Nicobar Islands. Distrib. Plains of British India, Ceylon, the lower Himalaya, Malayan Archipelago, China, Japan, Australia, West Africa.

Order XLII. HAMAMELIDEÆ.

Trees or shrubs. *Leaves* alternate, petiolate, simple or palmately lobed; stipules 1–2, rarely wanting, deciduous or rarely persistent. *Flowers* hermaphrodite or unisexual, collected into heads or spikes. *Calyx* small or 0, adnate to the ovary. *Petals* 0 or 4–5, perigynous or

nearly epigynous. *Stamens* 4–∞, perigynous, or rarely hypogynous; anthers dehiscing longitudinally. *Ovary* 2-celled; styles 2, separate and ultimately divaricate, usually persistent; ovules 1–∞, axile, pendulous. *Capsule* woody, its segments often bifid; endocarp often horny and separating from the exocarp. *Seeds* 1, or many and then usually only the lowest in each cell perfect. DISTRIB. Species 35; Eastern Asia, the Himalaya, Khasia Hills, Malaya, China and Japan; also in North America and in South Africa.

Ovules solitary in each cell:—	
Stipules small and deciduous; heads ebracteate; stamens 5, with short filaments, the connective produced into a horn; flowers hermaphrodite	1. MAINGAYA.
Ovules 6 or more in each cell:—	
Stipules large, coriaceous; heads ebracteate; stamens 10–14, without appendages; flowers polygamous	2. BUCKLANDIA.
Stipules absent; heads with numerous coloured bracts; stamens 7–10 without appendages; flowers hermaphrodite...	3. RHODOLEIA.

1. MAINGAYA, Oliver.

A tree. *Leaves* alternate, undivided, petioled, persistent; stipules small, deciduous. *Heads* peduncled, quasi-terminal, ebracteate, of about 15 flowers. *Calyx-tube* adherent to the ovary; the limb closed, splitting up on one side a little way from the base and then circumscissile and deciduous. *Petals* 5, perigynous, linear, circinate in æstivation. *Stamens* 5, perigynous, filaments very short, connective produced as a horn. *Staminodes* about 10, horned. *Ovary* half-inferior, 2-celled; styles 2, distinct, short; ovule 1 in each cell, pendulous. *Capsule* woody, ovoid; endocarp horny, separating from the exocarp. *Seed* narrowly ellipsoid, and with pale thick iridescent testa.

MAINGAYA MALAYANA, Oliver in Trans. Linn. Soc. XXVIII, 517, t. 44. A tree 50 or 60 feet high; young branches rather slender, glabrous, pale-coloured when dry, lenticellate. *Leaves* membranous, oblong-lanceolate or elliptic, acuminate; the base broad, rounded or minutely cordate, sometimes slightly peltate; both surfaces glabrous, shining, the lower of a bright brown tint when dry; main nerves 7–10 pairs, curving upwards, slightly prominent on the lower surface only; length 6·5–9 in., breadth 2–4·5 in., petiole ·75–1 in., slender; stipules small, tomentose, caducous. *Capitules* from ·75–1 in. in diam., solitary, or two or three from a short peduncle. *Flowers* ·5 in. long, sessile; buds oblong or obovoid-oblong. *Calyx* thin, puberulous, not opening but separating in an irregular circumscissile manner. *Petals* linear, obtuse, glabrous, four or five times as long as the calyx. *Capsule* woody, ovoid, tapering into the thick pedicel, with truncate compressed apex, more than half enve-

loped by the calyx-tube, striate, minutely pubescent, ·6 in. long, ·4 in. wide at the apex. *Seeds* narrowly ellipsoid, tapering much to the apex; the testa thick, white, iridescent, with elongate reticulations. Clarke in Hook. fil. Fl. Br. Ind. II, 428.

Penang; *Maingay* 1513; *Curtis* 659. Perak; *Scortechini* 819; *King's Collector* 7330.

2. Bucklandia, Br.

A tall glabrous tree. *Leaves* alternate, acuminate, entire, long-petioled; stipules solitary or in pairs, large, oblong, coriaceous, deciduous. *Inflorescence* of 2–5 peduncled heads, at first enclosed between a pair of stipules; flowers adnate by their calyces, about 8 in a head, polygamous. *Calyx-tube* adnate to the ovary; limb 5-lobed. *Petals* in the ♂ flower linear-spathulate, fleshy, variable in number; in the ♀ fl. rudimentary. *Stamens* 10–14 (in the ♀ none); filaments long. *Ovary* half-inferior, 2-celled; styles 2, separate, soon divaricate; ovules in each cell 6 in two rows. *Capsule* nearly superior, woody, subglobose; endocarp horny, showing a tendency to separate from the exocarp. *Seeds* in each cell 6, oblong, trigonous; the upper wingless, solid, without any embryo, the lower one in each cell winged and fertile.

Bucklandia populnea, R. Brown in Wall. Cat. 7414. *Leaves* broadly ovate sub-reniform or sub-orbicular, the apex acuminate or tricuspidate, the edges entire; the base broad and rounded, subcordate or truncate, or narrowed and cuneate; both surfaces glabrous; the lower sometimes pubescent on the nerves; main nerves 5–7, radiating palmately from the base, the lower on each side slender, prominent on the lower surface; length 2·5–6·5 in., breadth 1·5–7 in.; petiole ·8–3 in., usually glabrous but sometimes pubescent; stipules oblong, sub-falcate, obtuse, ·9–1·25 in. long, slightly pubescent at the base, breadth ·25–·45 in. Griff. in Asiat. Res. XIX, 95, with two plates; Clarke in Hook. fil. Fl. Br. Ind. II, 429. *B. populifolia*, H. f. & T. in Journ. Linn. Soc. II, 86; Kurz Forest Fl. Brit. Burma, I, 445. *Liquidambar tricuspis*, Miq. Fl. Ind. Bat. I, Pt. I, 1097; and Suppl. 346, with a figure.

Perak; *Scortechini;* on Gunong Inas, elevat. 5000 feet, *Wray* 4151; on Ulu Batang Padang, about 3900 feet, *Wray* 1535. Distrib. The temperate Himalaya from Nepal to Bhotan, elevat. 5000–8000 ft.; Khasia Hills 4000–6000 feet; Burma, Java, Sumatra.

None of the Perak specimens have flowers or fruit. Scortechini's have leaves in no way differing from those from the Himalaya and Khasia mountains, except that the main nerves and petioles, even when old, are pubescent. Wray's specimens, on the other hand, have smaller ovate leaves, rarely tri-cuspidate and never sub-rotund or reniform; their petioles are sometimes slightly hairy, but their main

nerves have tufts of hair only in their axils. In all the Perak specimens the stipules are much narrower than in those from the Himalaya and Khasia mountains.

3. Rhodoleia, Hook.

Glabrous woody shrubs. *Leaves* exstipulate, evergreen, alternate, with long petioles, coriaceous, glaucous beneath. *Flowers* in few-flowered axillary pedunculate reflexed capitula surrounded by numerous whorls of coloured bracts, increasing in size from without inwards. *Flowers* unsymmetrical, hermaphrodite, adnate in the capitula by their calyces. *Calyx-tube* adherent to the lower half of the ovary; its limb annular, truncate, glandular inside. *Petals* rosy, 2–4, very unequal, unilateral, deficient in the central flowers, clawed, oblong-oblanceolate. *Stamens* 7–10, inserted with the petals; the filaments thick, elongate; the anthers linear-oblong, basifixed, 2-celled, the connective not produced. *Ovary* half-inferior, ovoid, the apex bifid, 2-celled, or 1-celled by abortion of the septum. *Style* subulate, elongate, deciduous, stigma simple. *Ovules* numerous in each cell, inserted on two biseriate axile placentas. *Capsule* sub-ligneous, bicuspidate, 2-celled, 2-valved; the valves bifid, many-seeded. *Seeds* imbricate, not winged, angular, compressed, testa crustaceous. Distrib. Two species; Hongkong and Sumatra.

Rhodoleia Teysmanni, Miq. in Versl. en Meded. K. Akad. v. Wetensch. VI, 124. *Leaves* oblong to elliptic, the apex obtuse, slightly narrowed at the base to the long petiole, both surfaces rugulose when dry; main nerves 7–9 pairs, spreading, faint; the midrib prominent beneath; length 2·5–5 in., breadth 1·5–2 in., petiole ·75–1·75 in. *Capitula* solitary, about ·75 in. long, ovoid, on decurved peduncles about ·25 in. long; the bracts broad, blunt, the outer short and glabrous, the inner longer and covered with reddish hair. *Stamens* and petals subequal, about ·5 in. long. *Ripe capsules* glabrous, about ·4 in. long, dehiscing widely for about half their length. Miq. Fl. Ind. Bat. Vol. I, pt. 2, p. 669; Suppl. 532.

Malacca; *Hervey*; *Ridley* 3289. Perak; elev. 3900 feet in Batang Padang Valley, *Wray* 1481. Distrib. Sumatra.

Order XLIII. HALORAGEÆ.

Herbs, often aquatic. *Leaves* opposite or whorled, or partly alternate, when submerged often pinnatisect, always exstipulate. *Flowers* small, axillary, solitary or fascicled, sessile or pedicelled, hermaphrodite or unisexual, the nodes between the floral whorls sometimes developed. *Calyx-lobes* 4 or 0. *Petals* 4 and epigynous, or absent. *Stamens* 8, 4 or 1, epigynous in the bisexual flowers. *Ovary* inferior, 4- 2- or 1-celled;

the styles equal in number to the cells, simple or finely lobed; ovules 4, (1 in *Hippurus*) pendulous. *Fruit* small, dry or drupaceous, with cells as in the ovary, indehiscent, or separating into its component carpels. *Seeds* 4 or 1. Distrib.; about 80 species, cosmopolitan.

Terrestrial; fruit 1-celled, 1-seeded... ...	1. Haloragis.
Aquatic (floating); fruit separating into its component carpels	2. Myriophyllum.

1. Haloragis, Forst.

Branching herbs. *Leaves* opposite, the upper sometimes alternate, toothed, rigid. *Flowers* minute, nearly sessile in the axils of bracts, spicate or racemose, partially unisexual or hermaphrodite. *Calyx-tube* 4–8-ribbed; lobes 4, erect, persistent, acute, valvate. *Petals* 4, coriaceous, often wanting in the ♀. *Stamens* 8, epigynous. *Ovary* 2- or 4-celled, with 4 pendulous ovules; stigmas 4 (in the females at least), sessile, feathery. *Fruit* a dry, 2–4-celled, 2–4-seeded nut; but in the following species by abortion 1-celled, 1-seeded. Distrib. Species 40; N. Asia, Australia.

Haloragis micrantha, R. Brown in Flinders Voy. II, 550. A branching glabrous herb. *Leaves* opposite, ovate, acute, denticulate; the petioles very short, diminishing in size towards the inflorescence. *Flowers* about ·05 in., on pedicels shorter than themselves, in terminal panicle-like racemes. *Sepals* triangular, much smaller than the petals. *Fruit* shining, 8-ribbed, about ·05 in. long, 1-celled, 1-seeded. Clarke in Hook. Flor. Br. Ind. II, 430; Benth. Fl. Austral. II, 482. *H. tenella*, Brongn. in Duperr. Voy. t. 68. *Gonocarpus micranthus*, Thunb. Fl. Jap. t. 15; DC. Prodr. III, 66. *Goniocarpus micranthus*, Koen. & Sims Ann. Bot. I, 546, t. 12.

At elevations of about 5000 feet on the Perak Central Range? Distrib. Malaya, China, Australia and New Zealand. Khasia mountains; at elevations of from 5000–7000 feet.

I include this as a Perak plant with some hesitation. Scortechini's specimens are not now in the Calcutta Herbarium, although his field note is.

2. Myriophyllum, Linn.

Glabrous, aquatic herbs. *Leaves* dentate-serrate or pectinate-pinnatifid, or entire, often whorled. *Flowers* small, sessile or nearly so, in the axils of floral leaves or in nearly naked spikes; monœcious or hermaphrodite. Male; calyx-tube short, limb 2–4-fid or 0; petals 2–4; stamens 2–8. Female; calyx-tube deeply 4-furrowed, limb 0 or of 4 minute lobes; petals minute or 0; ovary inferior, 4- or 2-celled; styles 2 or 4, short, usually recurved, the stigmas plumose; ovules solitary

in each cell, pendulous. *Fruit* 4-furrowed, or separating into 4 or 2 carpels. Distrib. Species 15; cosmopolitan.

Myriophyllum intermedium, DC. Prodr. III, 69. *Leaves* alternate, solitary or in fascicles of two or three, sometimes in whorls, linear, entire or serrate, ·5–1 in. long. *Fruit* axillary, oblong, only about ·05 in. long, with rounded and minutely scabrous ridges and shallow furrows between, ultimately separating into its component carpels. Miq. Flor. Ind. Bat. Vol. I, pt. 1, 634; Clarke in Hook. fil. Fl. Br. Ind. II, 433. *M. indicum*, Wight Ill. t. 102, (*exclude the fruit*). *M. variæfolium*, Hook. Ic. Pl. t. 289. *M. lineare*, Heyne MSS. *Haloragis oliganthа*, W. & A. Prodr. 338; Wight Ic. t. 1061 (*not of Arn.*)

Malacca; *Griffith* (probably on Mount Ophir). Distrib. Mountains of the Malayan Archipelago and of the South of British India; Australia, New Zealand, South America.

Order XLIV. RHIZOPHOREÆ.

Trees or shrubs. *Leaves* opposite and stipulate (alternate and exstipulate in *Anisophyllea*), usually coriaceous, glabrous; stipules interpetiolar, very caducous. *Flowers* axillary, usually bisexual (unisexual in *Anisophyllea*), surrounded at the base by connate or cupuliform bracts, or ebracteate. *Calyx* more or less adnate to the ovary; limb produced beyond the ovary, 4–14-lobed; lobes valvate, persistent. *Petals* equal in number to but usually smaller than the sepals, entire, emarginate, 2-fid or lacerate. *Stamens* usually twice the number of the petals, in pairs, opposite to and partly embraced by them; rarely indefinite (*Kandelia*); anthers 2-celled, rarely multi-loculate (*Rhizophora*). *Ovary* more or less adnate to the calyx, from 5–1-celled by solution of the septa; styles connate (distinct in *Anisophyllea*); stigma often lobed; ovules usually 2 in each cell, pendulous. *Fruit* coriaceous or woody, crowned or surrounded by the calyx-limb, mostly indehiscent, 1-celled, 1-seeded. *Seed* pendulous, arillate or not; albumen fleshy or 0; embryo inverted, small if surrounded by albumen, elongated if exalbuminous; radicle macropodous in the tribe *Rhizophoreæ*, perforating the apex of the pericarp and germinating while the fruit still adheres to the tree.—Distrib. Tropical plants; many sharing with an arboreal vegetation the muddy shores of the estuaries of rivers. Genera 17, species about 70.

