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Materials for a Flora of the Malayan Peninsula.—By GEORGE KING,
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No. 10.

I had hoped in the present contribution to have completed, for these *Materials*, my account of the whole of the remaining Natural Orders of *Calycifloræ*. This hope has, however, been frustrated by sickness. I have decided therefore to offer now to the Society the account of the five Orders which I have been able to elaborate; trusting, at some time in the near future, to deal with the remaining Orders of the Class. Following the sequence adopted by Sir Joseph Hooker in his *Flora of British India*, those treated of in the present paper come to be numbered as below; Nos. 48 *Lythraceæ*, 49 *Onagraceæ*, 50 *Samydaceæ*, 52 *Cucurbitaceæ*, and 56 *Araliaceæ*. And those which remain to be described would be Nos. 46 *Myrtaceæ*, 47 *Melastomaceæ*, 51 *Passifloraceæ*, 53 *Begoniaceæ*, 54 *Ficoideæ*, 55 *Umbellifereæ*, and 57 *Cornaceæ*. After finishing the *Calycifloræ*, I hope, in collaboration with my friend and successor, Dr. D. Prain, to describe the families which are embraced in the gamopetalous and apetalous groups.

Order XLVIII. LYTHRACEÆ.

Trees, shrubs or herbs; branches often quadrangular. *Leaves* entire, opposite, sometimes alternate or whorled; stipules 0. *Inflorescence* various, often in cymes or panicles. *Flowers* hermaphrodite, regular,
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rarely oblique, unisexual in *Cyrpteronia*. *Calyx-tube* free, persistent; lobes 3-6, valvate, some accessory often added. *Petals* as many as the calyx-teeth, rarely 0, inserted near the mouth of the calyx-tube. *Stamens* definite or numerous, inserted on the calyx-tube. *Ovary* free in the bottom of the calyx-tube (rarely inferior), 2-6-celled, style long; stigma capitate, rarely 2-lobed; ovules numerous, placentas axile (rarely parietal). *Fruit* coriaceous or membranous, free or more or less adnate to the base of the calyx, 2-6-celled or (by absorption of the partitions) 1-celled, dehiscent or indehiscent. *Seeds* numerous, various in shape, angular, sometimes winged; albumen none; embryo straight, (cotyledons convolute in *Sonneratia* and *Punica*.) **DISTRIB.** Species about 275 in tropical regions and especially in those of the New World; a few in temperate zones.

Tribe I. **AMMANNIÆ.** Herbs, mostly sub-aquatic, with small or minute flowers; the calyx membranous 1. **AMMANNIA.**

Tribe II. **LYTHREÆ.** Trees or shrubs with moderate or large-sized flowers (minute in *Crypteronia*), large often wrinkled petals, and coriaceous or herbaceous calyx.

Stamens not more than 12.

Calyx 6-toothed; petals 6; stamens 12; capsule circumscissile, 1-celled; seeds cuneate-obovate, angled 2. **PEMPHIS.**

Calyx 4- or 5-toothed; petals 0; flowers numerous, minute, racemose, sub-unisexual; stamens 4 or 5; capsule 2-celled and 2-valved; seeds minute, narrowly winged on one side 3. **CRYPTERONIA.**

Stamens indefinite.

Seeds free, not imbedded in pulp.

Stamens in 2 or more rows; capsule 3-6-celled; seeds large, winged laterally 4. **LAGERSTREMIÆ.**

Stamens in a single row; capsule 4-8-celled; seeds minute, narrowly winged at the upper margin 5. **DUABANGA.**

Seeds imbedded in pulp, angular; berry 10-15-celled 6. **SONNERATIA.**

1. **AMMANNIA**, Linn.

Annual glabrous herbs growing in damp places; branches often quadrangular. *Leaves* opposite and alternate, sometimes whorled, entire; stipules 0. *Flowers* small, axillary, solitary and sessile, or in small trichotomous cymes; bracteoles usually 2. *Calyx* campanulate or tubular-campanulate, 3-5-toothed, often with minute interposed teeth or folds. *Petals* 3-5 or 0, small, inserted between the calyx-teeth. *Stamens* 2-8, inserted on the calyx-tube. *Ovary* enclosed in the calyx-tube, 1-5-celled, the septa very thin and often absorbed; style filiform or short, stigma capitate; ovules numerous, placentas axile. *Capsule* membranous, globose or elongated-ellipsoid, enclosed in the calyx, 2-3-valved,

irregularly breaking up, or circumscissile. *Seeds* many, small, smooth, round on the back and with a raphe on the inner face, ellipsoid or nearly hemispheric; placenta ultimately free central by the absorption of the dissepiments covered by the seeds. **DISTRIB.** Species 30; in the tropical or warm temperate zones of the whole world.

Flowers sessile, calyx-tube elongate-campanulate, capsule ellipsoid, seeds narrowly oblong, falcate ... 1. *A. peploides*.
 Flowers pedicelled, calyx-tube depressed-hemispheric, capsule depressed-globose, seeds sub-hemispheric... 2. *A. baccifera*.

1. **AMMANIA PEPLOIDES**, Spreng. Syst. I, 444. *Flowers* in short axillary branches, sessile, solitary in the axils of reduced leaves; bracts in pairs, filiform, shorter than the tube of the calyx. *Calyx-tube* elongate-campanulate, almost smooth, its mouth with 4 acutely triangular teeth. *Petals* absent, or 4 and minute. *Capsule* 2-valved, ellipsoid; *seeds* narrowly oblong, sub-falcate, pink, angular, the hilum obscure. *Leaves* opposite, their midribs prominent; those of the flower-bearing branches linear-oblong, bearing a flower in the axil of each; those of the main stem elliptic or obovate, narrowed to the base and almost petiolate. *Stems* decumbent, often rooting, sometimes erect. Boiss. Flor. Orient. II, 742; Kurz in Journ. As. Soc. 1877, pt. II, 84; Clarke in Hook. fil. Flor. Br. Ind. II, 566. *A. nana*, Roxb. Flor. Ind. I, 427, (not of Wallich). *A. repens*, Rottl., DC. Prodr. III, 80. *Ameletia indica*, DC. in Mem. Soc. Hist. Nat. Genev. III, 11 (1825) 2, and 82, t. 3 f. A.; Prodr. III, 76; Wall. Cat. 2093; W. & A. Prodr. 303; Blume Mus. Bot. II, 135, t. 47; Dalz. & Gibs. Bomb. Flor. 96; Wight Ic. t. 257. *A. elongata*, Blume Mus. Bot. II, 135. *A. acutidens*, Miq. Flor. Ind. Bat. I, Pt. I, 617. *A. polystachya*, Wall. Cat. 2094. *A. latifolia*, Wall. Cat. 2096, (partly *Peplis indica*,) Willd. Sp. Pl. II, 244.

SOUTH ANDAMAN; near the settlements of Port Blair and Port Mowat; doubtless introduced as a weed of cultivation. **DISTRIB.** India, China, Persia; in rice and other fields.

2. **AMMANIA BACCIFERA**, Linn. Sp. Pl. 120. *Flowers* in very condensed axillary racemes or clusters shorter than the leaves; bracts filiform, shorter than the flower-pedicels. *Calyx-tube* widely campanulate, short, ridged; the teeth 4, broadly triangular, acute. *Petals* none or minute. *Capsule* depressed-globose, imperfectly circumscissile above the middle. *Seeds* sub-hemispheric, black, excavated on the plane face. *Leaves* opposite, rather distant, linear-oblong, sub-acute or obtuse, narrowed at the base, smaller upwards, 2-5 in. long. *Stem* erect, glabrous, 8-24 in. long. Blume Mus. Bot. Lngd. Bat. II, 133; Dalz. & Gibs. Bomb. Flor. 97; Kurz in Journ. As. Soc. 1877, Pt. II, 85; Clarke in Hook. fil. Flor. Br. Ind. II, 569. *A. vesicatoria*, Roxb. Hort. Beng. 11

Flor. Ind. I, 426; ed. Wall. I, 447; DC. Prodr. III, 78; W. & A. Prodr. 305; Wall. Cat. 2098, (partly). *A. indica*, Lamk. Ill. I, 311, No. 1555; DC. l. c. 77; W. & A. Prodr. 305; Wall. Cat. 2099; Blume l. c. t. 46. *A. debilis*, Ait. Hort. Kew, ed. 1, I, 163. *A. verticillata*, Boiss. Flor. Orient. II, 743, (not of Link). *Hapalocarpum vesicatorium* and *H. indicum*, Miq. Flor. Ind. Bat. I, Pt. I, 618. *Cryptotheca apetalata*, Blume Bijl. 1128; DC. l. c. 76.

PERAK; *King's Collector* 303; *Curtis* 3195. S. Andaman, in similar situations with the last.

2. PEMPHIS, Forst.

A maritime shrub or tree, 25–35 ft. high. *Leaves* opposite, oblong to oblong-lanceolate, entire, very thick, fleshy. *Flowers* small, axillary, solitary, peduncles 2-bracteate at their base. *Calyx-tube* campanulate, 12-∞-ribbed; teeth 6, short, with 6 shorter accessory teeth. *Petals* 6, inserted at the mouth of the calyx-tube and nearly as long, obovate, wrinkled, white or rose. *Stamens* 12, inserted in two series towards the middle of the calyx-tube. *Ovary* free at the bottom of the calyx-tube, 3-celled at the base; style long, stigma capitate; ovules many, ascending; placentas 3, sub-basal. *Capsule* coriaceous, obovoid or nearly globose, included in the calyx-tube or exerted nearly half its length, somewhat irregularly circumscissile, ultimately 1-celled. *Seeds* very many, long cuneate-obovoid, angular, smooth, standing out in all directions from the apparently free central placenta.

PEMPIS ACIDULA, Forst. Gen. t. 34. Young parts more or less clothed with grey silky hairs, the young branches 4-angled. *Leaves* subsessile or very shortly petioled, sub-acute or obtuse, .5–1.5 in. long. *Flowers* white. *Capsule* .4 in. long and .2 in. in diam. DC. Prodr. III, 89; Wall. Cat. 2108; W. and A. Prodr. 307; Griff. Notul. IV, 510; Blume Mus. Bot. II, t. 43; Miq. Flor. Ind. Bat. I, pt. I, 619; Bedd. Flor. Sylv. Anal. Gen. t. XIV, fig. 5; Kurz For. Flor. I, 518. *P. angustifolia*, Roxb. Hort. Beng. 91; Flor. Ind. II, 465. *P. setosa*, Lour. Flor. Filip. ed. I, 410. *Maclellandia Griffithiana*, Wight Ic. t. 1996. *Lythrum Pemphis*, Linn. f. Suppl. 249; Lamk. Ill. II, 408, fig. 2. *Melanium fruticosum*, Spreng. Syst. II, 445.

On the beech in SINGAPORE and probably in all the provinces. ANDAMAN and GREAT COCO ISLANDS; *Prair*. DISTRIB. Burma, Ceylon, S. of British India.

3. CRYPTERONIA, Blume.

Trees. *Leaves* opposite, petioled, entire, ovate or lanceolate. *Racemes* elongate, in branched panicles. *Flowers* minute, white or green,

with short linear bracts at the base of the pedicels, polygamo-dioecious. *Calyx-tube* short, saucer-shaped, or longer and subhemispheric; teeth 5 (rarely 4), valvate, persistent. *Petals* 0. *Stamens* as many as the calyx-teeth, inserted between them near the mouth of the calyx-tube. *Ovary* free, 2-celled, with numerous horizontal or ascending ovules attached to the axile placentas; style long, filiform; stigma capitate, obscurely 2-lobed. *Capsule* surrounded at the base by the calyx, globose, pubescent, crowned by the persistent style, 2-celled, dehiscing so as to divide the style, fruit-pedicle deflexed. *Seeds* many, elongate-ellipsoid, narrowly winged on one side. **DISTRIB.** Species 5, extending from the Khasia Hills to the Philippine Islands.