Leaves opposite, stipulate; style connate:—

Tribe I. Rhizophoreæ. Embryo exalbuminous, with a large radicle germinating while the fruit is still on the tree:—

Calyx 4-lobed; petals 4, entire; stamens 8; ovary 2-celled	1. Rhizophora.
Calyx 8–14-lobed; petals 8–14, 2-lobed or deeply emarginate; ovary 2–4-celled; stamens 16–28	2. Bruguiera.

Calyx 5- or 6-lobed; petals 5 or 6, their apices ciliate or with clavate or capitate bristles; stamens 10–12 ... 3. CERIOPS.
Calyx 5- or 6-lobed; petals 5 or 6, multifid; stamens indefinite; stigma 3-lobed ... ... 4. KANDELIA.

TRIBE II. LEGNOTIDEÆ. Embryo immersed in fleshy albumen, radicle not unusually large and not germinating in the fruit:—

Flowers 5–8-merous in trichotomous cymes; calyx-tube minutely bracteolate, half-superior, the calyx-lobes erect; stigma small, not lobed ... ... 5. CARALLIA.
Flowers 5-merous, axillary, solitary or in pairs; calyx ebracteolate, half-superior, its lobes reflexed; stigma discoid, 5–10-lobed ... ... 6. PELLACALYX.
Flowers 4–5-merous, in axillary fascicles; calyx-tube ebracteolate, adnate to the base of the ovary, its lobes reflexed; stigma discoid, 5-lobed ... ... 7. GYNOTROCHES.

Leaves alternate, exstipulate; style distinct:—

TRIBE III. ANISOPHYLLEÆ. Leaves alternate and exstipulate; flowers unisexual; styles distinct ... ... 8. ANISOPHYLLEA.

1. RHIZOPHORA, Linn.

Trees. *Branches* marked by leaf-scars. *Leaves* coriaceous, glabrous, opposite, mucronate. *Stipules* large, in pairs, interpetiolar, caducous. *Flowers* rather large, on axillary 2–3-chotomously-divided and few-flowered cymes. *Calyx* 4-lobed, surrounded at the base by connate bracteoles. *Petals* 4, entire, inserted on a fleshy disc. *Anthers* 8, subsessile, multi-loculate. *Ovary* 2-celled, half-inferior, projecting beyond the calyx as a fleshy cone; cells 2-ovuled; stigma bifid. *Fruit* coriaceous, ovoid or obconic, with the reflexed persistent calyx-teeth at its base. *Radicle* elongated, perforating the apex of the fruit and descending from the tree into the mud.—DISTRIB. About 5 species; frequent on muddy tropical shores.

Leaves elliptic; cymes longer than the petioles, usually 3-flowered; petals fleshy, lanate in front ... ... 1. *R. mucronata.*
Leaves oblong to oblong-lanceolate; cymes shorter than the petioles, 2-flowered; petals thin, glabrous ... ... 2. *R. conjugata.*

1. RHIZOPHORA MUCRONATA, Lamk. Dict. VI, 160, t. 396, f. 2. A large evergreen glabrous shrub or tree; young branches thick, with bold cicatrices, rather pale. *Leaves* elliptic, tapering to each end, the apex mucronate; upper surface reticulate when dry, the main nerves faint and depressed; the lower surface minutely rugulose and with black dots, even when dry the nerves invisible; length 5–7 in., breadth 2·5–4·25 in., petiole 1·2–1·75 in. *Cymes* axillary, slightly longer than the petioles, usually 3- rarely 2-flowered. *Flowers* ·5–·6 in. long, their pedicels shorter. *Calyx-lobes* coriaceous, triangular, subacute, glabrous.

Petals shorter than the sepals, linear-lanceolate, thick, lanate on the margins and inner face. *Stamens* 8, filaments short, anthers linear. *Fruit* inversely obovoid with the reflexed persistent calyx-teeth at its base, 1·5 in. long; the extruded radicle 1–2 feet long, cylindric, ·6 in. in diam. when dry. DC. Prodr. III, 32; Bedd. Fl. Sylv., Anal. Gen. t. XIII, fig. 4; Dalz. & Gibs. Bomb. Fl. 95; Wight Ill. I, 209; Ic. t. 238; Kurz For. Flor. Burm. I, 447; Hook. fil. Fl. Br. Ind. II, 435; Trimen Flora Ceylon, I, 151. *R. macrorrhiza*, Griff. in Trans. Med. Phys. Soc. Calc. VIII, 2. *R. candelaria*, W. & A. Prodr. I, 310; Wall. Cat. 4878. *R. Mangle*, Roxb. (not of Linn.) Fl. Ind. II, 456. *R. latifolia*, Miq. Fl. Ind. Bat. Suppl. 324.—Rheede Hort. Mal. VI, t. 34.

In all the provinces, at the mouths of rivers; very common. Distrib. The Tropics of the Old World and of Australia.

The original specimens in the Calcutta Herbarium of *R. latifolia*, Miq. are only large-leaved specimens of this.

2. Rhizophora conjugata, Linn. Sp. Pl. 634. A small glabrous tree; young branches clavate, smooth, pale, the upper part with bold cicatrices. *Leaves* oblong to oblong-lanceolate, tapering to each end, the apex mucronate; when dry the upper surface faintly reticulate, the main nerves visible; the lower surface not showing the main-nerves but the midrib there prominent, remotely pustulate and minutely dotted; length 5–6 in., breadth 1·65–2·5 in., petiole ·8–1·25 in. *Cymes* axillary, shorter than the petioles, 2-flowered. *Calyx-lobes* oblong, concave, acute. *Petals* slightly shorter than the calyx, thin, glabrous. *Stamens* 6–8; filaments short, anthers linear. *Fruit* inversely clavate, 1 in. long, the protruding radicle from a few inches to a foot long, cylindric; ·25–·3 in. in diam., when dry. DC. Prodr. III, 33; Blume Mus. Bot. I, 134; Wight Ill. I, 309; Kurz. For. Flora Burma, I, 447; Hook. fil. Fl. Br. Ind. II, 436. *R. apiculata*, Blume Flor. Jav. I, 91. *R. candelaria*, DC. Prodr. III, 32; Trimen Flora Ceylon, I, 151.

In all the Provinces, at the mouths of rivers and in tidal marshes. Distrib. The Tropics of the Old World.

2. Bruguiera, Lamk.

Trees or shrubs. *Leaves* usually coriaceous, oblong, quite entire. *Peduncles* axillary, cymose, or solitary. *Flowers* rather large, coriaceous. *Calyx* 8–14-merous, obconical or campanulate, ebracteate, adnate to the base of the ovary; lobes subulate-lanceolate, valvate. *Petals* oblong, equal in number to the calyx-lobes, 2-lobed or emarginate, appendiculate, embracing the stamens by pairs. *Stamens* 16–28; filaments filiform; anthers linear, mucronate, about as long as the filaments. *Ovary* 2–4-celled, included in the calyx-tube; cells 2-ovuled; style filiform;

stigma 2–4-lobed, minute. *Fruit* coriaceous, included in or adnate to the calyx-tube, 1-celled, 1-seeded. *Germination* as in *Rhizophora*. Distrib. Species about 7, in the tropics of the Old World.

Flowers 1 in. long or upwards, solitary :—	
Petals 2-lobed, each lobe with 2–4 apical bristles, otherwise glabrous	1. *B. gymnorhiza.*
Petals 2-lobed, the sinus between the lobes with one bristle; the edges densely clothed with short white hairs	2. *B. eriopetala.*
Flowers not more than 5 in. long, in axillary cymes :—	
Lobes of the calyx as long as the tube, spreading or reflexed; petals bifid, each lobe crowned by 3–5 pale hairs, their edges with scanty white hairs outside ...	3. *B. caryophylloides.*
Lobes of calyx only one-fourth the length of the tube, erect; petals with broad emarginate apex, bearing 5 white flexuose hairs, the edges glabrous ...	4. *B. parviflora.*

1. Bruguiera gymnorhiza, Lamk. Encycl. IV, 696; Ill. t. 397. A large glabrous evergreen tree: young branches stout, marked with cicatrices towards the apex. *Leaves* elliptic or elliptic-oblong, acute, the base cuneate; upper surface shining when dry, the nerves faint; the lower dull, the veins invisible but the midrib very prominent; length 3·5–6 in., breadth 1·75–2·5 in., petiole 1·3–1·6 in. *Flowers* solitary, axillary, 1·25–1·5 in. long; the peduncles about ·35 in., deflexed. *Calyx* coriaceous, campanulate, ribbed, cut for half its length into 12 narrow acute suberect teeth. *Petals* shorter than the calyx-lobes and equal to them in number, sub-convolute, two-lobed at the apex and with 2–4 bristles at the point of each lobe, pubescent at the base, otherwise glabrous. *Stamens* two opposite each petal and shorter than it, each alternate filament short; anthers linear. *Fruit* small, in the fundus of the calyx-tube, containing a single seed germinating *in situ* and forming a cylindric radicle 1–2 feet long prior to its fall. W. & A. Prodr. 311; Brand. For. Fl. 219; Miq. Fl. Ind. Bat. I, pt. 1, 586; Blume Mus. Bot. 136; Kurz For. Flor. Burm. I, 450; Hook. fil Fl. Br. Ind. II, 437; Dalz. & Gibs. Fl. Bomb. 95; Trimen Flora Ceylon, I, 153. *B. Rheedii*, Miq. l. c. 587; Blume, l. c. 136; Wight Ic. t. 239; Dalz. & Gibs. Bomb. Fl. 95; Hook. Ic. Pl. t. 397. *Rhizophora gymnorrhiza*, Linn. Sp. 634; Roxb. Fl. Ind. II, 460; Griff. Ic. Pl. Asiat. t. 645; Wall. Cat. 4874; Thwaites En. Pl. Ceyl. 120.

Tidal Forests in all the provinces. Distrib. Malaya, Australia, Africa.

2. Bruguiera eriopetala, W. & A. in Wight Ill. I, p. 210; Wight Icon. 239 B. A tree; young branches slender, with cicatrices towards the apex. *Leaves* oblong-lanceolate or oval-oblong, sometimes rather oblanceolate, acute, the base very cuneate; upper surface shining, the

nerves faint; the lower reddish-brown when dry, the nerves very faint or obsolete but the midrib prominent; length 3·25–4 in., breadth 1·25–1·65 in., petiole ·6–·75 in. *Flowers* 1–1·25 in. long, solitary, axillary; the peduncle short, decurved. *Calyx* as in *B. gymnorhiza*, but the lobes only 10. *Petals* shorter than the calyx-lobes, deeply bifid, with a stout seta in the sinus between the two narrow lobes, the edges densely clothed with stout white hair, the apices of the lobes bearing one short bristle each. *Fruit* as in *B. gymnorhiza*, but the germinating radicle shorter. Wall. Cat. 2451; Brandis For. Flora, 219; Hook. fil. Fl. Br. Ind. II, 438. *B. Rumphii*, Blume Mus. Bot. Lugd. Bat. I, 138. *B. parietosa*, Griff. Notul. IV, 670; Ic. Pl. Asiat. t. 641.

In similar situations to the last, but not so common. MALACCA; *Griffith* 2206; *Maingay* 642. PENANG; *Curtis* 514. PAHANG; *Ridley* 1045 C. PERAK; *Scortechini*; *Wray* 2711. DISTRIB. Malayan Archipelago, Australasia.

3. BRUGUIERA CARYOPHYLLOIDES, Blume Enum. Pl. Javae I. 93. A tree; young branches slender, with cicatries towards the apex. *Leaves* oblanceolate or ovate-oblanceolate, slightly oblique, acute, the base cuneate; upper surface shining when dry, the lower dull, both pale in colour and the nerves faint in both; length 2·5 to 4 in., breadth 1–1·65 in., petiole ·75–1 in. *Cymes* axillary, rather longer than the peduncles, erect, laxly 2- or 3-flowered, (rarely only 1-flowered). *Flowers* about ·4 in. long, on short pedicels. *Calyx-tube* clavate, not grooved when fresh, surmounted by about 8 linear obtuse fleshy lobes as long as itself, at first spreading, but finally reflexed. *Petals* as many as but shorter than the calyx-lobes, apex bifid, the margins with scanty white hairs outside; the apical lobes obtuse, each crowned by 3–5 flexuose pale hairs, the sinus with a single bristle. *Stamens* 16, unequal. *Fruiting-calyx* about ·5 in. long, the fruit in its fundus with the growing radicle protruding and growing to 6–8 in. in length. Arn. in Ann. Nat. Hist., I, 368; Wight Ill. 210; Miq. Fl. Ind. Bat., Vol. I, Pt. I, 589; Kurz For. Flora Burma I, 450; Hook. fil. Fl. Br. Ind. II, 438. Trimen Flora Ceylon, I, 153. *Rhizophora caryophylloides*, Jack Mal. Misc. I. 34; Hook. Bot. Misc. II, 80; Wall. Cat. 4879; DC. Prod. III, 32. *Kanilia caryophylloides*, Blume Mus. Bot. Lugd.-Bat. I, 141; Thwaites En. Pl. Ceyl. 120. *B. parviflora*, Wall. (not of Blume) Cat. 4877 C and D.

In tidal Forests like the other species of the genus; in all the provinces. DISTRIB. Malay Archipelago.

4. BRUGUIERA PARVIFLORA, W. & A. Prodr. 311; Arn. in Ann. Nat. Hist. I, 369. A shrub or small tree; young branches slender, the cicatrices distant. *Leaves* oblong-lanceolate to elliptic-lanceolate, acute, much attenuate at the base; upper surface shining and showing the

nerves faintly when dry; the lower dull and evenious; length 3–3·5 in., breadth ·8–1·25 in., petiole ·75–1 in. *Cymes* axillary, longer than the petioles, laxly 2–5-flowered, erect. *Flowers* erect, ·4–·5 in. long, their peduncles slightly shorter. *Calyx-tube* cylindric, crowned by 8 lanceolate erect lobes about a fourth of its own length. *Petals* as many as the calyx-lobes but shorter, oblong; the apex broad, emarginate and bearing five white short hairs, otherwise glabrous. *Stamens* 16, unequal, two embraced by each petal. *Ovary* 3-celled, fruiting-calyx cylindric, ribbed, 1 in. long, the fruit concealed in it; radicle growing to 4–5 in. before falling. Wight Ill. 210; Miq. Flor. Ind. Bat. Vol. I., Pt. 1, 588; Kurz For. Flora Burma, II, 449. *B. cylindrica*, W. & A. Prod. 311. *Rhizophora cylindrica*, Roxb. Hort. Beng. 36. *R. parviflora*, Roxb. Fl. Ind. II, 461; Wall. Cat. 4877. *Kanilia parviflora*, Blume Mus. Bot. Lugd.-Bat. I, 140 t. 30; Dalz. & Gibs. Flora Bombay 95.

Tidal Forests in all the provinces. Distrib. Malaya.