Leaves membranous, usually narrowed to the base, nerves
5 or 6 pairs, calyx less than '1 in. in diam. 1. *C. paniculata*.

Leaves coriaceous, rounded or cordate at the base, nerves
7 or 8 pairs, calyx more than '1 in. in diam. 2. *C. Griffithii*.

1. **CRYPTERONIA PANICULATA**, Blume Bijdr. 1151. A tree 20–40 feet high; young branches glabrous or sometimes puberulous. *Leaves* membranous, oblong to oblong-lanceolate or more or less broadly elliptic, bluntly acuminate or blunt, narrowed to the base, entire, glabrous on both surfaces or slightly pubescent on the lower; main nerves 5 or 6 pairs, rather faint, curved; length 3–6 in., breadth 1·25–2·5 in. *Flowers* on short pedicels, very numerous, in long cylindrical pubescent or glabrous racemes longer than the leaves, the racemes often paniced. *Calyx* less than '1 in. in diam., its teeth triangular or triangular-lanceolate, acute. *Stamens* in the hermaphrodite flowers of the same length as the calyx-teeth, longer in the male flowers. *Capsules* globose-conic, puberulous or minutely velvety. Kurz in Journ. As. Soc. Beng. 187, Pt. II, 86; For. Flora Burma, I, 519. *C. pubescens*, Blume Mus. Bot. Lugd. Bat. II, 123; Clarke in Hook. fil. Flor. Br. Ind. II, 574; Griff. Notul. IV, 404; Ic. Pl. Asiat. t. 564, fig. II. *C. glabra*, Blume Mus. Bot. II, 123; Clarke in Hook. fil. Flor. Br. Ind. II, 574. *Henslowia pubescens*, Wall. Cat. 4904; Pl. As. Rar. III, 14 t. 221; Miq. Flor. Ind. Bat. I, Pt. I, 716; Planch. in Hook. Lond. Journ. Bot. IV, 477, t. XVI. *B. Henslowia Hookeri*, Wall. Cat. 8566. *H. affinis*, Planch. Lond. Journ. Bot. IV, 477 (*in part*). *H. leptostachys*, Planch. Lond. Journ. Bot. IV, 478. *H. glabra*, Wall. Cat. 4093; Pl. As. Rar. III, 14; Planch. in Hook. Lond. Journ. Bot. IV, 478; Miq. Flor. Ind. Bat. I, Pt. I, 716.

PENANG; *Porter*. MALACCA; *Maingay* (Kew Distrib. 650/2). PERAK; *King's Collector* No. 5205. ANDAMAN ISLANDS; very common; *King's Collector*. **DISTRIB.** Burma, Chittagong, Khasia.

I can find nothing better to distinguish the species which have been named

C. glabra and *C. pubescens* from each other than the presence on the latter of a small amount of hair, neither can I find any tangible character to separate either from *C. paniculata*, Blume. To the latter species, as the oldest, I therefore reduce both.

2. *CRYPTERONIA GRIFFITHII*, Clarke in Hook. fil. Flor. Br. Ind. II, 574. A tree 40–60 feet high; young branches glabrous. *Leaves* coriaceous, broadly elliptic, acute, very slightly narrowed to the rounded or cordate base, entire, glabrous on both surfaces; main nerves 7 or 8 pairs, distinct on the lower surface, curved, ascending; length 4–8 in., breadth 2.25–3.5 in. *Racemes* much longer than the leaves, rusty-pubescent, sometimes paucicled; *flowers* numerous but not crowded, shortly pedicellate. *Calyx* rather more than .1 in. in diam., its teeth triangular. *Stamens* exerted. *Capsule* shorter than the calyx-teeth, velvety, less than .1 in. in diam., crowned by the long stout pubescent style. *Henslowiæ* sp. Griff. Notul. 406; Ic. Pl. Asiat. t. 564, fig. 1.

MALACCA; *Griffith* 2513. *Maingay* (Kew Distrib.) 651. *Derry* 1201. PENANG; *Curtis* 1739. PERAK; *Scortechini* 221. *Wray* 2589, 2638. *King's Collector* 3473, 4152, 8592.

4. *LAGERSTRÆMIA*, Linn.

Trees or shrubs. *Leaves* opposite, distichous (or the uppermost alternate), entire, oblong or ovate. *Panicles* axillary and terminal, the ultimate branchlets usually cymose, sometimes dense; peduncles 2-bracteate at their apex; pedicels 2-bracteolate. *Flowers* often large. *Calyx-tube* funnel-shaped, smooth, grooved, angular or sub-alate; lobes 5-sometimes 7–9, ovate, subacute, valvate. *Petals* 6, sometimes 7–9 (or 0), inserted at the summit of the calyx-tube, clawed, wrinkled; margin crisped, erose, or fimbriate. *Stamens* very many, inserted in several rows near the bottom of the calyx-tube; filaments long, exerted. *Ovary* sessile in the bottom of the calyx, 3–6-celled; style long, bent, stigma capitate; ovules numerous, ascending, placentas axile. *Capsule* more or less adnate to the calyx, ellipsoid, coriaceous, smooth, 3–6-celled, 3–6-valved. *Seeds* many (rarely few), elongate, flat, erect, winged from their summit. **DISTRIB.** Species 18, in South-east Asia extending to Australia.

Inflorescence and exterior of calyx stellately ferruginous-tomentose 1. *L. floribunda*.

Inflorescence and outside of calyx minutely cinereous or whitish-velvety (the calyx sometimes rusty in *L. Flos-Reginæ*).

Leaves glaucous beneath; calyx 10-ribbed, the mouth with only 5 teeth 2. *L. hypoleuca*.

Leaves not glaucous beneath.

Calyx 8- or 9-ribbed, the teeth as many as the ribs and alternate with them; flowers 1·5 in. in diam.; leaves 2-3·25 in. long 3. *L. ovalifolia*.

Calyx 12-14-ribbed; the teeth half as many as the ribs, the ribs opposite the teeth broader; flowers 2-3 in. in diam.; leaves 3·5-8 in. long 4. *L. Flos-Reginæ*.

1. *LAGERSTRÆMIA FLORIBUNDA*, Jack in Mal. Misc. I, 38. A tree 15-30 feet high. *Leaves* ovate-oblong or elliptic-oblong, sub-acute, the base rounded, sub-sessile; main nerves 8-12 pairs, sub-horizontal or curving upwards; both surfaces minutely reticulate when dry, the upper glabrous and shining, the lower with deciduous stellate pale brown pubescence, or glabrous; length 5-7 in., breadth 2-2·75 in. *Panicle* much longer than the leaves, terminal, erect; the branches long, racemoid, the ultimate branchlets cymose, ascending, everywhere (as also the calyces,) covered with more or less deciduous woolly rusty pubescence. *Flowers* 1·5 in. in diam., on short pedicels. *Calyx* turbinate in bud, boldly 12-ridged, each alternate ridge passing into one of the 6 triangular calyx-teeth and often forming a mucro at its apex. *Petals* sub-orbicular, with wavy edges, rose-coloured changing to whitish. *Stamens* unequal, the outer rows the longest. *Capsule* ·5 in. long, elliptic, minutely cinereous-tomentose, half enveloped in the calyx, style persistent. DC. Prodr. III, 93; Wall. Cat. 2115; Miq. Flor. Ind. Bat. I, pt. I, 623 (*not Blume Mus. Bot. II, t. 41*); Griff. Notul. IV, 509; Kurz For. Flor. I, 522; Clarke in Hook. fil. Flor. Br. Ind. II, 577.

KEDAH; *Curtis* 2602. PENANG; *King*. TRANG; *King's Collector* 1407. MALACCA; *Maingay* (Kew Distrib.) 653/2. DISTRIB. Burma, Siam, China.

2. *LAGERSTRÆMIA HYPOLEUCA*, Kurz in Journ. As. Soc. Beng. for 1872 Pt. II, p. 30. A tree 60-70 feet high; all parts except the inflorescence glabrous. *Leaves* thickly membranous, oblong-lanceolate to elliptic or oblong-elliptic, shortly acuminate, the base rounded; main nerves 8-12 pairs, spreading, not prominent; both surfaces rather distinctly reticulate when dry, the upper shining, the lower glaucous; length 5-8 in., breadth 2-3 in., petiole ·3 in. long. *Panicles* minutely cinereous-velvety, longer than the leaves, terminal, few-branched, the branches with rather short cymose sub-horizontal branchlets. *Flowers* about 1·25 or 1·5 in. in diam., on jointed whitish unequal pedicels. *Calyx* turbinate in bud, minutely whitish-velvety, boldly 10-ribbed, the alternate ribs excurrent into the 5 triangular acute mucronate lobes of the mouth. *Petals* lilac, oblong, wavy, ·5 in. long. *Capsule* woody, oblong, mucronate, about ·65 in. long. For. Flor. Burm., I, 523; Clarke in Hook. fil. Flor. Br. Ind. II, 577.

ANDAMAN ISLANDS; *Kurz, Prain, King's Collectors.* GREAT COCO ISLAND; *Prain.*

3. *LAGERSTREMLIA OVALIFOLIA*, Teysm. et Binn. in Nat. Tijdsch. Ned. Ind. II. (1840) 306. A tree 50 or even 100 feet high. *Leaves* oblong, ovate or oblong-obovate, acute, slightly narrowed to the base; main nerves 4 or 5 pairs, curved, ascending, slightly prominent on the lower surface when dry; upper surface greenish with minute black dots when dry, glabrescent except sometimes the minutely pubescent nerves; the lower brown when dry, glabrescent; length 2–3·25 in., breadth 1·25–2 in., petiole ·25 in. *Panicle* terminal, puberulous, 3–8 in. long, few-flowered; the branches few, sub-horizontal, cymose, puberulous below; the pedicels minutely velvety, cinereous. *Flowers* 1·5 in. in diam., on jointed velvety pedicels. *Calyx* turbinate, minutely cinereous-velvety, with 8 or 9 bold winged ridges not passing into the calyx-teeth. *Calyx-teeth* 8 or 9, acutely triangular, the edges thickened and reflexed. *Petals* (with claw) ·75 in. long, orbicular, clawed, purple, their edges slightly undulate. *Capsule* elliptic-ovoid, blunt, minutely velvety, ·75 in. long, and ·6 in. in diam. Kriudk. Arch. III, 440; Pl. Nov. Hort. Bog. (ed. Vriese) 20. Blume Mus. Bot. Lugd. Bat. II, 127; Miq. Flor. Ind. Bat. I, Pt. I, 624; Koorders and Valeton, Bijdr. I, 193. *L. celebica*, Bl. l. c. 127. *L. hexaptera*, Miq. Flor. Ind. Bat. I, Pt. I, 623; Clarke in Hook. fil. Flor. Br. Ind. II, 577.

MALACCA; *Maingay* (Kew Distrib. 653). PERAK; *King's Collectors* 8701, 10025 & 10332. PAHANG; *Ridley* 2640.

I can find no character to separate *L. hexaptera*, Miq. from the older species of Teysmann and Binnindik. Miquel's name is moreover an unhappy one, as the calyx-teeth are usually 9 and not 6.