3. Ceriops, Arn.

Shrubs. *Leaves* opposite, ovate or obovate. *Stipules* caducous, axillary. *Cymes* condensed. *Calyx* 5–6-merous, surrounded at the base by connate bracts. *Petals* 5–6, inserted at the base of a 10–12-lobed fleshy disc, emarginate or truncate; their apices ciliate or with clavate or capitate bristles. *Stamens* 10–12, filaments inserted between the lobes of the disc; anthers 2-celled. *Ovary* 3-celled (at least above), cells 2-ovuled; style short, stigma simple. *Fruit* obovoid, the reflexed limb of the calyx persistent at its base, 1-celled, 1-seeded. *Germination* as in *Rhizophora*. Distrib. Species 7; river-mouths, tropics of Old World.

Flowers sessile; petals setose-ciliate at the apex; anthers linear, longer than the filaments	1. *C. Roxburghiana.*
Flowers pedicelled; petals with 3 short clavate processes at apex; anthers ovate, acute, much shorter than filaments	2. *C. Candolleana.*

1. Ceriops Roxburghiana, Arn. in Ann. Nat. Hist. I, 364. A glabrous dwarf tree or shrub 2–4 feet high. *Leaves* elliptic, slightly obovate, or orbicular-elliptic, the apex rounded, the edges slightly recurved, rather narrowed at the base, (often somewhat abruptly); main nerves faint on both surfaces; the upper surface shining, the lower dull; length 2·25–3·75 in., breadth 1·5–2·25 in., petiole ·75–1·15 in. *Cymes* axillary, shortly pedunculate, not branched; flowers ·2 in. long, sessile, densely crowded. *Calyx* with 5 or 6 ovate-lanceolate sub-acute lobes. *Petals* oblong-obovate, the apex emarginate or sub-truncate, setose-ciliate. *Anthers* linear, much longer than the short filaments. *Fruit* clavate, ·5 or ·6 in. long, the protruded radicle a few inches long, clavate,

deeply ridged and furrowed. Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 591; Kurz For. Flora Burma, I, 448; Hook. fil. Fl. Br. Ind. I, 436; Trimen Flora Ceylon I, 153. *Rhizophora decandra*, Roxb. Hort. Beng. 36; Wall. Cat. 4875.

At the mouths of rivers, probably in all the provinces. DISTRIB. Tropical tidal forests of the old World.

2. CERIOPS CANDOLLEANA, Arn. in Ann. Nat. Hist. I, 364. A glabrous shrub or dwarf tree 3–6 feet high. *Leaves* obovate-oblong, obtuse, sometimes emarginate, much and gradually attenuate to the base, the edges slightly reflexed, main nerves slightly visible on both surfaces when dry, length 1·75–2 in., breadth 1–1·5 in., petiole ·6–1 in. Cymes axillary, peduncled, branched; flowers ·25 in. long, on short pedicels. *Calyx-lobes* 5, oblong, sub-obtuse. *Petals* oblong-obovate, the apex truncate or emarginate and with 3 short clavate appendages. *Stamens* 10, nearly as long as the petals; the anthers ovate, acute, only about a fourth of the length of the filaments. *Fruit* clavate, ·5 in. long, the protruded radicle a few inches to a foot long, (rarely longer,) gradually thickening to near the apex and then becoming acute, deeply grooved and ridged. Blume Mus. Bot. Lugd.-Bat. I, 142; Wight Ill. 209; Icones t. 240; Miq. Fl. Ind. Bat. Vol. I, Pt. 1, 590; Brandis For. Flora 218; Kurz For. Flora Burm. I, 448; Hook. fil. Fl. Br. Ind. II, 436; Trimen Flora Ceylon I, 152. *Rhizophora timorensis*, DC. Prod. III, 32.

At the mouths of rivers and in tidal swamps in all the provinces. DISTRIB. Tropics of old World.

4. KANDELIA, Wight & Arn.

A small tree. *Leaves* opposite, coriaceous, oblong, obtuse; stipules caducous. *Peduncles* axillary, dichotomously branched, few-flowered. *Flowers* rather large, white. *Calyx* 5–6-merous, surrounded at the base by connate bracteoles, adnate to the base of the ovary; lobes linear—lanceolate, valvate. *Petals* 5 or 6, bifid; the lobes multifid, segments capillary. *Stamens* indefinite, anthers small; filaments slender, exserted. *Ovary* 1-celled, half-inferior, prolonged above the calyx into a fleshy cone; style slender, stigma 3-lobed; ovules 6, fixed in pairs to a central column. *Fruit* ovoid, girt at the base by the reflexed limb of the calyx, 1-celled, 1-seeded. *Radicle* fusiform, very acuminate. *Germination* as in *Rhizophora*. DISTRIB. A single species; British India, Malaya.

1. KANDELIA RHEEDII, W. & A. Prodr. I, 310. *Leaves* narrowly elliptic-oblong, obtuse, narrowed at the base, glabrous, 2–4 in. long, the petiole ·4–·6 in. *Peduncles* longer than the petiole, 2–3-chotomous, 4–9-flowered. *Flowers* ·6–·8 in. long, white. *Fruit* 1 in. long, obovoid; the protruded radicle 6–15 in. long, cylindric, not ridged. Arn. in Ann. Nat.

Hist. I, 365; Blume Mus. Bot. 135; Wight Ill. I, t. 89; Hook. Ic. Pl. t. 362; Wall. Cat. 4876; Kurz For. Flor. Brit Burm. I, 449. Kurz For. Flora Burma, I, 449; Hook. fil. Fl. Br. Ind. II, 437. *Rhizophora Candel*, Linn. Sp. Pl. 443; DC. Prodr. III, 32; Roxb. Hort. Beng. 36; Wall. Cat. 4876.

Andaman Islands, and probably also in the other provinces.

5. Carallia, Roxb.

Trees or shrubs. *Leaves* coriaceous, glabrous, petiolate, ovate or elliptic; stipules caducous. *Peduncles* short, rather thick. *Flowers* small, in short 3-chotomous axillary branching cymes, sessile and often crowded. *Calyx-tube* cylindric or campanulate, minutely bracteate at the base; limb 5–8-lobed, the lobes erect, short, valvate. *Petals* 5–8, inserted on the margin of a crenulated disk lining the calyx-tube, clawed, orbicular, 2-fid or entire, subserrate or lacerate at the apex. *Disc* epigynous, 10–16-lobed. *Stamens* inserted with the petals, filaments filiform; anthers small, oblong. *Style* subulate or filiform. *Fruit* small, globose, coriaceous, 1-celled, 1-seeded (*unknown in two species*). *Seed* globose-reniform, testa fibrous, embryo curved.—Distrib. Species about 12, natives of the Indian Ocean.

Cymes on peduncles as long as the petioles, bearing numerous crowded sessile flowers ·15 in. long	1.	*C. lucida.*
Cymes on peduncles slightly longer than the petioles, bearing from 3–5 shortly pedicelled flowers ·1 in. long ...	2.	*C. Scortechinii.*
Cymes on peduncles much longer than the petioles, bearing 3 flowers ·25 in. long on pedicels as long as themselves ...	3.	*C. eugenoidea.*

1. Carallia lucida, Roxb. Hort. Beng. 92; Corom. Plants III, t. 211. A small glabrous tree; young branches thin, dark-coloured when dry. *Leaves* coriaceous, varying from obovate to elliptic-oblong, oval or oblong-lanceolate; the edges recurved, entire or serrulate in the upper half or three-fourths, the apex usually shortly cuspidate, the base more or less cuneate; both surfaces shining and reticulate; the main nerves numerous, spreading and interarching freely; length 2·5–3 in., breadth 1–1·75 in., petiole ·25–·35 in. *Cymes* axillary and from the axils of fallen leaves, on stout peduncles about as long as the petioles, densely umbellate, usually trichotomous. *Flowers* ·15 in. long, sessile. *Calyx-tube* cylindric, its mouth with 6 or 7 short triangular incurved teeth. *Petals* equal in number to the calyx-teeth, orbicular, crenate, clawed, not embracing the stamens. *Stamens* twice as many as and longer than the petals, the filaments much longer than the ovate anthers. *Fruit* pisiform, glabrous, pulpy, 1-celled and usually only 1-seeded. Roxb. Fl. Ind. II, 481; Wall. Cat. 4880; Wight Ic. 605; Kurz For. Flora Burma, I, 451. *C. integerrima*, DC. Prodr. III, 33; Wight Ill. t. 90;

Benth. in Journ. Linn. Soc. III, 74; Bedd. Fl. Sylvat. t. CXCIII; Dalz. and Gibs. Fl. Bomb. 96; Brandis For. Flora 219; Hook. fil. Fl. Br. Ind. II, 439. Trimen Flora Ceylon I, 155. *C. ceylanica*, *C. corymbosa*, and *C. sinensis*, Arn. in Ann. Nat. Hist. I, 371. *C. ceylanica*, Arn. Wight Ill. 211 t. 90. *C. timorensis*, Blume Mus. Bot. Lugd. Bat. I, 128? *C. octopetala*, Muell. Fl. Aust. Trop. Occ. ex Benth. in Journ. Linn. Soc. III, 74. *C. symmetria*, Blume Mus. l. c. 130.

Perak; very common. Singapore, and probably also in several of the other provinces. Distrib. Malayan Archipelago, China, Australia, British India.

DeCandolle's *C. integerrima*, published in 1828, is in my opinion merely the entire-leaved form of this very common Indian tree, the leaves of which are sometimes serrulate and sometimes entire. It is a tree which Roxburgh could not possibly have overlooked. He published and figured the serrulate-leaved form of it as *C. lucida* in his Coromandel Plants (1819), having previously given the name in his Hortus Bengalensis, p. 92. In the belief that *C. lucida* is the oldest name for this plant, I have followed Kurz in restoring it. DeCandolle's name *C. integerrima* is however adopted by Mr. Bentham, and also by Mr. Henslow who described the *Rhizophorex* in Hooker's Flora of British India.

2. Carallia Scortechinii, King n. spec. A shrub or small tree; young branches slender, opposite, smooth, dark-coloured when dry. *Leaves* lanceolate or ovate-lanceolate, shortly caudate-acuminate, the base slightly cuneate; the edges entire, slightly revolute when dry; both surfaces shining, the lower with sparse black dots and with the numerous spreading main nerves slightly prominent; length 2–2·75 in., breadth 1–1·25 in., petiole ·2–·25 in. *Stipules* lanceolate, ·25 in. long, caducous. *Cymes* axillary, on pedicels slightly longer than the petioles, trichotomous, spreading, not crowded. *Flowers* 3–5, rather more than ·1 in. long and about the same in width at the mouth, on pedicels nearly ·1 in. long and bracteolate at the base. *Calyx-tube* campanulate, with 5 triangular lobes half as long as itself, their apices slightly inflexed. *Petals* 5, thin, reniform, erose-crenate, clawed, each embracing a stamen. *Stamens* 10, inserted on the 10-toothed epigynous disc, unequal. *Ovary* adnate to the calyx-tube, 5-celled, with 2 axile ovules in each cell. *Style* stout, as long as the calyx-lobes, stigma 5-lobed. *Fruit* unknown.

Perak; *Scortechini* 2023; *King's Collector* 1013. Singapore; *Ridley* 5593.

The specimens collected by Scortechini are described by him as taken from a shrub 5 or 6 feet high, while those collected by Mr. Kunstler are noted as from a tree 30–40 feet in height. They resemble each other exactly both in flowers and leaves, and I have no doubt whatever that the two belong to the same species. I give this species a name with considerable hesitation; for it does not differ much from Roxburgh's description of *C. lanceæfolia*. It also closely resembles *C. cuspidata*, Blume, in leaves, but has larger flowers.

3. Carallia eugenoidea, King n. spec. A tall tree; young branches slender, glabrous, reddish when fresh, black when dry. *Leaves* oblanceolate, the apex sub-acute, the base cuneate, the edges thickened and with black glandular dots, entire; upper surface shining when dry; the lower dull, the 6–8 pairs of spreading main-nerves slightly prominent; length 1·75–2·25 in., breadth ·8–1·1 in., petiole ·2–·25 in. *Stipules* in pairs, lanceolate, ·25 in. long, caducous. *Cymes* axillary, their peduncles an inch or more in length, bearing at the apex, on pedicels as long as themselves, 3 flowers ·25 in. in length. *Calyx-tube* narrowly campanulate, with 5 triangular lobes as long as itself. *Petals* apparently none. *Stamens* twice as many as the calyx-lobes; the filaments alternately shorter, inserted on the 10-lobed disc. *Ovary* occupying the tube of the calyx, 5-celled, with 2 nearly pendulous ovules in each cell; *stigma* 5-lobed. *Fruit* unknown.

Perak; *Scortechini*, 326.

In the externals of the flowers and also in its leaves this has a superficial resemblance to a *Eugenia*; but the presence of stipules and the structure of the flower show it to be a true *Carallia*.

6. Pellacalyx, Korth.

Trees with bifarious opposite petiolate entire or obscurely serrulate leaves and interpetiolar elongate caducous stipules. *Flowers* axillary, solitary or in pairs, minutely bracteolate. *Calyx* ebracteolate, its tube tubular-campanulate, adherent to the ovary at its base; the mouth expanded and with 4–6 short recurved valvate teeth. *Petals* 4–6, lacerate at the apex, inserted on the margin of the tube of the calyx. *Stamens* 8–12, incurved, inserted on the margin of the thin crenulated disc lining the calyx-tube. *Ovary* half-inferior, 5–10-celled. *Style* subulate; stigma discoid, 5–10-lobed; ovules many in each cell, fascicled, attached to the axis. *Fruit* fleshy, sub-globose, 5–10-celled, many-seeded. *Seeds* ovoid, with striate testa; albumen copious with the embryo in its axis; cotyledons flat, narrow; the radicle terete and elongate. Distrib. Two species, both Malayan.

Calyx-tube with 5 or 6 teeth; flowers 5-merous; leaves densely stellate rusty-pubescent beneath ... ... 1. *P. axillaris.*
Calyx-tube with 4 teeth; flowers 4-merous; leaves glabrous 2. *P. Saccardianus.*

1. Pellacalyx axillaris, Korth. in Van der Hoev. & De Vr. Tijdsch. III, 20, t. 2. Young branches rusty-pubescent. *Leaves* thinly coriaceous, oblong, sometimes slightly wider above the middle, the apex shortly and abruptly acuminate, the base rounded; upper surface with a few small scattered sub-stellate hairs, or sub-glabrous when old, the midrib always pubescent; lower surface boldly reticulate and stellately

rusty-pubescent; main nerves about 12 pairs, conspicuous beneath, curving sharply upwards; length 4·5–7 in., breadth 1·25–2 in.; petiole ·2–·3 in., rusty-pubescent; *stipules* lanceolate, rusty-pubescent, ·35 in. long. *Flowers* ·25–·35 in. long, on pedicels of about the same length, both rusty-pubescent. *Fruit* pisiform, fleshy, ·25 in. in diam., crowned by the persistent wide upper part of the calyx. Benth. in Journ. Linn. Soc. III, 76; Griff. Notul. IV, 420; Ic. Pl. Asiat. t. 486.