4. *LAGERSTREMLIA FLOS-REGINÆ*, Retz (1789) Obs. V, 25. A tree 30–60 feet high, all parts except the inflorescence glabrous. *Leaves* oblong to elliptic-oblong, acute, narrowed (rarely obtuse) at the base, shortly petiolate; main nerves 10–13 pairs, curving upwards, slightly prominent beneath when dry; both surfaces minutely reticulate, glabrous, the upper shining, the lower dull and of a dark brown colour when dry, length 3·5–8 in., breadth 1·75–3 in., petiole ·25–4 in. *Panicle* terminal, longer than the leaves, its ultimate branchlets cymose. *Flowers* from 2–3 in. in diam., on rather thick greyish unequal pedicels. *Calyx* turbinate, with 12–14 prominent stout ridges; those opposite the calyx-teeth broader, the mouth with 6–7 acute triangular spreading thick coriaceous teeth thickened at the edges. *Petals* sub-orbicular, clawed, corrugated and with undulate edges. *Stamens* all equal in length. *Capsule* oblong to sub-globose, minutely apiculate, ·8–1·25 in. long, and ·6–·75 in. in diam. *Kurz* in For. Flora Burm. I, 524; *Clarke* in

Hook. fil. Flor. Br. Ind. II, 577. *L. Munchhausia*, Lamk. Ency. III, 375 ; Ill. t. 473 fig. 2. *L. Reginæ*, Roxb. Pl. Corom. I, 46, t. 65 ; Hort. Beng. 38 ; Hook. fil. Flor. Br. Ind. II, 505 ; Blume Bijdr. 1127 ; DC. Prodr. III, 93 ; W. & A. Prodr. Flor. Penins. Ind. 308 ; Blume Mus. Bot. Lugd. Bat. II, 126 ; Miq. Flor. Ind. Bat. I, Pt. I, 623 and Suppl. 328. *L. speciosa*, Pers. (1807) Ench. II, 72 (not of DC.) ; Koehne in Engl. Bot. Jahrb. IV, 28 ; Koorders and Valetton, Bijdr. I, 190, (excl. from all where reduced the syn. *L. macrocarpa*, Wall.).

MALACCA, Singapore. PERAK. DISTRIB. Java, British India.

I have adopted Retz's name (published in 1789) for this plant, as it is pretty nearly certain what Retz's plant was. Koehne, Koorders and Valetton and others however adopt Persoon's name of *L. speciosa* on the ground that, although it dates from only 1807, it preserves the specific name of Linnæus (*Munchausenia speciosa* 1770). But this procedure is rendered inadmissible when Linnæus's description of that plant is consulted, for he describes *M. speciosa* as a *shrub*, whereas this plant is a large tree ; moreover the rest of his description would apply to various other species of *Lagerstræmia* ; the identity of *M. speciosa*, *L.* is thus quite uncertain. *L. macrocarpa* of Wall. Cat. 2114, is a tree of about the size of *L. Flos-Reginæ* and resembles it in most respects, but differs (1) in having leaves of larger size (5-12 in. long) more or less broadly elliptic, never oblong or elliptic-oblong, the apex often sub-acute and the base broad or narrowed into a petiole twice as long as that of *L. Flos-Reginæ* ; (2) in the calyx being very slightly, if at all, furrowed and never ribbed, and (3) in having a larger more globose capsule (1-1.35 in. long and nearly as much in diam.). This tree has been in cultivation in the Bot. Garden, Calcutta, side by side with *L. Flos-Reginæ* for many years. It flowers earlier than the latter, has pink (not lilac) petals, and much larger capsules. In my opinion it is a good species and should not be merged in *L. Flos-Reginæ*. It is found only in Burma and Chittagong. Kurz, who was familiar with it in its wild state in Burma, considered it distinct and kept it as a species in his Forest Flora of British Burma.

5. DUABANGA, Ham.

Large glabrous trees with pendent quadrangular branches. *Leaves* opposite, distichous, large, short-petioled, elongated, acute, entire, cordate or rounded at the base. *Panicles* large, terminal, with opposite branches ; flowers large. *Calyx-tube* wide, adnate to the base of the ovary ; lobes 4-7, thick, valvate in the bud. *Petals* 4-7, clawed, obovate, crisped and undulate, white. *Stamens* very many, inserted on a perigynous ring. *Ovary* conical, 4-8-celled ; style bent, long ; stigma capitate, 4-8-lobed ; ovules very many, ascending, placentas covering nearly the whole interior surface of the ovarian cells. *Capsule* sub-globose, surrounded at the base by the thick spreading calyx, coriaceous, perfectly or imperfectly 4-8-celled, 4-8-valved. *Seeds* very numerous, minute, ellipsoid, testa produced at both ends in two tails much exceeding the length of the nucleus. DISTRIB. Species 2 ; Eastern Himalaya, Assam and Malaya.

DUABANGA SONNERATIOIDES, Ham. in *Trans. Linn. Soc.* XVII, 178. A tree 60–100 feet high. *Leaves* thinly coriaceous, oblong to ovate-oblong, 7–12 in. long and 2.5–4 in. broad, glabrous, glaucous beneath. *Flowers* 2–2.5 in. across, on thick-jointed pedicels tapering to the base; panicle short, few-flowered, drooping. *Petals* 4–7, about 1 in. long. *Capsule* ovoid-globose, 1–1.5 in. in diam. Hook. fil. *Ill. Him. Pl.* t. 11; Kurz *For. Flor. Burm.* I, 525; Clarke in Hook. fil. *Flor. Br. Ind.* II, 579. *D. grandiflora*, Walp. *Rep.* II, 114. *Lagerstroemia grandiflora*, Roxb. *Hort. Beng.* 38; *Flor. Ind.* II, 503; DC. *Prodr.* III, 93; Wall. *Cat.* 2111; Blume *Mus. Bot.* I, 109. *Leptospartion grandiflorum*, Griff. *Ic. Pl. Asiat.* t. 591.

PERAK; *Scortechini*, *King's Collector* 5912. ANDAMANS AND NICOBARS, *King's Collectors*. *DISTRIB.* Burma, Assam, Khasia, Eastern Himalaya.

6. SONNERATIA, Linn. f.

Ever-green trees, growing near the sea, glabrous. *Leaves* opposite, petioled, coriaceous, entire. *Flowers* without bracts, large, three together at the summits of the branches, or axillary and solitary. *Calyx* thick, coriaceous; lobes 4–8, lanceolate, valvate. *Petals* 0, or as many as the calyx-lobes and linear-oblong. *Stamens* numerous, inserted in a circular band on the calyx-tube. *Ovary* nearly free, or adnate at the base to the calyx-tube, many-celled; style long, stigma capitate; ovules numerous, ascending, placentas axile. *Berry* subglobose, supported by the persistent calyx, 10–15-celled. *Seeds* very many, small, curved, angular, embedded in pulp; cotyledons convolute. *DISTRIB.* Species 4–5; on the tropical sea-shores of the Eastern hemisphere.

With petals	...	...	...	...	...	1. <i>S. acida</i> .
Without petals:—						
Calyx in bud ovoid, obtuse	...	...	...	...	...	1. <i>S. acida</i> , var. <i>Griffithii</i> .
Calyx in bud narrowly ellipsoid, tapering to both ends	...	...	...	...	...	2. <i>S. alba</i> .

1. SONNERATIA ACIDA, Linn. fil. *Suppl.* 252. A small tree 10–35 feet high, the branchlets jointed and 4-angled. *Leaves* oblong to oblong-obovate or obovate, tapering into a broad short petiole, blunt and sometimes retuse; length 2–3 in., breadth 1.35 to 2 in. in the obovate forms. *Flower-buds* solitary, ellipsoid, the calyx-tube not angled; the calyx when fully developed 1 in. long, its lobes 6–8, the lobes triangular, reflexed. *Petals* linear, slightly broader towards the apex than at the base. *Style* exerted, sometimes 3 in. long, stigma capitate. *Capsule* depressed-globose, sometimes as much as 2 in. in diam., the apex somewhat concave, the walls thick. Roxb. *Hort. Beng.* 38; *Flor. Ind.* II, 506; Roth *Nov. Sp.* 233; DC. *Prodr.* III, 231; Wall. *Cat.* 3641;

W. & A. Prodr. 327; Wight Ic. t. 340; Griff. Notul. IV, 652; Blume Mus. Bot. I, 336; Miq. Flor. Ind. Bat. I, Pt. I, 496; Dalz. & Gibs. Bomb. Flor. 98; Brand. For. Flor. 242; Kurz For. Fl. Burm. I, 526; Clarke in Hook. fil. Flor. Br. Ind. II, 580; Koorders and Valeton, Bijdr. I, 198. *Rhizophora caseolaris*, Linn. Sp. Pl. 635. *Aubleitia caseolaris*, Gærtn. Fruct. I, 479, t. 78.

PENANG; *Curtis* 1108. PERAK; *Scortechini*, *Wray* 2494. ANDAMANS; *Kurz*, *Prain*, *King's Collectors*. DISTRIB. the coasts of Burma, the Deltas of the British Indian Rivers and of those of the Malayan Islands.

VAR. *Griffithii*, *Leaves* obovate, petals none. *S. Griffithii*, *Kurz* Pegu Report, App. B. 54; For. Flora Burma, I, 526; Clarke in Flor. Br. Ind. II, 580. *S. alba*, Griff. (not of Smith) Notul. IV, 652. *S. neglecta*, Bl. Mus. Bot. Lugd. Bat. I, 338; Miq. Flor. Ind. Bat. I, Pt. I, 498.

PERAK; *Scortechini* 967. DISTRIB. Burma.

The fruit of this variety is unknown; but the scanty material, so far as it goes, appears to show that the plant is merely an apetalous form of *S. acida* with leaves more obovate than is usual in that species. I have therefore reduced it to a form of the latter. Blume described other three species of *Sonneratia* with petals, viz., *S. obovata*, *S. evenia*, and *S. lanceolata* separating them chiefly by characters taken from the shapes of the leaves. But in this genus the form of the leaf is very variable, and I doubt whether these three species are more than forms of *S. acida*. *S. Pagapat*, Blanco, and *S. ovalis*, Korth. are probably also forms of it.

2. SONNERATIA ALBA, Smith in Rees Cyclop. XXXIII, No. 2. A small tree 10–15 feet high; young branches rather terete. *Leaves* obovate or obovate-reniform, decurrent on the short petiole, blunt or retuse, 2–4 in. long and nearly as broad, petiole .125–.25 in. *Flower-buds* narrowly ellipsoid, tapering to each end, very slightly ridged; the fully developed calyx sharply angled; its lobes 6–8, oblong-lanceolate, acute. *Petals* none. *Flowers* about the size of those of *S. acida*, usually 2 or 3 together. *Capsule* broadly obconic, ribbed, 1 in. or more in diam. at the apex. DC. Prodr. III, 231; Blume Mus. Bot. Lugd. Bat. I, 338; Miq. Flor. Ind. Bat. I, Pt. I, 497; Kurz For. Flora Burma I, 526; Clarke in Flor. Br. Ind. II, 580; Koorders and Valeton, Bijdr. I, 200. *S. Mossambicensis*, Klotsch in Peters Reis. Mossamb. Bot. t. 12. *S. acida*, Benth. (not of Linn. fil.) Flor. Austral. III, 301; Hiern in Oliv. Flor. Trop. Africa. II, 483; Wall. Cat. 3641 B.

SINGAPORE; *Wallich*. DISTRIB. Java, Moluccas.

Order XLIX. ONAGRACEÆ.

Herbs, rarely undershrubs, sometimes aquatic. *Leaves* opposite or alternate, entire or toothed, undivided (in *Trapa* the submerged leaves pinnatipartite), exstipulate. *Flowers* hermaphrodite, mostly axillary and solitary, or spiked or racemed towards the ends of the branches,

sub-irregular. *Calyx-tube* wholly adnate to the ovary (half-adnate in *Trapa*), limb with 2-5 valvate lobes. *Petals* epigynous, alternate with the calyx-lobes, rarely 0. *Stamens* as many or twice as many as the petals, inserted with them. *Ovary* inferior (half-inferior in *Trapa*), 1-6-celled, most often 4-celled; style 1, cylindric or subulate, stigma capitate or nearly 2-lobed or 4-fid; ovules one or many in each cell, pendulous or half-ascending, placentas axile. *Fruit* various, dehiscent or indehiscent, membranous capsular or bony, 1- or several-celled, 1 or ∞ -seeded. *Seeds* without albumen, or nearly so. **DISTRIB.** Species 300, spread throughout the world, most abundant in the North Temperate Zone.

Stamens twice as numerous as the calyx-lobes ...	... 1. JUSSLÆA.
Stamens equal in number to the calyx-lobes ...	... 2. LUDWIGIA.

1. JUSSLÆA, Linn.

Herbaceous or suffruticose, sub-aquatic. *Leaves* simple, alternate, usually entire. *Flowers* white or yellow, solitary, axillary; pedicel usually bibracteate at the apex. *Calyx-tube* narrow, only slightly produced above the ovary; its teeth 4-6, acute, persistent. *Petals* 4-6, epigynous. *Stamens* also epigynous, twice as numerous as the petals. *Ovary* inferior, 4-5-celled; style simple, usually very short, the stigma 4- or 5-lobed; ovules numerous, axile, in several vertical rows at the inner angle of each cell. *Capsule* narrow, cylindric or angled, 4- or 5-celled, 8-10-ribbed, dehiscing septicidally. *Seeds* very numerous, without coma. **DISTRIB.** Species 30, tropical, chiefly American.

JUSSLÆA SUFFRUTICOSA, Linn. Sp. Pl. 555. Erect, branching, 1-4 feet high. *Leaves* lanceolate, ovate-lanceolate or almost linear, acute or acuminate, narrowed to the base, villous, pubescent or sub-glabrous, 2-3 in. long, and .25-.75 in. broad, sessile or very shortly petioled. *Flowers* .5-.75 in. in diam., on very short pedicels, the bracts small or foliaceous. *Petals* wholly yellow. *Capsule* linear, cylindric, 1-2 in. long, membranous, not woody, 8-ribbed, deciduously villous or pubescent. *Seeds* sub-hemispheric; the testa with a prominent raphe, shining, brown, not corky. DC. Prodr. III, 58; Wall. Cat. 6334; Miq. Flor. Ind. Bat. I, Pt. I, 628; Kurz in Journ. As. Soc. 1877, Pt. II, 90; Clarke in Flor. Br. Ind. II, 587. *J. exaltata*, Roxb. Hort. Beng. 33; Flor. Ind. II, 401. *J. villosa*, Lamk. Dict. III, 331; DC. Prodr. III, 57; Wall. Cat. 6333; W. & A. Prodr. 336; Gibs. & Dalz. Bomb. Flor. 98. *J. fruticosa*, DC. l. c. *J. scabra*, Willd.; DC. l. c. *J. Burmanni*, and *octophila*, DC. l. c. *J. longipes*, Griff. Notul. IV, 689. *J. decumbens*, Wall. Cat. 6322. *J. angustifolia*, Lamk. Dict. III, 331 and III, t. 280, fig. 3; DC. Prodr. III, 55; Miq. Flor. Ind. Bat. I, Pt. I, 627. *Epilobium fruticosum*, Lour. Flor. Cochinchina 226. Rheede Hort. Mal. II, t. 50.

SINGAPORE; PENANG; PERAK; ANDAMAN ISLANDS, and probably in all the other provinces; DISTRIB. British India, Ceylon.

A widely distributed plant to which many names have been given. It is readily distinguished from *J. repens*, Linn. (the only other species common to the tropics of both worlds) by its narrower leaves, membranous capsule and erect habit.

2. LUDWIGIA, Linn.

Herbs. *Leaves* alternate, undivided, sub-entire. *Flowers* usually axillary, solitary, sessile or nearly so, peduncle 2-bracteate at its apex. *Calyx-tube* scarcely produced above the ovary, linear in the Indian species; teeth 3-5, acute, persistent. *Petals* 3-5 (or 0), epigynous, yellow. *Stamens* equal in number to the calyx-segments, epigynous. *Ovary* inferior, 4-5-celled; style simple, stigma capitate; ovules very many, attached in 2 or more vertical rows to the inner angle of each cell. *Capsule* linear or oblong (in the Indian species), 4-5-celled, opening by terminal pores or breaking up irregularly along the sides. *Seeds* numerous, obovoid, smooth, raphe obscure or prominent but not large, without coma. DISTRIB. Species 20, mostly in North America; extending from the cool temperate zone to the equator; chiefly inhabiting marshes.

- | | | | |
|---------------------------------------------------------------------|-----|-----|---------------------------|
| Capsules inflated, seeds in several rows | ... | ... | 1. <i>L. parviflora</i> . |
| Capsules filiform, not inflated; seeds in a single row in each cell | ... | ... | 2. <i>L. prostrata</i> . |

1. LUDWIGIA PARVIFLORA, Roxb. Hort. Beng. 11; Flor. Ind. I, 419. An erect glabrous herb 8-24 in. high. *Leaves* lanceolate, linear-lanceolate or linear-oblong, narrowed to each end, 1-3 in long, and .25-.75 in. broad. *Flowers* on short pedicels, usually 4-fid. *Petals* small. *Capsule* inflated, obsoletely 4-angled, smooth, crowned for sometime by the persistent calyx-teeth, .35-.5 in. long. *Seeds* in many rows in each cell. DC. Prodr. III, 59; Wight Ill. t. 101; W. & A. Prodr. 336; Dalz. & Gibs. Bomb. Flor. 99; Benth. Flor. Austral. III, 307; Boiss. Flor. Orient. II, 752; Kurz in Journ. As. Soc. 1877, Pt. II, 91; Clarke in Hook. fil. Flor. Br. Ind. II, 588. *L. lythroides*, Blume Bijd. 1134; DC. l. c. *D. jussieoides*, Wall. Cat. 6335 (not of Linn. and others).

PERAK; *Scortechini* 442; *Wray* 2720. DISTRIB. British India and Ceylon.

2. LUDWIGIA PROSTRATA, Roxb. Hort. Beng. 11; Flor. Ind. I, 420. *Stem* prostrate, or decumbent at the base and then erect, 8-24 in. long, glabrous. *Leaves* lanceolate or linear-lanceolate, acute or acuminate, tapering to the base, 2-4 in. long and .35-.75 in. broad. *Flowers* sometimes more than one in an axil, sessile, 4-fid. *Petals* lanceolate, longer than the calyx. *Capsule* 4-angled, thin, filiform, not at all inflated,

smooth, crowned by the linear calyx-teeth; length .5–1 in. diam. .02 in. *Seeds* oval, in a single row in each cell. DC. Prodr. III, 59; Wight Ic. t. 762; Kurz in Journ. As. Soc. 1877, Pt. II, 91. Clarke in Flor. Br. Ind. II, 588. *L. diffusa*, Ham. in Trans. Linn. Soc. XIV, 301; Wall. Cat. 6336; DC. l. c. *L. fruticulosa*, Blume Bijdr. 1133; DC. l. c. *Nemato-pyxis prostrata, pusilla, and fruticulosa*, Miq. Flor. Ind. Bat. I, Pt. I, 630.

PERAK; *Curtis* 3183. SINGAPORE; *King's Collector* 58. ANDAMANS; *King's Collector*. DISTRIB. Burma, Cachar, Sylhet, Assam, and the base of the Eastern Himalaya.

A species closely resembling *L. parviflora*, but readily distinguished by having very slender capsules, through the walls of which the seeds may be distinguished lying in single row in each cell; whereas in *L. parviflora* the seeds are in several rows in each cell and are undistinguishable on the outside of the thick walls of the short inflated capsules.

Order L. SAMYDACEÆ.

Trees or shrubs. *Leaves* alternate, often distichous, petioled, rarely sessile, simple, entire or slightly crenate or serrate, often closely punctulate beneath; stipules small, deciduous. *Flowers* regular, small, axillary, shortly pedicelled, densely fasciated or in long simple or paniced racemes. *Calyx* coriaceous, persistent; tube short, free, or longer and adnate to the ovary; limb 3–7-fid. *Petals* as many as the calyx-lobes (or 0), perigynous, imbricated. *Stamens* definite or indefinite, often with staminodes between or united in a tube with them. *Ovary* superior or half-superior, 1-celled; style 1, capitate or 3-fid at the apex, or styles 2–5; ovules many or several, placentas 2–5 (usually 3), parietal. *Fruit* loculicidally 2–5- (usually 3-) valved, valves carrying the seeds on their mesial line. *Seeds* several (usually few, sometimes many), oblong or angular, albuminous, usually drilled. DISTRIB. Species 180, scattered through the tropical regions of the globe, rarely also in the subtropical.

Flowers without petals:—

Flowers in axillary glomeruli, rarely solitary ...	...	1. CASEARIA.
Flowers in long slender racemes or panicles ...	...	2. OSMELIA.
Flowers with petals; flowers in axillary or terminal racemes or panicles ...	...	3. HOMALIUM.

1. CASEARIA, Jacq.

Shrubs or small trees. *Leaves* alternate, distichous, petioled, undivided, entire or slightly serrate, often minutely punctate; stipules small, lateral, caducous. *Flowers* small, greenish-yellow, clustered in the axils (in the Indian species); pedicels short, jointed above their bases, surrounded by small scales. *Calyx* inferior, deeply 4–5-lobed;

lobes imbricate, obtuse, persistent. *Petals* 0. *Stamens* double the number of the calyx-lobes or thereabout, united in a tube with staminodes alternating with the free portion of the filaments; staminal tube hypogynous, sometimes very short so that the filaments are nearly or quite free. *Ovary* free, ovoid, 1-celled, style simple, stigma capitate or 3-fid; ovules many, parietal. *Fruit* succulent, globose or ovoid, ellipsoid (when dry somewhat 3-angular or 6-ribbed), 3-rarely 2-valved. *Seeds* many, angular or obovoid, with a fleshy usually coloured aril; embryo straight. **DISTRIB.** Species 140, in the warmer parts of the whole globe, most plentiful in America.

Leaves pubescent on the lower surface, glabrescent on the upper:—

Leaves narrowed or rounded, but never cordate or truncate, at the base; glomeruli few-flowered ... 1. *C. Lobbiana*.

Leaves cordate or truncate at the base; glomeruli many-flowered ... 2. *C. grewiae*folia.

Leaves glabrous on both surfaces:—

Fruit not exceeding 1 in. in length and usually much shorter:—

Leaves broadly elliptic, shortly acuminate, thinly membranous; calyx-teeth 4 ... 3. *C. albicans*.

Leaves elliptic-oblong, thinly coriaceous or membranous, main nerves 10-12 pairs; stamens 10 ... 4. *C. andamanica*.

Leaves elliptic-oblong to elliptic-lanceolate, main nerves 6-8 pairs; stamens 8 ... 5. *C. esculenta*.

Fruit large, fleshy, 1·5-2 in. long; leaves narrowly oblong; coriaceous.

Flowers in glomeruli:—

Leaves tapering slightly to base and apex; fruit apiculate ... 6. *C. Kunstleri*.

Leaves acute at the apex, sub-acute at the base; fruit not apiculate ... 7. *C. Clarkei*.

Flowers solitary or in fascicles of 2, axillary ... 8. *C. macrocarpa*.

1. **CASEARIA LOBBIANA**, Turcz. in Bull. Soc. Nat. Mosc. (1858), XXXI, Pt. I, 463. A slender tree 15-20 feet high; young branches slender, densely tawny-pubescent. *Leaves* oblong or oblong-lanceolate, shortly acuminate, the base rounded or narrowed; upper surface glabrescent, the midrib and nerves pubescent; lower surface sparsely pubescent, densely so on the midrib and nerves; main nerves 8-10 pairs, curving upwards, length 2-5 in., breadth ·75-2·25 in.; petioles ·2-3 in., tomentose, slender. *Flowers* few together in the leaf-axils, on very short pedicels, glabrescent. *Calyx-teeth* triangular, acute, reflexed. *Staminodes* villous, rather shorter than the stamens. *Fruit* almost sessile and nearly globose, orange-yellow when ripe, ·5 in. long and ·4 in. in diam. Clarke in Hook. fil. Flor. Br. Ind. II, 594.

SINGAPORE; *Lobb.* PERAK; *King's Collector* 2377, 2631, 10731; *Wray*; 829, 2594; *Scortechini* (without number). DISTRIB. Tenasserim.