Malacca; *Griffith* 2217/1; *Maingay* 638. Penang; *Griffith*; *Curtis* 937. Singapore; *Ridley* 6917; *Anderson*, 81. Perak; *Scortechini* 119; *King's Collector*, 1049, 2036.

2. Pellacalyx Saccardianus, Scortechini in Nuov. Giorn. Bot. Ital. XVII, 143. A small tree, young branches rusty-puberulous. *Leaves* thinly coriaceous, oblong, shortly acuminate, edges entire, base rounded or cuneate; upper surface quite glabrous, shining; the lower dull, paler, slightly reticulate, glabrous or sometimes puberulous near the midrib and nerves; main nerves 7–9 pairs, rather prominent beneath, spreading and curving upwards; length 4–7 in., breadth 1·6–2 in., petiole ·25 in. *Flowers* about ·25 in. long, on slightly shorter pedicels, rusty-puberulous. *Calyx-tube* as in *P. axillaris* but only 4-cleft. *Petals* 4, broadly oblong, emarginate, irregularly toothed towards the apex, narrowed and entire at the base. *Stamens* 8. *Ovary* usually 9-celled. *Fruit* as in *P. axillaris*, but glabrous. Hemsley in Hooker's Ic. Pl. 1546.

Perak; *Scortechini* 325. *Wray* 701, 1328. Malacca; *Maingay* 639.

This differs from *P. axillaris*, Korthals, in having glabrous or nearly glabrous leaves with only 7–9 pairs of main nerves, and also in its tetramerous flowers.

7. Gynotroches, Blume.

Trees or shrubs. *Leaves* coriaceous, shining; stipules deciduous. *Flowers* small, axillary, fascicled, the peduncles joined in the middle. *Calyx* ebracteolate, 4–5-partite; segments valvate, reflexed. *Petals* 4–5, inserted below the margin of an 8–10-lobed perigynous disc, clawed, spathulate, fimbriate-lacerate. *Stamens* 8–10, inserted on the disc, filaments filiform, anthers small. *Ovary* superior, adhering by a broad base to the calyx, ovoid-globose, 3–6-angled, 3–6-celled; style columnar, furrowed, conical at the base; stigma peltate, deeply 5-lobed; lobes emarginate, recurved; ovules 4 in each cell, ascending, fascicled. *Berry* globose, 4–6-celled, many-seeded. *Seeds* small, obovoid, testa crustaceous and wrinkled, albumen fleshy, embryo terete. Distrib. Species 2, both Malayan.

Gynotroches axillaris, Blume Bijdr. 219. A tree; young branches dark-coloured, smooth. *Leaves* oblong, or elliptic-oblong to elliptic, tapering to each end; the apex shortly and rather bluntly acuminate,

the edges entire; both surfaces shining, the lower much reticulate; main nerves 9–12 pairs, spreading, curving upwards; length 3·5–5·5 in., breadth 1·25–2·5 in., petiole ·25–·35 in. *Fascicles* 6–10-flowered, axillary, shorter than the petioles. *Flowers* less than ·1 in. long, the pedicels about as long as the fruit-producing flowers, sub-dicœcious; the stamen-bearing flowers with perfect petals, but the ovary and stigma abortive; the flowers with fertile ovaries and with perfect stigmas having imperfect stamens and often abortive petals. *Fruit* a globular glabrous berry ·1–·15 in. in diam. Blume Mus. Bot. Lugd. Bat. I, 127, t. XXXI; Miq. Fl. Ind. Bat. Vol. I. Pt. I, 592; Kurz For. Flora Burma, I, 451; Hook. fil. Fl. Br. Ind. II, 440. *G. Dryptopetalum*, Blume Mus. l. c. 127; Miq. Fl. Ind. Bat. l. c. 592. *Dryptopetalum coriaceum*, Arn. in Ann. Nat. Hist. I, 372. *G. reticulata*, A. Gray. Bot. Amer. Expl. Expedit. Vol. I, 607? *Microtropis coriacea*, Wall. Cat. 4338. *Casearia? acuminata*, Wall. Cat. 7198. *Rubiacea*, Wall. Cat. 8455.

In all the provinces; common. DISTRIB. The Malayan Archipelago.

8. ANISOPHYLLEA, Br.

Trees and shrubs. *Leaves* exstipulate, distichous, obliquely ovate-lanceolate or elliptic, with 3–5 main nerves proceeding from the base (the nervation pinnate in one species), quite entire; the alternate leaves sometimes smaller or minute and stipuliform. *Flowers* monœcious, minute, in axillary simple or fascicled spikes, ebracteate or minutely bracteolate. *Calyx-tube* of ♀ flower ovoid, adnate to the ovary, terete or ribbed; limb 4-fid, lobes erect. *Petals* 4, small, involute, entire, lobed or lacerate. *Stamens* 8; filaments short, subulate; anthers small, didymous, usually abortive in the females. *Ovary* inferior, 4-celled; styles 4, subulate, erect or recurved, stigmas acute or subcapitate; ovules solitary in each cell, pendulous, anatropous. *Fruit* coriaceous, oblong or pyriform, ribbed or smooth, 1-seeded. *Seed* pendulous, exalbuminous, testa coriaceous, embryo clavate, cotyledons very small or 0, radicle large. DISTRIB. Species 10, natives of Tropical Asia and Africa.

Leaves dimorphous	1.	*A. disticha.*
Leaves uniform :—		
Flowers apetalous...	2.	*A. apetala.*
Flowers with 4 petals :—		
Petals minute, deltoid	3.	*A. Gaudichaudiana.*
Petals thick, subquadrate, entire or submarginate	4.	*A. Griffithii.*
Petals 3-fid at the apex	5.	*A. Scortechinii.*
Petals divided to the very base into narrow segments	6.	*A. Curtisii.*

1. ANISOPHYLLEA DISTICHA, Baill. in Adansonia, XI, 311. A shrub with ferruginous-pilose slender branches. *Leaves* dimorphous, in two

series; the longer oblong-rhomboid, subfalcate, acute, the base cuneate, subsessile, 3-nerved, puberulous or pubescent or sometimes nearly glabrous on both surfaces, ·75–1·5 in. in length and about one-third or one-quarter as much in breadth; the smaller set stipule-like, lanceolate and only ·25–·3 in. long, inserted below the larger and overlapping their bases. *Male flowers* in short few-flowered axillary fascicles and racemes much shorter than the leaves, ·05 in. in diam., on short pedicels; *calyx* with 4 broad lobes; *petals* shorter than the calyx, trifid; *stamens* 8, as long as the petals. *Female flowers* solitary, larger than the males, subsessile; *calyx-tube* elongated, tubular, pubescent externally, connate with the ovary, crowned at the apex with 4 triangular lobes; *petals* and *stamens* as in the male; *styles* stout, shorter than the petals, truncate; *stigmas* 2-lobed; *fruit* narrowly elliptic, tapering to each end, with 8 vertical grooves, glabrous; seed oblong. Hook. fil. in Herb. Kew; Hensl. in Hook. fil. Fl. Br. Ind. II, 442. *Anisophyllea trapezoidalis*, Baill. in Adansonia, XI, 311. *Anisophyllum trapezoidale*, Baill. in Adansonia, III, 24, 26. *Haloragis disticha*, Jack Mal. Misc. VII, 19; Wall. Cat. 2519; Hook. Journ. Bot. I, 371; Calc. Journ. Nat. Hist. IV, 336.

In all the provinces except the Andamans and Nicobars; common. Distrib. The Malayan Archipelago.

The name *Anisophyllea* was first given to this genus by Robert Brown, who however published no description of it. In 1823, Sabine (in a paper published in the *Trans. Hort. Soc. Lond.*) first used it in giving a popular description of a plant from Sierra Leone under the name *A. laurina*. Overlooking this publication, Don founded for that very plant the genus *Anisophyllum*, and named it *Anisophyllum laurinum*, and this name was published in 1849 in Hooker's *Niger Flora*, 342. In the addenda and corrigenda to that volume, Don's name is however reduced and Brown's is restored. Baillon (in *Adansonia* III, 24 and 36,) applied the generic name *Anisophyllum* to three plants of which the present species is one. But, in a subsequent volume of *Adansonia* (XI, 310 and 378) and in his *Histoire des Plantes* (VI, 304), Baillon abandons Don's name *Anisophyllum* and adopts Brown's earlier one.

2. Anisophyllea apetala, Scortechini MSS. in Herb. Calcutt. A tree 30–40 feet high; young branches slender, glabrous. *Leaves* membranous, oblong to elliptic or ovate-elliptic, or elliptic-lanceolate, caudate-acuminate, the base rounded or slightly cuneate; both surfaces glabrous, minutely reticulate; the upper shining, the lower somewhat dull when dry; main nerves 5, springing from the apex of the petiole, the middle three bold, the two lateral rather faint; length 3–8 in., breadth 1·25–3 in., petiole ·25–·3 in. *Racemes* in lax few-branched extra-axillary panicles as long as the leaves, the rachises glabrous. *Flowers* monocious, depressed-globular, usually tetramerous, sometimes (fide Scortechini) pentamerous. *Male flowers* on pedicels longer than

themselves; *calyx* deeply cut into 4 (rarely 5) triangular thick concave segments; *petals* none; *stamens* 4, exserted, the filaments dilated at the base; *styles* and *ovary* rudimentary. *Female flowers* on the same branches as the males, sessile; *calyx-tube* slightly elongated, the lobes of the mouth smaller than in the male, staminodes shorter than the calyx-lobes; *ovary* tetragonous, included in the calyx-tube, the styles exserted; *fruit* ovoid or elliptic, tapering to each end, glabrous, with vertical purple stripes, 2–3 in. long and 1–1·25 in. in diam.; pericarp woody, thick.

Perak; *Scortechini*, 684 and 1808; *Wray* 2340, 2758; *King's Collector* 2932, 4326, 4792, 6587, 6318, 7399.

This resembles *A. Gaudichaudiana*, Baill. in the shape of its leaves which are, however, much thinner in texture and more caudate-acuminate. It differs from that, however, in having apetalous flowers, and in the males having longer pedicels. The fruit also differs, being pointed at each end and quite glabrous, whereas the fruit of *A. Gaudichaudiana* is obtuse at the ends and rusty-pubescent.

3. Anisophyllea Gaudichaudiana, Baill. in Adansonia, XI, 311. A tree 50–80 feet high; young shoots rather slender, glabrous, minutely lenticellate. *Leaves* coriaceous, broadly oblong to elliptic-oblong, entire, shortly and rather bluntly acuminate, the base rounded or slightly narrowed; both surfaces glabrous, dull when dry, with wide reticulations and 5, rarely 7, bold vertical curving main nerves springing from the apex of the petiole, the transverse connecting veins distinct; length 6–10 in., breadth 2·5–4 in.; petiole ·25–·3 in., stout, channelled, articulate at the base. *Panicles* axillary, solitary or in fascicles, much shorter than the leaves, with few short distant spicate rusty adpressed-pubescent branches. *Flowers* monœcious. *The males* depressed-globose, mostly about ·05 in. in diam., on short pedicels; *calyx* of 4 triangular concave fleshy segments; *petals* deltoid, much smaller than the calyx-lobes. *stamens* 8, incurved, pistil rudimentary. *Female flowers* sessile, longer than the males; the *calyx-tube* elongate, tubular, containing the ovary, its mouth with segments like the male; *stamens* none; *styles* 4, recurved. *Fruit* large, subpyriform or ellipsoid, sub-oblique, obtuse, minutely rusty-pubescent, 3·5 in. long, and 2·25 in. diam.; pericarp woody, ·5 in. thick. *Seed* solitary. Hook. Ic. Plant. 1551. *A. grandifolia*, Hensl. in Hook. fil. Fl. Br. Ind. II, 442. *Cocculus ? ? flavicans*, Wall. Cat. 4976. *Strychnos ? grandis*, Wall. Cat. 4454. *Anisophyllum flavicans*, Hook. & Thoms. Fl. Ind. 175. *A. grande*, Benth. in Journ. Linn. Soc. I, 79.

Penang; *Gaudichaud*, *Maingay* 1517, *Curtis* 521, *Stolickza*. Perak; *King's Collector* 2706, 2731, 5472; *Ridley* 3029.

On the principle by which Herr Otto Kuntze desires to guide botanical nomenclature Baillon's name *A. Gaudichaudiana* would have to give way to the name *A.*

grandis, because, although Wallich referred the plant to a family with which it has no affinity, he gave it the earliest specific name "*grandis*."

4. Anisophyllea Griffithii, Oliver in Trans. Linn. Soc. XXIII, 460. t. 48. A tree 40–50 feet high, with drooping branches; young branches slender, glabrous. *Leaves* thinly coriaceous, greenish-yellow when dry, lanceolate, ovate-lanceolate or broadly elliptic-lanceolate, the apex bluntly acuminate, the base cuneate, the edges entire and slightly revolute when dry; both surfaces glabrous and very minutely dotted, the upper shining, the lower rather dull; length 2·5–3·5 in., breadth 1·2–2 in., petiole ·15–·2 in.; a basal nerve springing from the apex of the petiole on each side and running close to the edge; main nerves pinnate, about 6 pairs, oblique, curving but slightly. *Spikes* solitary or in pairs, axillary or extra-axillary, slender, tawny-puberulous, ·75–1 in. long, (1·5–2·75 in., *fide* Oliver), laxly-flowered. *Male flowers* ·05 in. in diam., sessile; *calyx-limb* with 4 triangular coriaceous lobes; *petals* 4, shorter than the calyx-lobes, thick, broadly-oblong, subquadrate, entire or faintly emarginate; *stamens* 8, the 4 opposite to the petals attached to the latter, filaments dilated, anthers broadly-elliptic; *styles* 4, free, subulate, ovary imperfect. *Female flowers* like the males, but the *calyx-tube* elongated and containing the 4-celled ovary. *Fruit* globular-ellipsoid, obtuse at each end, glabrous, smooth, 1·75 in. long and 1·35 in. in diam. Laws. in Hook. fil. Fl. Br. Ind. II, 442.

Malacca; *Griffith* 2439. Penang; *Curtis* 148 and 1511. Perak; *King's Collector* 7600.

This differs from all other Malayan species in the pinnate venation of its leaves. There are indeed two nerves which spring along with the midrib from the apex of the petiole and run round the edges, but the midrib has pinnate branches.