2. CASEARIA GREWIAEFOLIA, Vent. Choix. 48. A small tree; young branches 4-angled, densely rusty-tomentose. *Leaves* oblong, acute, not at all or very little narrowed to the cordate sub-truncate base, the edges entire or minutely crenulate; upper surface shining, almost glabrous, the lower surface pellucid-punctate when fresh, tomentose on the midrib and 10–14 pairs of little-curved ascending main nerves, otherwise sparsely pubescent; length 4·25–6 in., breadth 1·25–2·35 in., petiole ·2 in. *Glomeruli* many-flowered, chiefly from the axils of fallen leaves; the flower-pedicels slender, ·25 in. long, minutely pubescent, articulated at the base. *Flower-bud* ·15 in. long; sepals minutely adpressed-pubescent, adnate at the base to the short staminal column. *Stamens* 8, the glabrous filaments alternating with the 8 pubescent staminodes. *Ovary* pyramidal, hairy at its junction with the style. *Fruit* compressed-ellipsoid, nearly 1 in. long, glabrous, boldly ridged when dry. DC. Prodr. II, 51; Miq. Flor. Ind. Bat. I, Pt. I, 706; Clarke in Flor. Br. Ind. II, 594. *C. variabilis*, Blume Mus. Bot. Lugd. Bat. I, 252. *C. subcuneata*, Miq. Flor. Ind. Bat. I, Pt. I, 706. *C. cinerea*, Turcz. in Bull. Soc. Nat. Mosc. (1858), XXXI, Pt. I, 462.

MALACCA; *Maingay* (Kew Distrib.) 659, 661. PERAK; *Scortechini*; 2003. DISTRIB. Java, Bali, and other Islands of the Malay Archipelago.

3. CASEARIA ALBICANS, Wall. Cat. 7197. A shrub 3 or 4 feet high; young branches slender, very pale, almost white when dry, glabrous. *Leaves* thinly membranous, pale brown when dry and much pellucid-punctate, more or less broadly elliptic, shortly acuminate; the base rounded or very slightly narrowed, the edges entire, both surfaces glabrous and finely reticulate when dry; main nerves 8 or 9 pairs, curved, ascending; length 4–7·5 in., breadth 2·25–4 in., petiole ·25 in. *Glomeruli* small, few-flowered, axillary; flower-buds obovoid, almost sessile, surrounded by numerous acute bracteoles. *Calyx-teeth* 4, broadly triangular, glabrous. *Fruit* broadly ovoid, compressed, acute, subglabrous, 1 in. long and ·65 in. in its broad diameter. "*Samydeæ*," Wall. Cat. 7432.

PENANG; *Wallich.* PERAK; *King's Collector* 3634.

The above description is drawn up from the two sheets of Wall. Cat. above quoted and of King's Collector 3634. One of Wallich's specimens 9197 has fruit in a pocket detached from the twig, the others have no fruit. The plant here named *C. albicans* is not, however, that described under the same name by Mr. C. B. Clarke in the Flora of British India. Mr. Clarke's plant is 660 of *Maingay's* Herbarium, and is referred by me (along with 660/2) to *C. macrocarpa*, Clarke.

4. CASEARIA ANDAMANICA, new species. A tree 20–40 feet high; young branches pale brown, glabrous. *Leaves* oblong-elliptic, acute,

slightly narrowed and somewhat oblique at the very base; both surfaces glabrous, minutely reticulate when dry; main nerves 10–12 pairs, spreading, curving upwards, slightly prominent beneath; length 6–9 in., breadth 2·75–3·5 in., petiole ·5–·75 in. *Glomeruli* axillary, large and many-flowered; buds sub-globular, glabrous; pedicels about ·25 in. long glabrous, the bracteoles minute. *Calyx-segments* ovate, glabrous; staminal tube wide, nearly glabrous, adherent below to the sepals; filaments 10, as long as the tube and as the alternating villous staminodes. *Ovary* elongate-pyramidal, 3-angled, stigma capitate; fruit unknown.

ANDAMAN ISLANDS; *King's Collectors.*

5. *CASEARIA ESCULENTA*, Roxb. Flor. Ind. II, 422. A shrub or small tree as high as 20 or 30 feet; young branches pale, striate when dry, glabrous. *Leaves* thinly coriaceous, elliptic-oblong to elliptic-lanceolate, acute at the apex and acute or obliquely rounded at the base, the edges entire; both surfaces reticulate; main nerves 6–8 pairs, spreading, not prominent; length 3–7 in., breadth 1·5–2·25 in., petiole ·25 in. *Glomeruli* axillary, many-flowered; buds and pedicels glabrous, the latter ·2–·25 in. long; bracteoles very short, glabrous. *Calyx-teeth* 4, broadly ovate, concave. *Stamens* 8, alternating with the staminodes. *Ripe fruit* ellipsoid to globular-ovate, glabrous, dehiscing by 2 or 5 valves, length ·75 in. or more. Clarke in Flor. Br. Ind. II, 592. *C. lævigata*, Dalz, in Hook. Journ. Bot. IV, 107; Dalz. & Gibs. Bomb. Flor. 11. *C. Championii* and *C. Zeylanica*, Thwaites, Enum. Pl. Ceylon, 19. *C. varians*, Thwaites Enum. 19 (*in part*).

SINGAPORE; *Lobb, Griffith, Maingay* (Kew Distrib.) 657.

PERAK; *Ridley* 5218; *Scortechini* 804; *King's Collector* 4699, 7001.

A widely distributed species presenting a considerable amount of variation. Perak specimens have larger leaves than those from British India; but they appear to have smaller fruits; for Roxburgh describes the fruit of the plant, as it grows in the Northern Circars, as being as large as a nutmeg.

6. *CASEARIA KUNSTLERI*, King n. spec. A tree 30–80 feet high; young branches pale, glabrous. *Leaves* coriaceous, narrowly oblong, tapering slightly to each end, the edges entire; both surfaces glabrous and minutely reticulate; the upper shining, the lower rather dull; main nerves 7 or 8 pairs, ascending and only slightly curved, prominent on the lower surface; length 5–7 in., breadth 1·5–2 in.; petiole ·25 in., stout. *Glomeruli* mostly in the axils of fallen leaves, many-flowered; pedicels stout, glabrous ·35–·45 in. long; buds ·15 in. long, blunt. *Calyx* 5-cleft, the segments broadly ovate, obtuse, concave, minutely pubescent. *Stamens* 10, broad, sub-acute, the filaments broad, pointed, their edges pubescent. *Staminodes* elliptic, their apices acute and

pubescent. *Ovary* broadly ovate, 5-celled; the stigma capitate-discoid, almost sessile. *Fruit* bright yellow, broadly ovoid or obovoid, apiculate, tapering also to the base, glabrous, 1.5–2 in. long and .75–1.35 in. diam., pulpy and smooth when ripe, boldly 3-angled when dry.

PERAK; *Wray* 3752; *King's Collector* 3694, 6936, 7118.

This resembles both *C. macrocarpa* and *C. Clarkei* in several respects, but it has larger and more numerous flowers, and the fruit is broader, in proportion to its length, than is the case in either of these species. The leaves are less shining and reticulate than those of *C. macrocarpa*, but they closely resemble those of *C. Clarkei*.

7. CASEARIA CLARKEI, King. A tree; young branches thick, glabrous, striate. *Leaves* coriaceous, narrowly oblong, acute at both base and apex, both surfaces glabrous, the upper shining; main nerves 5–7 pairs, slightly curved, ascending, prominent beneath; length 5–10 in., breadth 1.5–2.75 in., petiole .25–.4 in. long. *Glomeruli* very condensed, axillary, many-flowered; pedicels .25 in. long, glabrous like the buds. *Ripe fruit* ovoid, bright yellow, 2 in. long and 1.25 in. in diam. *C. albicans*, Clarke in *Flor. Br. Ind. II*, 593 (not of Wallich).

MALACCA; *Maingay* (Kew Distrib.) 660. SINGAPORE; *Ridley* 6334.

This species resembles *C. macrocarpa* Clarke, but has smaller fruit. Its leaves are moreover larger, less shining and less reticulate, and the glomeruli are much more numerous flowered.

8. CASEARIA MACROCARPA, Clarke in *Hook. fil. Flor. Br. Ind. II*, 593. A small tree; young branches reddish, glabrous. *Leaves* narrowly lanceolate, acute or acuminate, the base narrowed, the edges entire; both surfaces glabrous, shining, minute, reticulate when dry; main nerves about 5 or 6 pairs, curved, ascending, length 4–6 in., breadth 1 to 1.5 in., petiole .3–.4 in. long. *Glomeruli* axillary, one- or few-flowered; pedicels about .15 in. long, glabrous, the buds glabrous outside, reddish; calyx-teeth 5, oblong, blunt, minutely velvety inside. *Fruit* obovoid or ellipsoid, compressed, 1.5–1.75 in. long by .65 in. broad; seeds obovoid, compressed.

PENANG; *Maingay* 660/2; *Curtis* 229 and 960.

2. OSMELIA, Thwaites.

Trees. *Leaves* alternate, petioled, ovate or oblong-lanceolate, entire or obscurely serrate, epunctate; stipules minute, deciduous. *Flowers* small, very nearly sessile, in long simple or paniced racemes. *Calyx* inferior, divided nearly to the base; lobes 4 or 5, rounded, imbricate. *Petals* 0. *Stamens* 8 or 10, half alternating with as many 2-lobed hairy scales and half inserted in the notches of those scales. *Ovary* superior, 1-celled; styles 3, short, with capitellate or bifid stigmas; ovules few;

placentas 3, parietal. *Capsule* subglobose, 3-valved. *Seeds* few, subglobose, with a red fleshy aril. **DISTRIB.** Species 6; Malaya, Philippines, Ceylon.

OSMELIA MAINGAYI, King n. spec.. A dioecious tree 20-60 feet high; young branches slender, minutely tawny-tomentose. *Leaves* membranous, oblong or elliptic-oblong to elliptic, shortly acuminate, the base rounded or slightly narrowed, the edges entire or very obscurely crenate; the upper surface glabrous, the lower covered with minute yellowish pubescence especially on the nerves and midrib; main nerves 6-10 pairs, curved, spreading, interarching within the edge; length 4-6 in., breadth 1.75 to 3 in., petiole .6-.75 in. *Male panicles* slender, terminal, several times as long as the leaves; flowers .1 in. in diam. or less, on short pedicels bracteate at the base, in slightly distant small glomeruli. *Sepals* 4, membranous, imbricate, rotund, pubescent, concave. *Petals* 0. *Stamens* 8 in two rows, one row with longer filaments alternating with the row opposite the broad villous glands. *Panicles of female flowers* axillary, shorter than the leaves, slightly longer in fruit. *Calyx* as in the male, but the segments smaller. *Stamens* subequal, shorter than the calyx, the filaments very short, glands and ovary densely hairy; the latter sub-globular, tomentose, crowned by 3 short distant bifid glabrous stigmas, 1-celled; ovules 3, erect. *Capsule* .5-.65 in. long, 3-ridged, dehiscing by 3 valves.

MALACCA; *Maingay* (Kew Distrib.) 1448. **PERAK**; *Scortechini* 158, 191, 623. *King's Collector* 741, 1240, 2339, 4259, 4096, 5667, 7660, 7045, 10017, 10981; *Wray* 3665. **PAHANG**; *Ridley* 2654. **SINGAPORE**; *King, Ridley* 3804, 1904.

This appears to be a very common tree in Perak; for there is large suite of specimens of it in the Calcutta Herbarium numbering about 150 sheets. The various gatherings vary somewhat as to the amount of pubescence and number of nerves on the leaves, as also in the length of the panicles; but I cannot make out more than one species. *Maingay's* specimen (Kew Distrib.) 1439 looks as if it might be different. There is only a single sheet of it at Calcutta, and no flower remains on its panicles. *Beccari's* Sumatra plant 928 may possibly belong to still another species. All the species have the *facies* of *Antidesma*; the capsular fruit when present however at once distinguishes them from that genus.