5. Anisophyllea Scortechinii, King n. spec. A tree 25–30 feet high; young branches slender, rusty-tomentose. *Leaves* falcately lanceolate-rhomboidal, the apex much acuminate, the base obliquely acute; both surfaces shining, the upper quite glabrous, the lower glabrous except for a few thin scattered brown apically-directed adpressed hairs on the intercostal spaces; the nerves (and particularly the middle one) more pubescent, especially towards the base; main nerves 3, 4 (from the splitting of the middle one) or rarely 5, springing from the apex of the petiole, the middle one straight, the two lateral curved; all prominent on the lower and deeply depressed on the upper surface; connecting veins sub-horizontal, prominent; length 2·5–3 in., breadth ·6–1·25 in., petiole ·15 in. *Panicles* extra-axillary, with only 1 or 2 branches, ·5–1 in. long, rusty-pubescent. *Male flowers* ·1 in. in diam., on pedicels as long as themselves, minutely bracteolate at the base; *calyx-lobes* 4 or 5, broadly ovate-acute, not concave, reflexed; *petals*

shorter than the calyx-lobes, 3-fid at the apex; *stamens* 8; *styles* 4, conical, rudimentary. *Female flower* larger than the male and with the calyx-tube elongated and containing the ovary; lobes of the mouth broadly ovate; *stamens* 8; rudimentary styles 4, stout, as long as the calyx-lobes; *stigmas* sub-capitate. *Fruit* ellipsoid, glabrous, ·75 in. long and ·4 in. in diam., glabrous, smooth; the pericarp woody.

Perak; *Scortechini* 1807. *Wray* 960 and 2100; *King's Collector* 5681, 8821.

A species closely allied to the Bornean *A. rhomboidea*, Baill. The latter species has however leaves of thinner texture, and their main nerves are more pubescent beneath while, instead of being deeply depressed on the upper surface, they are scarcely visible. The transverse veins are also finer and less visible than in the leaves of this, while the lower surface has numerous minute white scales; the leaves of this have no scales. The petals of *A. rhomboidea* are described by Baillon as flabellate-incised.

6. Anisophyllea Curtisii, King n. spec. A tree 30–40 feet high with drooping branches; young twigs slender, deciduously and sparsely adpressed rusty-pubescent. *Leaves* thinly coriaceous, elliptic-lanceolate, slightly oblique especially towards the rather abruptly and obliquely cuneate base, gradually tapering to the caudate-acuminate apex: upper surface glabrous, not reticulate; the lower faintly reticulate, glabrous except for a few adpressed hairs near the base; main nerves 5, springing from the apex of the petiole, the two outer faint and running close to the edge, the three middle prominent on the lower surface but obsolete on the upper; length 2·5–3·25 in., breadth ·8–1·25 in., petiole ·2 in. *Male and female* flowers on distinct adpressed-pubescent spikes about ·5 in long, each flower with a short blunt bracteole at its base. *Male flowers* ·15 in. long, sessile, clavate; calyx-tube elongate, rusty adpressed-pubescent externally, its mouth with 4 broadly triangular lobes; *petals* 4, as long as the calyx-lobes or longer, cut almost to the base into filiform lobes; *stamens* 8, with filaments of unequal length, those with short filaments attached to the petals; *styles* subulate, ovary abortive. *Female flowers* ·25 in. long, the calyx-tube longer than in the male and ribbed; lobes of the mouth reflexed. *Petals* as in the male but larger and with more lobes; *stamens* as in the male; *style* as long as the petals. *Fruit* unknown.

Penang; *Curtis* 746.

A very distinct species, at once recognised by its comparatively large flowers and deeply fimbriate petals; allied to *A. rhomboidea*, Baill. and to *A. Scortechinii*, King; but well distinct from either.

Order XLV. COMBRETACEÆ.

Trees or shrubs, often climbers. *Leaves* alternate subopposite or

opposite, sometimes ternate, petioled, entire, simple (in *Illigera* 3-foliolate); stipules 0. *Flowers* bracteolate at the base, in the tribe *Gyrocarpeæ* cymose; in the *Combretæ* spicate or racemose (the racemes often panicled); often polygamo-monœcious. *Calyx-tube* adnate to the ovary and produced above it (sometimes to a great length), the limb of 4–5 (rarely 4–7) valvate lobes. *Petals* 4–5 or 0, (rarely 6–7). *Stamens* 4–5 or 8–10, inserted on the calyx; (in the *Gyrocarpeæ* the filaments with staminodes attached at the base, and the anthers dehiscing by recurved lateral valves). *Ovary* inferior, 1-celled; style simple; stigma simple or in *Illigera* sinuate, almost lobed; ovules 1–7 (usually 2–3), pendulous from the apex of the cell. *Fruit* coriaceous or drupaceous, generally indehiscent, ovate, angular or very commonly winged; in *Calycopteris* and *Gyrocarpus* crowned by the greatly enlarged calyx. *Seed* 1, without albumen; cotyledons in *Terminalia* and others convolute; in *Combretum* and others plano-convex. Distrib. Species about 320, in the tropics of the whole world; and in S. Africa outside the tropics.

Sub-Order I. Combreteæ. *Calyx-lobes* valvate; *stamens* without basal glands or staminodes; the anthers with longitudinal dehiscence. *Ovules* 2–7, suspended by long funicles. *Flowers* in spikes or racemes:—

Flowers apetalous:—	
Limb of the calyx deciduous	1. Terminalia.
Limb of the calyx accrescent	2. Calycopteris.
Flowers with 4 or 5 petals (except in *Combretum apetalum*):—	
Limb of the calyx persistent, leaves alternate ...	3. Lumnitzera.
Limb of the calyx deciduous, leaves opposite:—	
Calyx-tube prolonged above the ovary for less than ·5 in.	4. Combretum.
Calyx-tube prolonged above the ovary for from ·75–2·5 in.	5. Quisqualis.

Sub-Order II. Gyrocarpeæ. *Calyx-lobes* valvate or imbricate; *stamens* with glands or staminodes at their bases; anthers dehiscing by up-turned valves. *Ovule* 1, suspended by a short funicle. *Flowers* cymose:—

Scandent; leaves 3-foliolate	6. Illigera.
Trees; leaves entire	7. Gyrocarpus.

1. Terminalia, Linn.

Large trees. *Leaves* alternate or subopposite, exstipulate, entire or slightly crenulate, often with glands on the petiole or near the base of the midrib beneath. *Flowers* small, spicate, (the spikes sometimes panicled), hermaphrodite, the upper flowers on the racemes often males and the lower hermaphrodite; a narrow deciduous bract at the base of each flower. *Calyx-tube* produced above the ovary, having a campanulate

mouth with 5 short valvate triangular lobes, deciduous. *Petals* 0. *Stamens* 10, inserted on the calyx-tube; the epigynous disc within them densely hairy. *Ovary* 1-celled, inferior; style long, simple; ovules 2 or 3, pendulous from the summit of the cell. *Fruit* ovoid, various in size and texture, smooth or angular, or with 2–5 wings, indehiscent, coriaceous. *Seed* solitary, exalbuminous, cotyledons convolute. Distrib. Species 135; in the tropics of both worlds.

Sect. I. Fruit ovoid or elliptic, sometimes compressed, never winged, but sometimes keeled at the edges or obscurely 4–5-ridged:—		
Leaves broadly oblong, lanceolate-oblong to elliptic-oblong; fruit sub-clavate, obscurely 5-ridged, glabrous, 2–3 in. long	1.	*T. citrina.*
Leaves elliptic or ovate, acuminate; fruit oblong, obscurely 5-ribbed, slightly compressed on one side, ·6–·75 in. long, glabrous	2.	*T. Manii.*
Leaves obovate, broadly elliptic or sub-rotund, minutely papillose on the upper surface, the petioles very long (1·75–4 in.); fruit ovoid or globular-ovoid, minutely tomentose ...	3.	*T. belerica.*
Leaves obovate, tapering to a very narrow base; fruit glabrous:—		
Fruit elliptic, 2·25 in. long, with very thick corky pericarp; leaves 3–4 in. long	4.	*T. phellocarpa.*
Fruit obovate-ellipsoid, plano-convex, 1·5 in. long; leaves 5–6 5 in. long...	5.	*T. fœtidissima.*
Fruit ellipsoid, somewhat compressed, keeled at the edges, 2 in. long; pericarp fleshy; leaves 6–9 in. long	6.	*T. Catappa.*
Sect. II. Fruit narrowly elliptic, its edges produced into 2 broad leathery wings:—		
Leaves obovate or oblong-obovate, 6–9 in. long, the petioles 2·25–2·75 in.; fruit 1·25–1·75 in. long, its breadth (including the wings) 2·5–3·5 in.	7.	*T. bialata.*
Leaves spathulate-oblanceolate, 3–4 in. long, the petioles 1·15–1·5 in.; fruit ·75–1·25 in. long; its breadth (including the wings) 1·2–2 in.	8.	*T. subspathulata.*

1. Terminalia citrina, Fleming in Asiat. Res. XI, 183. A glabrous tree 60–80 feet high; young shoots slender, rusty-pubescent, but at an early stage glabrous. *Leaves* thinly coriaceous, sometimes almost opposite, from broadly oblong-lanceolate to elliptic-oblong, on short bi-glandular petioles, the apex acute or shortly acuminate, the base cuneate or sometimes rounded; both surfaces when very young rusty-puberulous, afterwards perfectly glabrous and shining, the lower minutely areolate-reticulate, the bottom of the areolæ covered with white felt; main nerves 8–12 pairs, curving upwards, distinct on both surfaces when dry; length 3–6 in., breadth 1·25–2·5 in., petiole ·4 or ·5 in. *Spikes* in small panicles shorter than the leaves, axillary, deciduously rusty-puberulous.

Flowers ·2 in. in diam., sessile, all hermaphrodite, each with a deciduous linear bracteole. *Calyx* glabrous outside, rusty-villous inside, the tube oblong; glands 5, rusty-woolly. *Drupe* oblong-lanceolate, slightly clavate, smooth, glabrous, obscurely 5-ridged, 2–3 in. long, and ·75–1 in. in diam. Roxb. Hort. Beng. 33; Fl. Ind. II, 435; Wall. Cat. 3970; DC. Prodr. II, 12; Miq. Fl. Ind. Bat. I, pt. I, 602; Kurz For. Flora Burma, I, 456; Clarke in Hook. fil. Fl. Br. Ind. II, 446; W. & A. Prodr. 313; Braud. For. Fl. 223. *Myrobalanu citrina*, Gaertn. Fruct. II, t. 97.

British India.

Var. 2. *malayana*, Clarke in Hook. fil. Fl. Br. Ind. II, 447. *Petioles* ·75–1·25 in. long. *Fruit* about 1 in. long.

Nicobar Islands; *Jelinek, Kurz.* Malacca; *Griffith* 2178. *Maingay* 643. Perak; *King's Collector* 3173.

This species and its variety *malayana* may be readily distinguished from *T. Chebula*, Retz (which in many respects it resembles) and from every other Asiatic *Terminalia* by the peculiar areolate reticulation of the under surface of the leaves.

2. Terminalia Manii, King n. spec. A tree 20–40 feet high; young shoots slender, deciduously rusty-puberulous, lenticellate. *Leaves* thinly coriaceous, almost opposite, not crowded, scattered, elliptic or ovate, shortly and rather abruptly acuminate, the base rounded or somewhat cuneate and slightly oblique; both surfaces glabrescent or glabrous, minutely reticulate, the reticulations on the lower tesselate; main nerves 9–12 (rarely 14) pairs, spreading, curving upwards at the tips; length 3·25–6·5 in., breadth 2–3 in.; petiole ·75 in. long, often with 2 sessile oblong glands at the sides near its apex. *Panicles* lateral and terminal, with numerous spike-like rusty-puberulous ultimately glabrous branches shorter than the leaves when in flower, longer when in fruit. *Flowers* ·15 in. in diam. at the mouth, each subtended by a linear puberulous bracteole as long as itself. *Ovary* narrow, cylindric, thickened and pubescent towards the base, the upper half and the mouth glabrous outside; the mouth cupular with inconspicuous broad shallow teeth, woolly inside. *Stamens* exserted, glabrous. *Fruit* oblong, tapering a little to each end, slightly compressed on one side, obscurely 5-ridged, quite glabrous, ·6–·75 in. long, and ·3–·35 in. in diam.; pericarp crustaceous, hard, thick.

Nicobar and Andaman Islands; *King's Collectors.*

Named in honour of Mr. E. H. Man, C. I. E., Deputy Superintendent of the Andaman and Nicobar Islands, whose powerful help has made it possible to explore the Forests of these most interesting islands; a species of which the nearest ally is probably *T. citrina*, Roxb.

3. Terminalia bellerica, Roxb. Fl. Ind. II, 431. A tall tree.

Leaves clustered at the apices of the branches, coriaceous, obovate, broadly elliptic or sub-rotund, the petioles long; the apex usually broad and rounded, rarely subacute; the base slightly cuneate, sometimes slightly unequal; both surfaces puberulous when young, glabrous and reticulate when old, the upper with numerous minute papillæ; main nerves 6–8 pairs, spreading, prominent, the midrib prominent on both sides and sometimes with 2 glands near the sides of its base; length 4·5–8 in., breadth 3·5–4·75 in., petiole 1·75–4 in. *Spikes* axillary, slender, longer than the petioles, shorter than the leaves, rusty-pubescent. *Flowers* about ·25 in. in diam., those in the upper part of the spike male, those in the lower hermaphrodite. *Calyx-tube* short, stout, including the ovary, minutely tomentose, the mouth with broad triangular lobes, pubescent outside, densely villous inside. *Stamens* much exserted. *Drupe* ovoid or globular-ovoid, densely covered with minute pale tomentum, when dried obscurely 5-angled, 1 in. long and ·75 in. in diam. W. & A. Prodr. 313 (excl. syn.); Wall. Cat. 3963; Wight Ic. t. 91; Thwaites Enum. 103; Dalz. & Gibs. Bomb. Fl. 91; Brand. For. Fl. 222; Kurz For. Fl. Brit. Burma I, 455; Hook. fil. Fl. Br. Ind. II, 445; Bedd. Fl. Sylvat. t. 19; Trimen Fl. Ceyl. I, 159. *T. Gella*, Dalz. in Hook. Kew Journ. III, 227. *T. punctata*, Roth Nov. Sp. 381; DC. Prodr. III, 13. *T. eglandulosa*, Roxb. Herb. (*wrongly referred in Willd. Sp. Pl. IV*, 968). *T. moluccana*, Roxb. Hort. Beng. 33; Fl. Ind. II, 432.

Perak; *Scortechini* 1684; *King's Collector* 8778. Distrib. British India.

Roxburgh describes and figures (Corom. Plants t. 198; Fl. Ind. II, 431) a form of this with two glands at the apex of the petiole on the under surface of the leaf; but this form has not hitherto been collected in any Malayan country, and its occurrence in British India must be rare.

4. Terminalia phellocarpa, King n. sp. A tree; young branches rather slender, deciduously rusty-tomentose. *Leaves* crowded near the apices of the branches, coriaceous, obovate, blunt, tapering from above the middle to the petiole, slightly oblique at the base; both surfaces glabrous and shining, the lower widely reticulate and minutely dotted; main nerves 4–6 pairs, spreading but curving upwards; length 3–4 in., breadth 1·75–2 in.; petiole about ·8 in., thickened towards the base, rusty-pubescent. *Flowers* unknown. *Fruit* elliptic, blunt at each end, 2·3 in. long, breadth 1·5 in.; the apex with a short sharp mammilla ·15 in. long, the pericarp thick, spongy, with horizontal layers of fibrous tissue, the endocarp woody.