3. HOMALIUM, Jacq.

Shrubs or trees. *Leaves* alternate, crenate or subentire, petioled or sessile, rarely punctulate. *Flowers* hairy, small, in slender axillary and sub-terminal simple or paniced racemes; bract at the base of the pedicel often prominent but caducous. *Calyx-tube* funnel-shaped or cylindric, adnate to the base of the ovary; lobes 5-10, narrow, persistent. *Petals* 5-10, inserted in the throat of the calyx, linear-oblong, persistent. *Disc*

tomentose. *Stamens* solitary or in fascicles of 2–7, opposite the petals, alternating with large glands. *Ovary* half-superior, 1-celled; styles 2–5, filiform, stigmas capitellate; ovules many or several; placentas parietal, extending only down the upper free portion of the ovary. *Capsule* half-superior, coriaceous, 2–5-valved at the apex. *Seeds* few, angular or oblong. **DISTRIB.**—Species 50, scattered over the hot regions of nearly the whole globe.

Flowers never more than .35 in. in diam. :—

Stamens 1 opposite each petal; leaves glabrous ... 1. *H. longifolium*.

Stamens 2 in front of each petal; calyx-tube funnel-shaped :—

Leaves glabrous, glaucous beneath; flowers 6-merous 2. *H. Kunstleri*.

Leaves glabrous except on the midrib beneath, not glaucous; flowers 6- or 7-merous ... 3. *H. propinquum*.

Leaves sparsely pubescent on both surfaces, the midribs tomentose; flowers 10-merous ... 4. *H. Griffithianum*.

Stamens 4 in front of each petal; flowers 6-merous, calyx-tube cylindric, expanding very slightly at the mouth 5. *H. frutescens*.

Flowers .6–.75 in. in diam. :—

Stamens 4 in front of each petal; calyx-teeth 5, much smaller than the petals 6. *H. undulatum*.

Stamens 7–9 opposite or sub-opposite to each petal; calyx-teeth 7–9, larger than the petals and accrescent 7. *H. grandiflorum*.

1. *HOMALIUM LONGIFOLIUM*, Benth. in Journ. Linn. Soc. IV, 35. A tree 30–60 feet high; young branches slender, lenticellate, almost glabrous. *Leaves* coriaceous, oblong or oblong-lanceolate, acute or shortly and bluntly acuminate, the base narrowed; the edges entire, sometimes slightly undulate; both surfaces quite glabrous, the lower darkest when dry; main nerves 7–9 pairs, spreading, curved, faint; length 3–4.5, in., breadth 1.5–1.75 in.; petiole .3 in., stout. *Racemes* slender, axillary, solitary, rarely branched, 4–7 in. long, covered with minute white tomentum. *Flowers* .15 in. across, almost sessile, in fascicles of 3 or 4, 6-fid. *Calyx-tube* narrow, its segments lanceolate like the petals but broader. *Stamens* one opposite to each petal alternating with yellow-glands. *Fruit* unknown. Clarke in Flor. Br. Ind. II, 596. *Blackwellia macrostachya*, Turcz. in Bull. Soc. Imp. Mosc. 1863 (Vol. XXXVI), 610.

PENANG; *Phillips, Curtis* 201. MALACCA; *Maingay* (Kew Distrib.) 665; *Derry* 994. PERAK; *King's Collector* 4444, 7855, 10230, 10763; *Scortechini* 487, 2036. SELANGOR; *Scortechini* 1910.

2. *HOMALIUM KUNSTLERI*, n. spec. King. A tree 30–40 feet high; young branches glabrous, rather slender, smooth, glaucous. *Leaves*

coriaceous, oblong-elliptic, shortly acuminate, narrowed or rounded at the base, sometimes oblique; the edges remotely crenate, revolute when dry; both surfaces glabrous, the lower glaucous; main nerves 8 or 9 pairs, faint, curving upwards; length 4·5–7 in., breadth 2·25–2·75 in.; petiole 2–3 in., thick. *Racemes* solitary, axillary, slightly longer than the leaves, bearing rather distant glomeruli of 3 or 4 flowers each, the rachis densely and minutely tomentose. *Flowers* 3 in. in diam., the pedicels about 1 in. long. *Calyx-tube* short, widely funnel-shaped; teeth 6, oblanceolate, obtuse, spreading, minutely tomentose externally. *Petals* 6, broadly lanceolate, sub-acute, equal in length to the calyx-teeth, villous on the inner surface. *Stamens* 2 in front of each petal; the filaments glabrous rising from a small bulb. Ovary hairy. Styles 5, short, sub-erect.

PERAK; *King's Collector* 4286, 7109.

3. *HOMALIUM PROPINQUUM*, C. B. Clarke in *Flor. Br. Ind.* II, 597. A tree 60–80 or even 120 feet in height; young branches pale brown when dry, puberulous. *Leaves* coriaceous, elliptic to elliptic-obovate, obtuse, or shortly acuminate, more or less narrowed and sometimes slightly oblique at the base, the edges undulate- or undulate-crenate; both surfaces glabrous, the midrib alone sometimes puberulous beneath; main nerves 9–11 pairs, curved, spreading, prominent beneath when dry; length 4–7 in., breadth 2·25–3·5 in.; petiole 25–35 in. *Racemes* 4–12 in. long, clustered and sometimes paniced at the apices of the branches, covered with soft pale tomentum. *Flowers* 2 in. in diam., 6 or 7-fid, in close clusters and on pedicels 15 in. long. *Calyx-tube* funnel-shaped; its segments longer than the petals, subspathulate. *Stamens* twice as many as the petals, all bearing anthers. *Fruit* unknown. *H. longifolium*, (*in part*) Benth. in *Journ. Linn. Soc.* IV, 35. *Blackwellia propinqua*, Wall. *Cat.* 4898. *B. spiralis*, Wall. *Cat.* 4897A.

PENANG; *Porter, Curtis* 1592. PERAK; *King's Collector* 3748, 3935, 4883, 7936. MALACCA; *Griffith; Maingay* (*Kew Distrib.*) 664.

4. *HOMALIUM GRIFFITHIANUM*, Kurz in *Journ. As. Soc. Bengl.* XL, Pt. II, (for 1877), 57. A tree 30–40 feet high, the young parts softly tawny-pubescent. *Leaves* membranous, obovate-oblong, shortly and bluntly apiculate, slightly narrowed to the rounded or minutely subcordate base, the edges subentire to coarsely crenate; both surfaces sparsely pubescent, tomentose or densely pubescent on the midrib and 7–9 pairs of spreading little curved not prominent main nerves; length 2·75–5 in., breadth 1·65–2·5 in.; petiole 2–4 in., pubescent. *Racemes* solitary, one and a half times as long as the leaves, softly tawny-tomentose; the glomeruli few-flowered, not crowded together. *Flowers* 35 in. in diam., densely villous in all parts. *Calyx-tube* conical

expanding into a wide mouth; the teeth 10, linear. *Petals* oblanceolate or spathulate, broader and longer than the sepals. *Stamens* 2 in front of each petal, glabrous. *Ovary* short, crowned by 5 short slightly spreading styles, glabrous towards the apex. *Fruit* unknown. Kurz For. Flora Burma, II, 531; Clarke in Flor. Br. Ind. II, 597. *H. foetidum*, Benth. in Journ. Linn. Soc. IV, 37 (*in part*). *Blackwellia dasyantha*, Turcz. Bull. Soc. Imp. Mosc. Vol. XXXVI (1863), 610. *Blackwellia spec.*, Griff. Notulæ IV, 584.

KEDAH; *Curtis* 2506. TRANG; *King's Collector* 1393. DISTRIB. Tenasserim.

Kurz describes the calyx-lobes and petals as 6 each, and in that he is quite wrong; for dissection of Griffith's specimen (which is the type of the species) shows 10 of each. Although the structure of the flowers is the same in the gatherings of this plant from Burma, Kedah and Trang, there is considerable difference as to the amount of hair on the leaves and also as to their edges. The Burmese specimens are rather obscurely crenate except when very young; the Kedah plant has its adult leaves boldly crenate and minutely pubescent on the lower surface and glabrescent on the upper (except the midrib and main nerves); while the Trang specimens are glabrescent on both surfaces, with the exception of the nerves and midrib. The flowers of the Trang plant are moreover slightly larger than those either from Kedah or Tenasserim.

5. *HOMALIUM FRUTESCENS*, King. A tree 20–30 feet high; young branches slender, pale when dry, glabrous, striate. *Leaves* thinly coriaceous, elliptic-oblong to elliptic, shortly acuminate, tapering slightly to the base; main nerves 7 or 8 pairs, curving upwards, prominent beneath; both surfaces glabrous, minutely reticulate, the lower pale-brown and the upper olivaceous when dry; length 3–5 in., breadth 1.75–2.25 (rarely 2.75 in.), petiole .1 in. *Racemes* axillary, sometimes with 2 or 3 branches, about as long as the leaves or sometimes longer, the rachis puberulous; the flowers numerous but not crowded, in pairs or solitary, about .25 in. long, and .1 in. or .15 diam. at the mouth; the pedicel under .1 in. in length. *Calyx* narrowly cylindrical-conic, boldly ridged; teeth 6, lanceolate, acute, erect. *Petals* larger than the petals, oblong-lanceolate, pubescent on both surfaces but especially on the upper. *Stamens* 4 opposite each petal and slightly exceeding it in length, glabrous. *Ovary* hairy, elongate; styles 5, as long as the stamens, cylindrical, erect. *Fruit* unknown. *Blackwellia longiflora*, Miq. Flor. Ind. Bat. I, Pt. I, 715. *B. caryophyllacea*, Zoll. et Moritz. Syst. Verz. 33; Miq. Flor. Ind. Bat. I, c. 715; *Homalium caryophyllaceum*, Benth. in Journ. Linn. Soc. IV, 38. *Cordylanthus frutescens*, Blume Mus. Bot. Ludg. Bat. II, 27, fig. III. *Homalium cordylanthus*, Benth. in Journ. Linn. Soc. IV, 38.

SELANGOR; *Ridley* 1902. JOHORE; *Ridley* 4050, 4182. PERAK; *King's Collector*, 776, 777, 784, 5246, 7040, 10471, 10237, 10102, 10996.

The flower of this is excellently figured by Blume in his *Mus. Bot.* as quoted above. Flowers however of a slightly different shape are found in some specimens. In these the calyx-tube is funnel-shaped and less cylindrical, and the petals are more spreading. These are associated usually with larger leaves, more broadly elliptic in shape; and at one time I was of opinion that they might belong to a different species. But the examination of nearly a hundred specimens of the two forms as collected in Perak has convinced that they are not specifically separable. Blume describes the plant as a shrub, but in Perak it is always a small tree. Miquel's *Homalium obovale* from Sumatra (*Flor. Ind. Bat. Suppl.* 334) comes very near this, and perhaps is not distinct.

6. *HOMALIUM UNDULATUM*, n. spec. King. A tree 40–60 feet high; young branches slender, pale-brown, minutely lenticellate. *Leaves* thinly coriaceous, elliptic, shortly and bluntly acuminate, slightly narrowed and sometimes unequal at the base, the edges undulate-crenate; both surfaces glabrous and minutely reticulate when dry, the upper shining, the lower dull; length 3–4 in., breadth 1.75–2 in., petiole .2–.25 in. *Inflorescence* consisting of a terminal panicle twice as long as the leaves and of a few solitary racemes from the upper leaf-axils, many-flowered, the rachises covered by minute rather sparse pale tomentum. *Flowers* .6 or .7 in. in diam., lax; their pedicels slender, tomentose, .4 in. long. *Calyx-tube* widely funnel-shaped, very slightly ridged, minutely tomentose; teeth 5, lanceolate, tomentose on both surfaces like the tube. *Petals* 5, much longer than the sepals, obovoid, blunt, clawed at the base, reticulate, tomentose. *Stamens* shorter than the sepals and much shorter than the petals, 4 in front of each petal, glabrous. *Ovary* hairy, crowned by 3 narrowly conical spreading hairy styles. *Fruit* unknown.

PERAK; King's Collector 7064, 8184.

7. *HOMALIUM GRANDIFLORUM*, Benth. in *Journ. Linn. Soc.* IV, 37. A tree 30–40 feet high; young branches rather stout, glabrous. *Leaves* coriaceous, elliptic to oblong, acute or shortly acuminate, narrowed near the petiole, the edges revolute and obscurely crenulate; both surfaces minutely reticulate when dry, and the upper very shining, the lower somewhat duller; main nerves 9–12 pairs, ascending, only slightly curved; length 3.5–6.5 in., breadth 1.75–3.25 in.; petiole .2–.3 in., stout. *Inflorescence* consisting of terminal few-branched panicles and of solitary axillary racemes with tomentose rachises. *Flowers* numerous but not crowded, solitary, not in glomeruli, .75 in. in diam.; the pedicels .2 in. long, tomentose. *Calyx-tube* short, hemispheric; teeth 7–9, spatulate-oblong, spreading, enlarged often flowering. *Petals* lanceolate, shorter than the calyx-teeth; the glands alternating with the petals, large. *Stamens* 7–12 opposite each petal; the filaments subulate, sparsely pilose. *Ovary* free or nearly so, 6–7-ridged, tomentose, conical; styles

6 or 7, short, glabrous, erect. *Fruit* unknown. Clarke in Flor. Br. Ind. II, 598. *Pierrea dictyoneura*, Hance, in Trimen's Journ. Bot. for 1877, 339.

MALACCA; *Griffith.* PERAK; *Scortechini.* SINGAPORE; *Ridley* 6527. Gulf of Siam; *Hance.* DISTRIB. Tenasserim.

An examination of flowers of his *Pierrea dictyoneura*, sent to me by the late Dr. Hance, proves that that plant is a species of *Homalium* with larger flowers and more stamens than usual.

Order LII. CUCURBITACEÆ.

Climbing herbs or shrubs; tendrils solitary, lateral, spiral, simple or divided. *Leaves* alternate, petioled, frequently cordate, simple, lobed or pedately divided. *Flowers* monœcious or diœcious, yellow or white, racemed and solitary, less commonly paniced. *Calyx-tube* wholly adnate to the ovary; limb rotate, campanulate, or tubular; lobes 5 (rarely 3), imbricate. *Petals* 5, inserted on the calyx-limb, united in a tube, or nearly or quite free, sometimes fimbriated at the margin, valvate or involute in the bud. *Stamens* inserted at the mouth or about the middle or at the base of the calyx-tube, usually 3 (sometimes 5 or 2), anthers free or united into a tube, one usually 1-celled and the other two 2-celled, cells straight or flexuose or conduplicate, the connective sometimes crested or produced. *Ovary* inferior, usually 3-carpellary; style 1 with 3 stigmas, more rarely styles 2-3-4; placentas usually 3, vertical, in double lines, the edges of the carpellary leaves being often turned in so far that the ovary (even before fertilization) is spuriously 3-celled; ovules usually many, horizontal, rarely pendulous, sometimes few and pendulous from near the top of the ovary. *Fruit* generally berried or fleshy, indehiscent or dehiscing by valves or by a circumscissile lid, often 1-celled, the seeds being often packed in pulp or fibre. *Seeds* usually many, often compressed, horizontal, pendulous, frequently corrugated or sub-spinose on the margins, albumen 0. DISTRIB. Species 600, in the warmer parts of the whole globe especially in the tropics.

Tribe I. CUCUMERINÆ. Ovules horizontal; female flowers solitary, never paniced; stamens 3, rarely 2 or 5, free or variously connate; cells of anthers straight, curved or flexuous; ovary bearing 3 (rarely 2 or 5) placentas:—

Anther-cells conduplicate or sigmoid; corolla rotate or campanulate, divided to the base:—

Petals cirriferous or fimbriate:—

- | | | | |
|-----------------------------------|-----|-----|-------------------|
| Seeds only 6, perfect, very large | ... | ... | 1. HODGSONIA. |
| Seeds numerous, testa not fibrous | ... | ... | 2. TRICHOSANTHES. |

Petals entire:—

- | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------------------|
| Calyx-tube of male flower elongate; the anthers included in the tube, cohering, sessile or subsessile, tendrils usually simple | ... | ... | ... | 3. GYMNOPETALUM. |
|--------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------------------|

Calyx-tube of male flower short; anthers usually exerted or sub-exserted, free or slightly coherent:—
Stamens inserted near the mouth of the calyx-tube; the anthers cohering slightly:—

Male flowers in racemes or clusters; fruit more or less fibrous, dehiscent by a transverse lid near the apex; tendrils 2-5-fid ... 4. LUFFA.

Male and female flowers solitary; fruit not fibrous, very fleshy, indehiscent; tendrils 2-fid 5. BENINCASA.

Stamens inserted below the mouth of the calyx-tube; anthers more or less cohering; male flowers in racemes, usually bracteate; tendrils simple ... 6. MOMORDICA.

Anther-cells straight, the connective produced, the fruit on a slender pedicel ... 7. MELOTHRIA.

Tribe II. GYNOSTEMMEÆ. Ovules pendulous; female flowers in panicles; stamens 3-5, anther-cells straight, filaments connate near the base; ovary 3-celled and with 3 placentas, fruit indehiscent ... 8. GYNOSTEMMA.

Tribe III. ZANONÆÆ. Ovules pendulous, female flowers in panicles or racemes; stamens 5, free, anthers straight; ovary with 3 placentas; fruit cylindrical or clavate, dry, 1-celled, dehiscence circumscissile; seeds winged:—

Calyx-lobes 3, seeds winged all round ... 9. ZANONIA.

Calyx-lobes 5, seeds winged at the apex only ... 10. ALSOMITRA.

1. HODGSONIA, H. f. & T.

A large climber. *Leaves* coriaceous, 3-5-lobed, long-petioled; tendrils 2-3-fid. *Flowers* large, diœcious; males in long racemes; bracts oblong, entire, deciduous; females solitary. *Male-calyx* long-tubular, with a shortly campanulate mouth and 5 short teeth; petals 5, connate at the base, very long-fimbriate; stamens 3, filaments very short; anthers exerted, connate, linear, one 1-celled, two 2-celled, cells conduplicate. *Female* calyx and corolla as in the male; ovary globose, 1-celled; style long; stigmas 3, oblong, bifid, exerted; placentas 3, parietal, near the base of the ovary, 2-ovulate on each side. *Fruit* large, depressed-globular, 12-grooved, flesh hard; perfect seeds usually six, each having a smaller, commonly barren one, attached to its side, flat-ellipsoid, with sunk veins.

HODGSONIA HETEROCLITA, Hook. fil. and Thoms. in Proc. Linn. Soc. II, 257. *Stem* very long, often reaching 80 or 100 feet. *Leaves* palmate, somewhat cordate at the base; the lobes entire, rarely slightly denticulate, acute; both surfaces glabrous, minutely reticulate when dry, 6-10 in. long and as broad, the petioles 2 or 3 in. long. *Male racemes* about as long as the leaves; bracts solitary, oblong, acute, 5 in. long. *Calyx* rusty-tomentose externally, the tube 3 or 4 in. long, with a gland

on each tooth of the mouth. *Petals* sub-obcordate, retuse, about 2 in. long, covered with brown hairs and 3-nerved externally; the inner surface white, the margins fringed with very long spiral villous yellow threads. *Filaments* clavate, anthers forming an inverted cone; *pistil* 0. *Female* flowers often on a separate plant; their peduncles 1 or 2 in. long, occasionally in a raceme much shorter than those of the males; *stamens* 0. *Fruit* turbinate, 4–10 in. in diam., and less from base to apex, covered with short reddish-brown tomentum. *Seeds* 2–3 in. long, and 1.5–2.25 in. broad. Hook, fil. Ill. Himal. Pl. tt. 1, 2, 3; Flor. des Serres, t. 1262, 3; Clarke in Hook, fil. Flor. Br. Ind. II, 606. *Hodgsonia macrocarpa*, Cogn. in DC. Mon. Phan. III, 349. *Trichosanthes macrocarpa*, Bl. Bijdr. 935; Ser. in DC. Prodr. III, 315; Miq. Flor. Ind. Bat. I, Pt. II, 676. *T. hexasperma*, Bl. Bijdr. 935; DC. Prodr. III, 315; Hassk. Pl. Jav. Rar. 192; Miq. Fl. Ind. Bat. l. c. 678. *T. heteroclita*, Roxb. Hort. Beng. 70; Fl. Ind. III, 705; Wall. Cat. 6684. *T. grandiflora*, Wall. Cat. 6685 (not of Blume).

PERAK; *Scortechini*, *Wray*, *King's Collector*. MALACCA; *Maingay*. PENANG; *Wallich*. *DISTRIB.* Sumatra, Java, Borneo, Burma, Assam, and the base of the Eastern Himalaya.

The earliest name of this species was Roxburgh's (*T. heteroclita*), published in the *Hortus Bengalensis* in 1814. Blume's name *T. macrocarpa* dates from 1826.

2. TRICHOSANTHES, Linn.

Scandent herbs. *Leaves* entire or 3–9-lobed, denticulate; tendrils usually 2–5-fid. *Flowers* dioecious or occasionally monoecious, white; male peduncles usually in axillary pairs, one 1-flowered caducous, the other racemose; bracts large or small or 0; female flower solitary. *Male-calyx* long-tubular; teeth 5, lanceolate, entire serrate or lacinate. *Corolla* 5-fid nearly to the base, lobes long-fimbriate; stamens 3; anthers almost included, connate (free in *T. dioica*), long-linear, one 1-celled, two 2-celled, cells conduplicate. *Female* calyx and corolla as in the male. *Ovary* inferior, at the base of the calyx-tube, 1-celled; style filiform, 3- or 6-fid at the apex; placentas 3, parietal; ovules very many, horizontal, half-pendulous. *Fruit* lanceolate or globose, smooth, acute or obtuse at the apex. *Seeds* many, horizontal, packed in pulp, compressed, ellipsoid, sometimes angular on the margin. *DISTRIB.* Species 38, in South-East Asia, extending through Malaya to North Australia, also through China to Japan.

Leaves, although often deeply lobed, always simple:—

Male inflorescence ebracteate 1. *T. cucumerina*.

Male inflorescence bracteate:—

Bracts linear-oblong or narrowly rhomboid, quite

entire 2. ? *T. Hearnii*.

- Bracts small ovate-lanceolate, caudate-acuminate, obscurely dentate, leaves quite smooth and glabrous on both surfaces 3. *T. tricuspidata*.
- Bracts very large, ovate to sub-orbicular, deeply incised or simply serrate; calyx-teeth lanceolate; fruit usually globular, rarely ovate 4. *T. palmata*.
- Bracts rather large, oblong-ovate, lacinate; calyx-teeth spreading, entire; fruit always ellipsoid ... 5. *T. Wallichiana*.
- Leaves usually trifoliolate, but sometimes simple on the same or different plants; leaflets membranous, unequal, much acuminate, the edges undulate-dentate: bracts of male inflorescence small, oblong, their edges with a few long distant teeth 6. *T. Wawraei*.
- Leaves always trifoliolate; leaflets coriaceous, shortly and bluntly apiculate or subacute, the edges quite entire; bracts of male inflorescence deltoid, their edges pectinate 7. *T. celebica*.