Singapore; on Bukit Mandai, *H. N. Ridley.*

This has been collected only once, and the specimens are without flowers. I have named it from its corky fruit. In its leaves this greatly resembles the Philippine species *T. nitens*, Presl; but that has a very much smaller fruit than this; more-

over the petioles of its leaves are glabrous, whereas in this the petioles are pubescent.

5. Terminalia fœtidissima, Griff. Notul. IV, 685. A tall tree; young branches as thick as a swan's quill, puberulous, rather rough. *Leaves* coriaceous, obovate, minutely cuspidate, narrowed from above the middle to the acute base; upper surface quite glabrous, very shining when dry the lower duller, glabrous except the sparsely rusty-pubescent midrib and nerves; main nerves 7–9 pairs, spreading but curving upwards; length 5–6·5 in., breadth 2·25–3·25 in.; petiole about ·8 in., terete. *Spikes* solitary, axillary, nearly as long as the leaves, rusty-pubescent. *Flowers* nearly all hermaphrodite, about ·2 in. in diam.; their ovaries elongate, clavate, rusty-tomentose, each with a linear bracteole. *Calyx-teeth* sparsely hairy, the mouth rusty-villous inside. *Drupe* obovate-ellipsoid, subacute, plano-convex, glabrous when ripe, 1·5 in. long. Clarke in Hook. fil. Fl. Br. Ind. II, 445.

Malacca; *Griffith*, *Maingay* 643½ and 644. Distrib. Burma.

6. Terminalia Catappa, Linn. Mant. II, 519. A tree 80–120 feet high; young branches stout, puberulous, becoming glabrous, the tips with large cicatrices. *Leaves* coriaceous, obovate or obovate-oblong, with a much attenuate cordate and often bi-glandular base; the petiole very short, stout, broad and channelled; both surfaces glabrous; main nerves 8–12 pairs, spreading, not prominent when dry; length 6–9 in., breadth 3·5–5 in., petiole ·35 in. *Spikes* axillary, slender, glabrous, shorter than the leaves. *Flowers* ·2 in. in diam., each with a small bracteole, those in the upper part of the raceme mostly male and shortly pedicelled, those in the lower part hermaphrodite; calyx-tube containing the ovary, conical. *Calyx* glabrous outside, the mouth villous inside. *Ovary* glabrous. *Drupe* ellipsoid, somewhat compressed, keeled all round, pointed at the base, glabrous; pericarp pulpy, endocarp woody and very hard; length 2 in., breadth 1·25 in. Willd. Sp. Pl. IV, 967; Roxb. Hort. Beng. 33; Fl. Ind. II, 430; Lamk. Ill. t. 848; DC. Prodr. III, 11; Wall. Cat. 3975; W. & A. Prodr. 313; Wight Ic. 172; Bot. Mag. 3004; Miq. Fl. Ind. Bat. I, pt. I, 599; Bedd. Fl. Sylv. t. 18; Kurz For. Fl. Brit. Burma, I, 454; Hook. fil. Fl. Br. Ind. II, 444. *T. Catappa* and *T. Badamia*, Tulasne in Ann. Sc. Nat. Ser. IV, Vol. VI, 92. *T. moluccana*, Lamk. Dict. I, 349, (not of Roxb.); DC. Prodr. III. 11; Willd. Sp. Pl. IV, 96 (excluding the synonym *T. eglandulosa*, Roxb.) *T. procera*, Roxb. Hort. Beng. 33; Fl. Ind. II, 249; Wall. Cat. 3974; Kurz For. Flora Burma, I, 454. *Terminalia* nov. spec. 168, Kurz in Journ. As. Soc. Beng. 1876, pt. II, p. 130. *T. Myrobalana*, Roth Nov. Sp. 378. *T. subcordata*, Willd. Sp. Pl. IV, 968. *T. intermedia*, Spreng. Syst. II, 359. *Juglans Catappa*, Lour. Fl. Cochinch. 703. *Catappa do-*

mestica, *C. litorea* and *C. sylvestris*, Rumph. Herb. Amboin. I, t. 68. *Badamia Commersoni*, Gaertn. Fruct. II, 97; Rheede Hort. Mal. IV, t. 3, 4.

In all the provinces; near the coast.

A magnificent species, at times attaining an enormous height, and usually with horizontal branches. The stem is frequently most picturesquely buttressed. The embryo is eatable, and is often known to Europeans in the East as the "Indian Almond." I have reduced to this *T. procera*, Roxb., the only tangible distinction between which and *T. Catappa* is said to be its obscurely 5-ridged fruit. But fruits with this peculiarity may be gathered from the same trees as those bearing the ordinary sharp-edged smooth fruit.

7. TERMINALIA BIALATA, Steud. Nomencl. II, 668. A glabrous tree 80–100 feet high; young branches stout and with large cicatrices. *Leaves* crowded at the apices of the branches, alternate, thinly coriaceous, obovate or obovate-oblong, with long petioles, the apex abruptly and shortly cuspidate, narrowed from above the middle to the cuneate and usually oblique base; upper surface shining when dry, the lower dull and paler, the reticulations rather distinct on both; main nerves 7–9 pairs, spreading, rather distinct on both surfaces when dry; length 6–9 in., breadth 2·75–4·5 in., petioles 2·25–2·75 in. *Spikes* axillary, drooping, solitary, longer than the petioles but rather shorter than the leaves, rusty-puberulous. *Flowers* ·2 in. in diam., sessile, the male flowers in the upper part, the hermaphrodite flowers in the lower, each with a minute deciduous bracteole. *Calyx* rusty-pubescent outside, densely rusty-villous inside; the lobes triangular, reflexed. *Stamens* exserted. *Ovary* villous. *Fruit* ellipsoid, tapering to each end, somewhat flattened on one side, covered with minute dense rusty tomentum and with 2 large slightly wavy, coriaceous, puberulous, horizontally striate lateral wings; length of fruit 1·25–1·75 in., breadth ·5–·75 in., the wings from 1·25–1·75 in. in width. Kurz For. Flora Burma, I, 456; Clarke in Hook. fil. Fl. Br. Ind. II, 449. *Pentaptera bialata*, Roxb. Hort. Beng. 34; Fl. Ind. II, 441; Wall. Cat. 3986.

ANDAMAN, and probably also the NICOBAR ISLANDS. DISTRIB. Burma.

8. TERMINALIA SUBSPATHULATA, King n. spec. A tree over 100 feet high; young branches rather slender, deciduously puberulous. *Leaves* alternate, crowded near the ends of the branches, coriaceous, spathulate-oblanceolate, shortly and bluntly cuspidate, tapering from near the apex to the long petiole, eglandular and sometimes slightly oblique at the base, the edges thickened and slightly revolute; upper surface glabrous and shining, the lower pale and sub-glaucous, both minutely reticulate; main nerves about 8 pairs, spreading and curving upwards, distinct; length 3–4 in., breadth near the apex 1–1·6 in., petiole 1·15–1·5 in. *Spikes* solitary, axillary, shorter than the leaves when in flower, longer

when in fruit, rusty-pubescent. *Flowers* ·15 in. in diam., those in the upper part of the spike male, those in the lower hermaphrodite. *Calyx* minutely rusty-pubescent outside; the tube narrow, sub-cylindric in the female, tapering much upwards; the mouth wide, cupular and with 5 broadly triangular shallow reflexed teeth, shortly lanate at the base. *Stamens* exserted. *Fruit* narrowly elliptic, cylindric at the ends, ·75–1·25 in. long; the edges produced into 2 coriaceous, horizontally striate, glabrous wings each ·6–1 in. wide.

Singapore; *Ridley* 5733. Malacca; *Derry* 1037. Perak; *King's Collector* 4529.

2. Calycopteris, Lamk.

A diffuse sub-scandent shrub with drooping branches. *Leaves* opposite, shortly petioled, elliptic or ovate, acuminate, entire. *Racemes* dense, axillary, and crowded towards the ends of the branches so as to form large panicles. *Flowers* small, greenish, each with a lanceolate bract. *Calyx-tube* 5-striate, produced above the ovary; limb 5-fid, persistent and much enlarged in fruit. *Petals* 0. *Stamens* 10, the five upper ones between the calyx-teeth, the five others alternate with them and lower down on the calyx-tube. *Ovary* 1-celled, inferior; *style* subulate, simple; ovules 3, pendulous from the top of the cell. *Fruit* narrowly ovoid, 5-ribbed, villous, 1-seeded, surmounted by the enlarged calyx. *Cotyledons* convolute. The only species.

Calycopteris floribunda, Lamk. Dict., Suppl. II, 41, and Ill. t. 357. A diffuse scrambling shrub, sub-scandent; young branches slender, puberulous. *Leaves* sub-coriaceous, ovate-lanceolate to ovate-oblong, sometimes shortly acuminate, the base rounded or slightly narrowed; both surfaces minutely tomentose, the upper tawny, the lower rusty and pitted; main nerves 5 or 6 pairs, ascending, curved, rather prominent beneath; length 2·5–4 in., breadth 1–2 in., petiole ·2–·3 in. *Inflorescence* rusty-tomentose. *Flowers* ·35 in. in diam., sessile, yellowish-green, each with a short lanceolate pubescent bracteole. *Stamens* unequal, but all much shorter than the linear-lanceolate calyx-lobes. *Fruit* about ·35 in. long, narrowly oblong, 5-angled, crowned by the enlarged veined calyx-lobes which often attain from ·75–1 in. in length. Brandis For. Flora 220; Clarke in Hook. fil. Fl. Br. Ind. II, 449. *Calycopteris nutans*, Kurz Journ. As. Soc. Beng. Vol. XLVI, pt. II, p. 59; For. Flora Burma, I, 468. *Getonia floribunda*, Roxb. Cor. Pl. t. 87 and Fl. Ind. II, 428; Roth Nov. Sp. 216; DC. Prodr. III, 15; Dalz. & Gibs. Bomb. Fl. 91; Miq. Fl. Ind. Bat. I, pt. I, 605; W. & A. Prodr. 315; Wall. Cat. 4013. *Getonia nutans*, Roxb. Hort. Beng. 33; Fl. Ind. II, 428; Wall. Cat. 4012; Miq. l. c.; DC. Prodr. III, 15. *Getonia nitida*, Roth Nov. Sp. 217. *Combretum sericeum*, Wall. in Herb. Calc.

Penang; *Wallich.* Singapore; *Lobb.* Trang; *King's Collector.* Andamans; *King's Collector.* Distrib. British India.

There is a variety of this, with glabrous leaves and with the longer stamens equalling the calyx-lobes, to which Kurz has given the varietal name *floribunda*, his name for the typical form being *C. nutans*. I have seen no specimens of the glabrous variety from any of the Malayan provinces.

3. Lumnitzera, Willd.

Large glabrous shrubs or small trees, growing in tropical salt marshes along with Mangroves and closely resembling them in habit. *Leaves* clustered towards the ends of the branches, alternate, thickly leathery, subsessile, narrowly obovate, entire or scarcely crenate. *Flowers* in racemes. *Calyx-tube* with two adnate bracteoles near the base, oblong, narrowed at both ends, produced above the ovary; lobes 5, persistent. *Petals* 5, oblong. *Stamens* 10 in two series, or fewer. *Ovary* inferior, 1-celled; style subulate, simple; ovules 2–5, pendulous from the top of the cell. *Fruit* woody, elliptic-oblong, ½–1 in. (including the calyx-limb), longitudinally striate or nearly smooth. *Seed* 1; cotyledons convolute.—Distrib. Species 2; on the shores of the tropics of the Old World and of Polynesia.

Petals scarlet; stamens twice as long as the petals and of the same colour	1. *L. coccinea.*
Petals white; stamens of the same colour and length as the petals	2. *L. racemosa.*

1. Lumnitzera coccinea, W. & A. Prodr. 316. A small tree 12–40 feet high. *Leaves* oblanceolate, obtuse, 2-3 in. long. *Racemes* terminal, sometimes several together forming a panicle. *Petals* scarlet, ·25 in. long. *Stamens* 5–10 (usually 7), twice as long as the petals and of the same colour. Miq. Fl. Ind. Bat. I. pt. I, p. 606; Clarke in Hook. fil. Fl. Br. Ind. II, 452. *L. littorea*, Voigt Hort. Suburb. Calc. 39 Kurz For. Fl. Brit. Burma, I, 469. *L. pentandra*, Griff. Notul. IV, 684, and Ic. Pl. Asiat. t. 644. *Pyrranthus littoreus*, Jack Mal. Misc. II, 57; Wall. Cat. 4018.

Andaman Islands. Perak; *King's Collector* 1180; *Scortechini* 1001; and probably in the Mangrove swamps of all the provinces; Distrib. British India, the Malayan Archipelago, North Australia and Polynesia.

2. Lumnitzera racemosa, Willd. in Ges. Naturf. Fr.* Neue Schr. IV, (1803), 187. A small tree 20–40 feet high. *Leaves* oblanceolate to oval, obtuse, 1–3 in. long. *Racemes* axillary, elongating in fruit. *Petals* minute, white. *Stamens* 5–10, about as long as the petals and also white. DC. Prodr. III, 22; W. & A. Prodr. 316; Miq. Fl. Ind. Bat. I, pt. I, 606; Dalz. & Gibs. Bomb. Fl. 90; Tulasne in Ann. Sc. Nat. Ser. IV, Vol. IV, p. 103; Bedd. Fl. Sylv. Pl. XXI; Brand. For. Fl. 221;

Kurz For. Fl. Brit. Burma I, 468; Clarke in Hook. fil. Fl. Br. Ind. II, 452. *Pyrranthus albus*, Wall. Cat. 4019. *Petaloma alternifolia*, Roxb. Fl. Ind. II, 372. *Bruguiera madagascariensis*, DC. Prodr. III, 23. Rheede Hort. Mal. VI, t. 37.

In Mangrove-swamps in all the Provinces. DISTRIB. British India, the Malayan Archipelago, North Australia and Polynesia.

4. COMBRETUM, Linn.

Shrubs with long pendent or scandent branches. *Leaves* entire, petioled, opposite or more seldom alternate or ternate. *Flowers* hermaphrodite or polygamo-dioecious, in spikes or panicles, bracteoles small. *Calyx-tube* constricted above the ovary, short or long-produced, urceolate funnel-shaped tubular or campanulate; limb 4–5-lobed, deciduous. *Petals* as many as the calyx-lobes, (0 in *C. apetalum*), placed on the calyx-limb. *Stamens* twice as many as the petals, inserted in two series with them. *Ovary* inferior, 1-celled; style 1, subulate, simple; ovules 2–5, pendent from the top of the cell. *Fruit* with 4–5 wings angles or ridges, dry, generally indehiscent. *Seed* 1; cotyledons plaited or flat, in a few species convoluted. DISTRIB. Species 160, common in the tropics of America, Africa and Asia; also in South Africa.

Flowers 5-merous; fruit 5-angled	1.	*C. trifoliatum.*
Flowers 4-merous; fruit 4-angled	2.	*C. tetralophum.*
Flowers 4-merous; fruit 4-winged :—		
Tube of calyx much elongate; flowers not squamose, buds ellipsoid, their apices very much pointed :—		
Flowers condensed in globose masses at the ends of the branches of the panicle	3.	*C. sundiacum.*
Flower-spikes elongated	4.	*C. extensum.*
Tube of calyx long; flowers squamose, buds globose, the apex rather acute	5.	*C. chinense.*
Tube of calyx short; buds not pointed :—		
Flowers squamose; leaves not cordate and with distinct petioles ·3–·4 in. long :—		
Fruit not compressed, its faces all narrow and equal, its wings broad and thin	6.	*C. squamosum.*
Fruit compressed, two of its faces broad and two narrow, its wings short and thick	7.	*C. Wrayi.*
Flowers not squamose; leaves cordate and with very short petioles (·05–·15 in. long) :—		
Leaves glabrous except the midrib :—		
Panicle and calyx with short thick glandular hairs	8.	*C. Kunstleri.*
Panicles cinereous-tomentose; flowers puberulous; fruit black when ripe and with narrow wings ...	9.	*C. nigrescens.*
Leaves, except when old, with long adpressed hairs beneath; panicles sericeous-tomentose; fruit pale-brown when dry, with broad thin wings	10.	*C. Scortechinii.*

1. Combretum trifoliatum, Vent. Choix t. 58. A powerful climber; young branches slender, terete, glabrous or puberulous; in the older branches the bark scaling off. *Leaves* coriaceous, opposite or alternate, oblong-lanceolate or oblong-oblanceolate, or narrowly elliptic, sub-acute, the base cuneate; both surfaces glabrous and shining; main nerves 5–7 pairs, spreading or ascending, distinct on the lower surface, hardly visible on the upper, reticulations indistinct; length 1·75–5·5 in., breadth ·8–2 in., petiole ·2–·25 in. *Spikes* axillary, solitary or in pairs, or terminal and in panicles, puberulous. *Flowers* ·15 in. in diam. at the mouth, densely crowded. *Calyx-tube* with a very short constriction above the ovary; the mouth wide, cupular, and with 5 broad triangular teeth, everywhere adpressed-pubescent externally. *Petals* lanceolate, slightly exceeding the calyx-lobes in length. *Disc* and bottom of the mouth of the calyx pubescent. *Stamens* exserted. *Fruit* 1·1–1·25 in. long and ·5 in. in diam., with 5 very acute angles, glabrous, dark-brown when ripe. G. Don in Trans. Linn. Soc. XV, 439; Miq. Fl. Ind. Bat. I, pt. I, 610; Kurz For. Fl. Brit. Burma I, 461; Clarke in Hook. fil. Fl. Br. Ind. II, 454. *C. lucidum*, Blume Bijd. 641. *C. undulatum* and *C. elegans*, Wall. Cat. 3993, 4003. *C. subalternans*, Wall. Cat. 4008? *Terminalia lancifolia*, Griff. Notul. IV, 685. *Embryogonia lucida*, Blume Mus. Bot. II, t. 52. *Cacoucia? trifoliata*, DC. Prodr. II, 22. *C. lucida*, Hassk. in Flora 1844, p. 607.

Trang; *King's Collector;* doubtless also occurring in other provinces. Distrib. British India, Java.

2. Combretum tetralophum, Clarke in Hook. fil. Fl. Br. Ind. II, 454. A powerful climber; young branches slender, with minute brown rusty scales. *Leaves* opposite, thinly coriaceous, oblong-elliptic, shortly acuminate, the base cuneate; upper surface glabrous, shining, the lower with scattered brown glands when young and puberulous on the midrib and nerves; main nerves 7 or 8 pairs, oblique, ascending, inconspicuous on both surfaces; length 2·5–5·5 in., breadth 1–2 in., petiole ·3–·4 in. *Spikes* axillary, solitary, much shorter than the leaves, slightly scaly below the flowers, very scaly and puberulous between them. *Flowers* ·1 in. in diam. at the mouth. *Calyx-tube* constricted above the ovary, the constricted part as long as the ovary; the mouth campanulate and with 4 ovate erect pubescent lobes. *Petals* slightly longer than the calyx-lobes but much narrower, linear. *Disc* and fundus of the mouth of the calyx rusty-villous. *Stamens* and *style* exserted. *Fruit* ·75–1 in. long and half as broad, shining, dark-coloured, the edges very acute but not winged.

Malacca; *Griffith* 2195. Perak; *King's Collector* 1012. Distrib. Siam, Borneo.

3. Combretum sundiacum, Miq. Fl. Ind. Bat. Suppl. 327. A very powerful climber; young branches closely covered with deciduous scales. *Leaves* opposite, thinly coriaceous, broadly elliptic to elliptic-orbicular, abruptly and very shortly acuminate; the base rounded, rarely slightly cuneate, sometimes unequal-sided; both surfaces glabrous, the upper punctate and with very sparse scales; the lower with the scales more numerous and white with dark centres; main nerves about 6 pairs, oblique, curving slightly, not prominent on the upper surface but slightly so on the lower when dry; length 2·75–4 in., breadth 1·8–2·75 in., petiole ·4–·8 in. *Panicles* axillary and terminal, umbellate, longer than the leaves, the branches ending in dense globose minutely bracteolate spikes. *Calyx-tube* about ·35 in. long, minutely pubescent, not scaly, 4-ridged along the ovary, above it cylindric, expanding upwards into a funnel-shaped mouth with 4 narrowly triangular-acuminate reflexed lobes; calyx inside with a ring of hairs at its base but not filled with long coarse hair, narrowly ovate and very acute in bud. *Petals* much shorter than the calyx-lobes, oval, not clawed, glabrous. *Stamens* exserted. *Fruit* about 1 in. long and nearly as broad, with 4 coriaceous horizontally-striate shining wings, and with a few minute scattered scales. Clarke in Hook. fil. Fl. Br. Ind. I, 458.

Malacca; *Maingay* 648. Singapore; *Hullett* 89; *Ridley* 4668. Perak; *Scortechini* 1016. *King's Collector* 4360, 4452, 5864, 7827; *Wray* 4272.

Readily recognised by its panicled inflorescence, the branches being umbellate and each ending in a globose spike of flowers with very acute buds which are not scaly.

4. Combretum extensum, Roxb. Hort. Beng. 28; Fl. Ind. II, 229. A large climber; young shoots rather slender, sometimes angled, very sparsely lenticellate. *Leaves* opposite or nearly so, coriaceous, broadly elliptic to sub-rotund, rarely ovate, the apex shortly and abruptly acuminate or sub-acute; the base broad and rounded, rarely slightly cuneate; both surfaces glabrous; the lower reticulate, punctate and slightly rough; main nerves 6 or 7 pairs, spreading, interarching a little way from the edge; length 4·5–7 in., breadth 2·75–4 in., petiole ·6–1·5 in., stout. *Spikes* axillary and solitary, or sometimes in few-branched panicles, rarely terminal, often as long as or longer than the leaves, puberulous. *Flowers* ·25 in. wide at the mouth when expanded; the buds ovate, very acute at the apices. *Calyx-tube* very long, (·35 in.) infundibuliform, puberulous; the mouth ·15 in. long, deeply cut into 4 triangular acuminate reflexed lobes. *Petals* ovate-truncate or obovate, shorter than the calyx-lobes; calyx with a ring of hairs at the throat inside, otherwise nearly glabrous. *Fruit* when fully ripe about 1·25–1·5 in. long, and (including the wings) nearly as broad, wings scariose,

glabrous or glandular-puberulous. Wall. Cat. 3996; G. Don in Trans. Linn. Soc. XV, 422; Miq. Fl. Ind. Bat. I, pt. I, 608; Kurz For. Fl. Brit. Burma I, 463; Clarke in Hook. fil. Fl. Br. Ind. II, 458. *C. rotundifolium*, Roxb. Fl. Ind. II, 226; Wall. Cat. 3995. *C. Wightianum*, Wall. Cat. 4007; W. & A. Prodr. 317; Wight Ic. t. 227; Dalz. & Gibs. Bomb. Fl. 90. *C. Horsfieldii*, Miq. l. c. 609; Kurz in Flora 1871, p. 289. *C. platyphyllum*, Heurck & Muell.-Arg. Obs. Bot. 242; Kurz in Journ. As. Soc. Beng. 1874, pt. II, 188. *C macrostachyum*, Wall. Cat. 3997. *C. latifolium*, Blume Bijd. 641; Miq. l. c. 609. *C. leucanthum*, Heurck & Muell.-Arg. Obs. Bot. 240. C. *formosum*, Griff. Notul. IV, 682, (*fide* Kurz).

Malacca; *Derry* 386. Andaman Islands; very common. Not common in the other Provinces. Distrib. British India.

5. Combretum chinense, Roxb. Hort. Beng. 28. A powerful climber; young branches slender, terete, with sparse minute scales. *Leaves* opposite, or in whorls of three (var. *ternatum*), thinly coriaceous, elliptic or elliptic-oblong, sometimes obovate, shortly and abruptly acuminate, the base slightly narrowed; both surfaces glabrous, sparsely squamulose like the young branches and inflorescence, the upper surface of a dark colour when dry, the lower pale-brown (pubescent in var. *pubescens*); main nerves 7 or 8 pairs, spreading, curved, slightly prominent on the lower surface, scarcely visible on the upper; length 3·25–5 in., breadth 1·5–2·25 in., petiole ·15–·4 in. *Spikes* solitary, axillary, longer than the leaves, many-flowered; the bracteoles linear, deciduous. *Calyx-tube* ·25 in. long, slender at the base, expanding into a funnel-shaped mouth ·15 in. in diam. when fully expanded, with 4 deep erect triangular acute scaly lobes, globular when in bud but the apex acute. *Petals* broadly obovate, clawed, longer than the lobes of the calyx, glabrous. *Disc* and interior of calyx fulvous-pubescent. *Fruit* 1–1·25 in. long and ·8–1 in. broad, with 4 slightly unequal scarious coriaceous horizontal striate sparsely squamulose wings. Roxb. Fl. Ind. II, 230 (*not of G. Don*); Kurz For. Flora Burma, I, 463; Clarke in Hook. fil. Fl. Br. Ind. II, 457. *? C. Griffithii*, Heurck and Muell.-Arg. Obs. Bot. 231.

Andaman Islands; very common. Perak; *Wray* 2314, 2743. *King's Collector* 4646.

Var. *ternatum*; Clarke in Hook. fil. Fl. Br. Ind. II, 453; leaves often in whorls of three, usually obovate. *C. ternatum*, Wall. Cat. 4002.

In the Andamans (doubtful). Distrib. Chittagong. Burma.

Var. *Porterianum*, Clarke in Hook. fil. Fl. Br. Ind. II, 457; leaves elliptic-oblong, acuminate, never obovate, main nerves about 8 pairs. *C. Porterianum*, Wall. Cat. 4000.

Penang.

This variety does not appear to have been collected since Wallich's time. I much doubt whether it is worth keeping up even as a variety.

Var. *pubescens*, King. *Leaves* pubescent in the under surface.

Perak; *King's Collector* 889.

6. Combretum squamosum, Roxb. Fl. Ind. III, 231. A large creeper; young branches slender, cylindric, covered (like almost all other parts of the plant) with scales with broad pale margins. *Leaves* opposite, thinly coriaceous, broadly elliptic or elliptic-rotund, rarely ovate-lanceolate, shortly and abruptly acuminate; the base rounded, rarely sub-cuneate; both surfaces dull when dry and scaly, but without hairs; length 3·25–5·5 in., breadth 2·25–4·5 in.; petiole ·3–·4 in., scaly. *Spikes* axillary or terminal, solitary or in panicles, shorter than the leaves, few-branched. *Flowers* ·15 in. in diam. at the mouth. *Calyx-tube* shortly constricted above the 4-angled ovary; the mouth cupular, with 4 broadly triangular teeth. *Petals* small, obovate. *Disc* and fundus of mouth of calyx fulvous-villose. *Fruit* ·75–1·5 in. long and nearly as broad (including the wings), with 4 wide thin membranous wings, squamose at the bottom of the deep grooves between the wings. Wall. Cat. 3987; Miq. Fl. Ind. Bat. I, pt. I, 607; G. Don in Trans. Linn. Soc. XV, 438 (*inaccurate as to the floral symmetry*); W. & A. Prodr. 317; Kurz For. Fl. Brit. Burma I, 463; Clarke in Hook. fil. Fl. Br. Ind. II, 456. *C. lepidotum*, Presl Bemerk. 142 (*see Kurz in Flora 1871, p. 289*). *C. Maluloea*, Wall. Cat. 3991.

Malacca; *Maingay* 648. Andaman Islands. Perak; *King's Collector* 5083. Penang; *Wallich, King's Collector* 1335, *Curtis* 258.

A species easily recognised by being everywhere covered with scales. Some of the Penang specimens have ovate-elliptic leaves; otherwise they do not differ from specimens from other places.

7. Combretum Wrayi, King n. spec. Young branches slender, striate when dry, glabrous but slightly scaly. *Leaves* opposite, coriaceous, narrowly elliptic, subacute or very shortly and bluntly acuminate, the base rounded; both surfaces reticulate, the upper glabrous and shining; the lower dull, glabrous elsewhere, but with some coarse hairs along the sides of the midrib near its base; main nerves 6 or 7 pairs, ascending, curved, slightly prominent beneath; length 2·5–3·5 in., breadth 1·15–1·5 in.; petiole ·35–·4 in., rather rough when dry, those in the upper part of the stem and in the axils of which the spikes arise much smaller. *Spikes* axillary, solitary, about 1 in. long, the peduncles glabrous, the floriferous part pubescent and scaly. *Flowers* few, in clusters of 2 or 3. *Calyx-tube* ·15 in. long, shortly constricted above the ovary, the mouth campanulate and deeply cut into 4 triangular acute erect

teeth, every part densely covered with brown scales externally. *Petals* slightly exceeding the calyx-lobes, oblanceolate, obtuse, glabrous, erect. *Stamens* 8, exserted. *Fruit* compressed, ovate, pointed at each end, dark-brown when dry, with 4 short wings, about 1·2 in. long and ·6 in. broad on the compressed surfaces, the other two surfaces narrow and grooved, all parts sparsely scaly.

Perak; sea-shore at Matang, *Wray* 2504.

8. Combretum Kunstleri, King n. spec. A powerful climber; young shoots slender, terete, very slightly puberulous and with very few scattered rusty hairs intermixed. *Leaves* opposite, narrowly elliptic or elliptic-oblong, shortly and bluntly acuminate, slightly narrowed to the minutely cordate base; upper surface glabrous except the minutely pubescent midrib, shining; the lower dull, glabrous even on the midrib; main nerves 5–7 pairs, ascending, curving, length 3–5·5 in., breadth 1·1–1·85 in.; petiole ·1 in. or less, glabrous. *Panicles* axillary and shorter than the leaves or terminal and much longer, pedunculate, with many short thick glandular hairs, the branches rather short and spreading, bracteoles shorter than the ovaries. *Calyx-tube* about ·1 in. long, constricted both below and above the ovary, the limb widely campanulate and with 4 very shallow broad reflexed teeth, clothed outside with glandular hairs. *Petals* inserted near the edge of the calyx-limb and projecting beyond its lobes, broadly ovoid, reflexed, pubescent. *Fruit* 4-winged, tapering to the ends (when young), unknown in the ripe state.

Perak; *King's Collector* 3435, 6664; *Scortechini* 2014.

9. Combretum nigrescens, King n. spec. A slender climber 20–40 feet long; young branches rusty-puberulous and with sparse long rusty-silky hairs. *Leaves* opposite, membranous, black when dry, narrowly elliptic to oblong, shortly acuminate, the base rounded, the petioles very short; upper surface shining, glabrous except the rusty-sericeous midrib; lower surface with the midrib and main nerves rusty-sericeous, the intercostal spaces almost glabrous; length 2·25–2·75 in., breadth ·75–1 in., petiole less than ·1 in. *Panicles* terminal, lax, spreading, longer than the leaves, minutely cinereous-tomentose with a few long rusty hairs intermixed, the branches interruptedly spicate, bracteoles shorter than the calyx-tube. *Calyx-tube* only about ·05 in. long; the limb rather longer, campanulate and with 4 rather shallow broad acute teeth, puberulous on the outer surface, pubescent on the inner, with a wing of hairs in the throat. *Petals* about as long as the calyx-lobes, broadly ovate or slightly obovate, blunt, puberulous on the outer surface, sericeous on the inner. *Stamens* 8, unequal, the outer row the longest. *Fruit* black when dry, shining, glabrous, with 4 narrow wings, ·8 in. long and ·4 in. broad.

Perak; *King's Collector* 3469, 8140.

10. Combretum Scortechinii, King n. spec. Young branches slender, softly sericeous-tomentose. *Leaves* opposite, thinly coriaceous, oblong-elliptic or sometimes oblong-oblanceolate, the base rounded or very minutely cordate; upper surface shining, glabrous except the depressed rusty-sericeous midrib; lower surface reticulate, with many long adpressed hairs near the base and along the prominent midrib, the nerves and intercostal spaces with shorter scattered hairs, when old almost glabrous; main nerves about 7 pairs, ascending, curved, prominent on the lower surface, slightly depressed on the upper, length 3·25–4·5 in., breadth 1·4–1·75 in., petiole ·1–·15 in. *Panicles* axillary and terminal, shorter than the leaves; the branches few, short and few-flowered, everywhere softly sericeous-tomentose. *Calyx-tube* ·1 in. long, cylindric; the mouth slightly longer, widely campanulate, with 4 shallow broad acute reflexed teeth, softly tomentose like the tube. *Petals* 4, inserted near the edge of the calyx and projecting beyond it, broadly ovate-lanceolate, reflexed, pubescent. *Stamens* 8, exserted. *Fruit* with 4 thin sub-coriaceous wings, pointed at each end, glabrous, 1·25 in. long, and ·65 in. broad.

Perak; *Scortechini.*

Collected only once, and the specimens are few.

5. Quisqualis, Linn.

Large shrubs scandent or subscandent. *Leaves* opposite, oblong or obovate, acuminate, entire. *Flowers* large, in short axillary or terminal spikes. *Calyx-tube* slender and much prolonged above the ovary, deciduous, its limb 5-lobed. *Petals* 5. *Stamens* 10, short. *Ovary* 1-celled; style filiform, partially adherent to the calyx-tube, stigma sub-capitate; ovules 3 or 4, suspended from the apex of the loculus. *Fruit* dry, 5-angled or 5-winged, coriaceous, subindehiscent. *Seed* solitary, cotyledons plane. Distrib. Species 5, tropical Asian or African.

Calyx-tube less than 1 in. long	...	...	...	1. *Q. densiflora.*
Calyx-tube from 1·5–2·5 in. long	...	...	...	2. *Q. indica.*

1. Quisqualis densiflora, Wall. Cat. 4011. Young branches minutely rusty-puberulous. *Leaves* elliptic-oblong or oblanceolate-oblong, shortly acuminate, the base rounded or minutely cordate; upper surface glabrous except the pubescent midrib and main nerves; lower surface glabrous, the 6 pairs of curved ascending main nerves with tufts of hair in their axils; both surfaces shining and minutely papillose; length 3·5 to 4·5 in., breadth 1·5–2 in.; petiole ·2–·3 in., pubescent on the upper surface. *Spikes* axillary and solitary, or terminal and almost panicled, rusty-pubescent; bracteoles lanceolate, sub-persistent, rusty-

pubescent, ·5–·75 in. long. *Calyx-tube* produced beyond the ovary for ·25–·5 in., cylindric, rusty-tomentose; its mouth funnel-shaped and deeply divided into 5 narrow lanceolate-subulate lobes. *Petals* shorter than the calyx-lobes, oblong, obtuse, about ·2 in. long, scarlet, rusty-pubescent on the outer side, nearly glabrous on the inner. *Fruit* oblong, shining, with 5 rather narrow unequal thin coriaceous wings, 1 in. long and ·65 in. broad.

Penang; *Wallich.* Perak; *Wray* 3353.

2. Quisqualis indica, Linn. Sp. Pl. 556. Young branches deciduously rusty-pubescent. *Leaves* elliptic, shortly acuminate, the base rounded; both surfaces more or less rusty-pubescent, nearly glabrous when adult except the midrib and nerves, always minutely papillose; main nerves 6–8 pairs, ascending, little curved, length 3–4 in., breadth 1·5–2 in., petiole about ·3 in. *Spikes* axillary, their rachises shorter than the leaves, many-flowered, very unequal, rusty-tomentose; bracts lanceolate, sub-persistent, ·35 in. long, pubescent. *Calyx-tube* produced beyond the ovary for 1·5–2·5 in., its mouth short, funnel-shaped and divided into 5 broad triangular acute lobes. *Petals* oblong or oblong-rotund, obtuse, ·5 in. or more in length, red, puberulous. *Fruit* narrowly ellipsoid, tapering much to the apex, less so to the base, sharply 5-angled, almost 5-winged, glabrous and of a deep brown colour, ·75–1·25 in. long and from ·3–·45 in. broad. Lour. Fl. Cochinch. 336; Lamk. Ill. t. 357; DC. Prodr. III, 23; Roxb. Fl. Ind. II, 427; Wall. Cat. 4010; Wight Ill. t. 92; W. & A. Prodr. 318; Miq. Fl. Ind. Bat. I, pt. I, 610; Brandis For. Fl. 220; Clarke in Hook. fil. Fl. Br. Ind. II, 459; *Q. villosa*, Roxb. Fl. Ind. II, 426; Spreng. Syst. II, 331; DC. Prodr. III, 23. *Q. glabra*, Burm. Fl. Ind. t. 28. *Q. pubesecens*, Burm. Fl. Ind. t. 35. *Q. ebracteata*, Beauv. Fl. Owar. t. 35. *Q. Loureiri*, G. Don Gen. Syst. II, 667. *Q. sinensis*, Lindl. in Bot. Reg. N.S. Vol. XXX, t. 15. *Q. longiflora*, Presl Epimel. 216. *Quisqualis sp.*, Griff. Notul. IV, 683. Rumph. Herb. Amboin. V, t. 38.

Malacca, and probably truly wild; in the other provinces often cultivated as a garden plant. Distrib. Burma.

6. Illigera, Blume.

Scandent shrubs. *Leaves* alternate, petioled, with three entire petioluled leaflets. *Flowers* in elongate lax peduncled cymes; bracteoles 1–3 at the base of each flower. *Calyx-tube* shortly constricted above the ovary; limb of 5 valvate oblong deciduous lobes. *Petals* 5, valvate, oblong, alternate with and as long as the calyx-lobes. *Stamens* 5, epigynous, filament near the base carrying on each side a staminode; anthers dehiscing by lateral valves. *Ovary* 1-celled; style, 1, filiform,

ending in a dilated undulate sinuate stigma; ovule 1, pendulous from the apex of the cell. *Fruit* broadly 2–4-winged (2-winged in the known Indian species), the wings veined. *Seed* with plano-convex (not convoluted) cotyledons. Distrib. Species about 7, extending from Khasia to Singapore, Malaya and the Philippines; and one aberrant species in Angola having 5 leaflets.

Main nerves of leaves 2 or 3 pairs, oblique ...	... 1. *T. appendiculata.*
Main nerves of leaves 12–14 pairs, horizontal ...	... 2. *T. lucida.*

1. Illigera appendiculata, Blume Bijdr. 1153; Nov. fam. exp. p. 14. A powerful climber 40–80 feet long; young branches slender, tawny-pubescent, soon becoming glabrous, striate when dry. *Common petiole* about 3 in. long, with an annular swelling at the base, glabrous or glabrescent. *Leaflets* thinly membranous, very variable in shape, often oblique, oblong, elliptic to sub-rotund, the apex shortly acuminate acute or sub-acute; the base cuneate or rounded, sometimes unequal-sided; upper surface usually glabrous; the lower very minutely lepidote, glabrous or pubescent all over or only on the 2 or 3 pairs of oblique indistinct main nerves; length 3–5·5 in., breadth 1·75–4 in., petioles ·2–·6 in. *Panicles* pendulous, very lax, 9–15 in. long, glabrous below but usually pubescent towards the extremities, the branches cymose. *Flowers* ·2–·35 in. in diam., on pubescent pedicels shorter than themselves. *Calyx* puberulous. *Petals* lanceolate, narrower than the lobes of the calyx, their midribs thick. *Stamens* curved inwards, longer than the staminodes when unfolded. *Fruit* narrowly oblong, tapering at the ends, 4-angled, minutely tomentose, 1–1·25 in. long, two of its margins produced into broadly oblong obtuse horizontally striate puberulous leathery wings 1·25 in. or more in width. DC. Prodr. XV, pt. I, 251; Kurz For. Flora Burma, I, 469. *I. Coryzadenia*, Meissn. DC. Prodr. XV, Pt. I, 251; Clarke in Hook. fil. Fl. Br. Ind. II, 460; *Coryzadenia trifoliata*, Griff. Notulæ, IV, 356.

Common in Perak and the Andaman Islands, and probably to be found in all the other Provinces. Distrib. British India, in Burma and Assam.

Variable in the shape and pubescence of the leaflets, the under surfaces of some being rather densely pubescent, while others are almost quite glabrous. For a form of the latter sort, the under surfaces of which are moreover somewhat glaucous, Kurz suggested the varietal name *pubescens*. Individual plants vary also as to the size of their flowers. The following, which I treat as a variety, was made a species by Clarke in Hooker's Flora of British India.

Var. *Kurzii*, *leaves* glabrous, not lepidote, very coriaceous, the margin recurved and thickened. *I. Kurzii*, Clarke l. c.

Malacca; *Maingay* 650, 649.

2. Illigera lucida, Teysm. & Binn. Nat. Tijds. Ned. Ind. XXVII, 29. A slender climber; young shoots puberulous, angled when dry. *Common petiole* ·75–2 in. long, glabrous. *Leaflets* membranous, oblong or elliptic-oblong, often oblique, the apex shortly and bluntly acuminate; the base rounded and usually minutely cordate; both surfaces glabrous and shining; the lower reticulate; main nerves 12–14 pairs, horizontal, interarching far from the edge, slightly prominent on the lower surface, obsolete on the upper; length 3–5 in., breadth 1·25–2·25 in., petiole ·15–·3 in. *Panicles* axillary and terminal, very lax; the ultimate branches sparse, few-flowered. *Flowers* ·3 in. in diam., on thin puberulous pedicels. *Calyx-lobes* oblong, sub-acute, glabrous except for a patch of white hairs at the base in front. *Petals* about as long as the calyx-lobes but much narrower, villous at the base. *Stamens* shorter than the petals, the anthers large, the filaments villous in the lower half. *Fruit* (*fide* T. & B.) 4-winged, two of the wings larger than the other two, glabrous, about 1 in. long. Miq. Fl. Ind. Bat. Vol. I, pt. I, 1094.

Perak; *Scortechini* 1610, *Curtis* 3182. Distrib. Java.

This differs from *I. appendiculata*, Bl. in having narrower leaflets, with much shorter petioles and more numerous nerves which are quite horizontal. The leaves are moreover quite glabrous and shining. The Perak specimens from which the above description has been taken agree absolutely with type specimens of *I. lucida* received at the Calcutta Herbarium from the Buitenzorg Botanic Garden.

7. Gyrocarpus, Jacq.

A tall tree. *Leaves* alternate, long-petioled, large, entire or lobed, clustered towards the ends of the branches. *Flowers* small, unisexual, very numerous, clustered in large branched cymes without bracts. *Male* flowers very numerous; calyx 4–7-partite; *petals* 0; *stamens* 4–7, inserted at the base of the calyx with as many alternate clavate glands; *anthers* 2-celled, dehiscing by valves; *ovary* 0. *Female* or *hermaphrodite* flowers few; *calyx-tube* adherent to the ovary, limb 2-partite, persistent, enlarging in fruit; *petals* and *stamens* 0; *ovary* 1-celled; style 0, stigma sessile; ovule solitary, pendulous from the apex of the cell. *Nut* bony, crowned by the elongate spathulate coriaceous calyx-lobes. *Seed* with convolute cotyledons. A single species.

Gyrocarpus americanus, Jacq. Select. Am. 282. t. 178. Young branches stout, glabrous. *Leaves* membranous, broadly rotund-ovate, acuminate, the base broad and sometimes sub-cordate; the base usually 5-nerved, the midrib with about 3 pairs of main nerves; length 4·5–6 in., breadth 4 or 5 in., petiole 3–5·5. *Fruit* sub-globular, about 1 in. in diam., minutely pubescent; the wing narrowly spathulate, ·3 in. long. *G. Jacquinii*, Gaertn. Fruct. II. 92; Roxb. Hort. Beng. 11, Cor. Pl. t.

I; Fl. Ind. I, 445; Lamk. Ill. t. 850; Bedd. Fl. Sylv. t. 196; Kurz For. Fl. Brit. Burma I, 470; Clarke in Hook. fil. Fl. Br. Ind. II, 461. *G. asiaticus*, Willd. Sp. Pl. IV, 982; Wall. Cat. 968; Miq. Fl. Ind. Bat. I, pt. I, 978; DC. Prodr. XV, pt. I, 248. *G. acuminatus*, Meissn. in DC. Prodr. XV, pt. I, 248. *G. sphenopterus* and *G. rugosus*, R. Br. Prodr. 405.

On the Sea-Coast in all the provinces. DISTRIB. Tropics generally.

The anthers of this species are two-celled and dehisce by upward-opening valves. Those of the genus *Hernandia* are also 2-celled, but dehisce by valves which open laterally. In habit and form of leaves *Gyrocarpus* much resembles *Hernandia*; whereas it is quite an aberrant form amongst *Combretaceæ*, as is also *Illigera*.