1. *TRICHOSANTHES CUCUMERINA*, Linn. Sp. Pl. Ed. 1, 1008. *Stems* slender, angled, puberulous. *Leaves* membranous, orbicular-reniform to broadly ovate in general outline; the edges remotely denticulate, often more or less deeply 3-5 or 7-lobed; the lobes broad with acute but not acuminate apices and often sinuate margins, the base deeply cordate, the sinus often sub-rectangular; upper surface sparsely pubescent or sub-glabrous, the lower deciduously pubescent at first, ultimately sub-scabrid; length 2-4 in. and breadth about the same; petiole 1-2 in., pubescent; tendrils slender, sulcate, puberulous, 2-3-fid. *Male peduncles* rather longer than the leaves, pubescent, bearing a few flowers towards the apex, ebracteate. *Flowers* .5-1 in. in diam. at the mouth; the tube 2 or 3 times longer, cylindric, a solitary male flower sometimes from the same axil as the peduncle. *Female flower* on a peduncle .5 in. long, fruit 1-3 in. long, narrowly ovoid, the apex conical, red when ripe; seeds half ellipsoid, compressed, corrugated. Lour. Flor. Cochchin, 588; Ser. in DC. Prodr. III, 315; Roxb. Hort. Beng. 70; Roxb. Flor. Ind. III, 720; Wall. Cat. 6690 A, B, C, D, F; Blume Bijd. 933; Dalz. & Gibs. Bomb. Flor. 102; Miq. Flor. Ind. Bat. I, Pt. I, 676; Naud. in Ann. Sc. Nat. Ser. 4, XVIII, 191; Kurz in Journ. As. Soc. 1877, Pt. II, 98; W. & A. Prodr. 350; Miq. Flor. Ind. Bat. I, Pt. I, 676; Thwaites Enum. Pl. Ceyl. 126; Benth. Flor. Austral. III, 314; Clarke in Hook. fil. Flor. Br. Ind. II, 609; Cogn. in DC. Mon. Phan. III, 358. *T. laciniosa*, Klein in Herb. Rottler. *T. pilosa*, Wall. Cat. 6691. *Bryonia umbellata*, Wall. Cat. 6700 D. *Cucumis Missionis*, Wall. Cat. 6728.

PERAK; *King's Collector* 5622. DISTRIB. Malayan Archipelago; British India.

The Perak plant has larger flowers than any Indian specimen, and I refer it to *T. cucumerina* with some hesitation.

2. ? *TRICHOSANTHES HEARNI*, F. Mull. in Benth. Flor. Austral. III, 315. *Stem* slender, glabrous, sulcate. *Leaves* membranous, broadly ovate, the apex acute or acuminate, the base deeply and widely cordate; the edges rather remotely denticulate, sometimes remotely sinuate-lobed; the upper surface glabrous and shining, the lower densely and minutely pubescent, the nerves, subglabrous and stout; length 4–8 in., breadth 3·5–6 in., petiole 1–1·75 in. *Male peduncles* often in pairs, axillary, longer than the leaves, slender, puberulous, angled; floriferous in the upper half; bracts linear-oblong, entire, about ·25 in. long; several of the lower ones narrowly rhomboid, all pubescent, flowers under 1 in. in diam. at the mouth; calyx-tube cylindrical, the mouth narrowly infundibuliform, puberulous; the lobes of the mouth narrow, acute. *Female flower* and fruit unknown.

ANDAMANS; *Kurz, King's Collector.*

The late Mr. Kurz collected a single specimen of this on Rutland island (in the Andaman group) many years ago, and he referred it in the Calcutta Herbarium to *Trichosanthes reniformis*, Miq. He also suggested for it the name *Trichosanthes herpetospermum*,—a name which he never published. In 1890 several specimens of the plant were collected near Port Mowat, on the South Andaman. Specimens of this second gathering, as well as of Kurz's original gathering, were sent by me to Mr. C. B. Clarke who found that they closely resemble, and are probably identical with, *T. Hearnii*, an Australian species named by the late Baron von Müller, and of which an imperfect description was published by Mr. Bentham in his *Flora of Australia*. And to this species I now doubtfully refer both the Andaman gatherings.

3. *TRICHOSANTHES TRICUSPIDATA*, Lour. Flor. Cochinchin. II, 723. *Stem* stout, sulcate, smooth, glabrous. *Leaves* thinly coriaceous, ovate-sub-triangular, with from 3–5 stout triangular broad, acute or acuminate, spreading lobes, the base broadly cordate, the edges remotely and minutely denticulate or subentire, glabrous on both surfaces; length and breadth 3–5 in.; petiole slender, 1–1·5 in.; tendrils 3-fid. *Male peduncles* floriferous for half their length, longer than the leaves, stout, glabrous or puberulous, 10–20 flowered; bracts thick, rigid, ovate-lanceolate, caudate-acuminate, obscurely dentate or entire; calyx-tube tapering to the base, shortly but densely tomentose, the lobes caudate-lanceolate with a few irregular distant teeth; corolla 1·5 in. in diam. *Female flower* from the same axil as the male peduncle, the tube 1·5 in. long, the corolla ·75 in. in diam.; *fruit* ovoid when young, subglobular and 2 in. in diam. when ripe, smooth, yellow with numerous small black pustules, the pulp thick; the seeds in the very centre, broadly ovate, compressed, ·5 in. long and ·4 in. broad. Blume Bijdr. 935; Ser. in DC. Prodr. III, 315; Roem. Syn., fasc. II, 95; Miq. Flor. Ind. Bat. I, Pt. I, 676; Cogniaux in DC. Mon. Phan. III, 374.

PENANG; *Curtis* 1947. PERAK; *Scortechini* 376; *King's Collector* 2202, 5111; *Wray* 4029.

This resembles *T. palmata*, Roxb. and *T. Wallichiana*, Wight; but the lobes of the leaves are shallower and their surfaces more glabrous and not at all scabrid, while the bracts of the male inflorescence are much narrower and very acuminate; and their edges, instead of being laciniate, are entire or at most obscurely dentate.

4. *TRICHOSANTHES PALMATA*, Roxb. Hort. Beng. (1814) p. 70. *Stem* stout, angled and sulcate, glabrous. *Leaves* thickly membranous, broadly ovate or orbicular in general outline, deeply cut down to about the middle into 3–7 lobes; the lobes acute or acuminate, their edges entire or denticulate, the base deeply but usually narrowly cordate; upper surface more or less scabrous or scabrid, glabrous, glandular near the apex of the petiole, the lower glabrous or somewhat pubescent, length and breadth 2–6 in.; petiole rather slender, 1 to 3 in. long; tendrils 2- or 3-fid. *Male* racemes sometimes in pairs, longer than the leaves, few-flowered; bracts large, ovate to sub-orbicular, deeply incised or simply serrate, glabrous or with viscid hairs; calyx-tube 1·5 in. long, tomentose or glabrous, the teeth lanceolate, the edges deeply serrate or laciniate. *Female* flower solitary, on a peduncle less than 1 in. long; fruit ovoid, pointed when young, globular when ripe, 1·5–2 in. in diam. *T. palmata*, Roxb. Flor. Ind. III, 704; Wall. Cat. 6688 (excl. C, F); W. & A. Prodr. 350; Wight Ill. t. 104, 105; Dalz. & Gibs. Bomb. Flor. 103. *T. laciniosa*, Wall. Cat. 6689 A, B. *T. aspera*, Heyne in Herb. Rottler. *T. tricuspis*, Miq. Flor. Ind. Bat. I, Pt. I, 679. *T. cordata*, Wall. Cat. 6686 (excl. A and B). *T. anguina*, Wall. Cat. 6687 (F partly); Voigt Hort. Bot. Sub. 58. *T. bracteata*, Kurz in Journ. As. Soc. Beng. 1877, Pt. II, 99; Cogn. in DC. Mon. Phan. III, 375. *T. pubera*, Blume Bijdr. 936; Ser. in DC. Prodr. III, 315; Roem. Syn. fasc. II, 95; Miq. Flor. Ind. Bat. I, Pt. I, 675. *Cucurbita Melopepo*, Wall. Cat. 6725. *Involucraria Wallichii*, Seringe in DC. Prodr. III, 318. *Bryonia palmata*, Wall. Cat. 6711 F.

PERAK; Wray 2181, 2371, 2478, 3049; King's Collector 1848, 4983, 10579. ANDAMANS; King's Collector.

The fruit when ripe is usually globular; but there are specimens in the Calcutta Herbarium which have oval fruit like *T. Wallichiana*, Wight, and at the same time the scabrid leaves and laciniate calyx lobes which are supposed to be characteristic of this species.

5. *TRICHOSANTHES WALLICHIANA*, Wight in Ann. and Mag. Nat. Hist. VIII, 70. *Stem* robust, angled and sulcate, glabrous. *Leaves* membranous, sub-orbicular in general outline, divided half-way down or more into 3–5 oblong or triangular acute lobes; the lobes sparsely denticulate, the lower on each side sometimes lobulate, the base deeply and widely cordate; both surfaces glabrous and usually smooth, the upper sometimes slightly scabrid and with a few glands near the apex of the petiole; length and breadth 3–7 inches, tendrils 3-fid. *Male*

peduncles at first shorter than the leaves, elongating with age; bracts oblong-ovate, their edges lacinate; calyx-tube glabrous, the teeth spreading, entire; petals obovate, lacinate. *Female flower* solitary; fruit ellipsoid, obtuse, smooth, 2–4 in. long. Cogn. in DC. Mon. Phan. III, 368. *Involucraria Wallichiana*, Ser. in Mem. Hist. Nat. Geneve III, Pt. I, 25 t. 5; in DC. Prodr. III, 318; Roem. Syn. fasc. 2, p. 98. *Trichosanthes multiloba*, Clarke in Hook. fil. Flor. Br. Ind. II, 607 (not of Miq.). *T. grandibracteata*, Kurz in Journ. As. Soc. Beng. XLVI, 98, 99.

PAHANG; *Ridley* 244. SINGAPORE; *Ridley* 296, 446, 4762. PENANG; *Curtis* 2004. PERAK; *Scortechini* 508 and 600.

A species scarcely separable from *T. pubera*, Bl., of which in my opinion it would better be treated as a variety.

6. TRICHOSANTHES WAWRÆI, Cogn. in DC. Mon. Phan. III, 384. *Stem* slender, sub-glabrous, sulcate. *Leaves* membranous, trifoliolate or simple; leaflets of the trifoliolate form unequal, the middle one oblanceolate, the lateral ones angularly auriculate or lobulate at the base on the outer side, the edges of all subentire or sparsely denticulate and the apices much acuminate, all with slender petiolules .25–.3 in. long; the lower surface reticulate when dry, glabrous, the upper sparsely and minutely pustulate and glabrous; length of the leaflets 2.5–5 in., breadth .75–1.5 in., petiole 1.25–2 in.; the simple form triangular-oblong, tapering gradually to the apex, the base with 2 short sub-horizontal lobules, length 2.5–5 in.; tendrils short, simple or bifid. *Male peduncles* shorter than the leaves, very stout, sulcate, glabrous, many-flowered; bracts small, oblong, their edges with a few long teeth, the flowers extending for half their length; calyx .5 in. long, narrowly campanulate, suddenly contracted into the tube, the teeth erectopate or recurved, lanceolate, acuminate, entire. *Female flower* with cylindric tube slightly dilated at the apex, the teeth as in the male; petals white, yellowish at the base, oblong, 3-nerved, the fimbriæ long, the external surface minutely papillose; ovary, glabrous, ovoid-oblong; *fruit* subglobular when young, oblong when ripe, smooth, red with orange or white stripes; *seeds* compressed, oblong-ovoid, .6 in. long.

PERAK; *King's Collector* 2203, 4519, 4668, 5380, 5405, 10176. *Wray* 2382; *Scortechini*. (SINGAPORE; *Wawra* 241 in Herb. Vindob. *vide* Cogniaux.)

Cogniaux describes this as having its leaves always trifoliolate. But in some of the Perak specimens both trifoliolate and simple leaves as above described are to be found; in a few only simple leaves, and in the majority only trifoliolate.

7. TRICHOSANTHES CELEBICA, Cogn. in DC. Mon. Phan. III, 385. *Stem* slender, glabrous, sulcate, sometimes hairy at the nodes. *Leaves* coriaceous, trifoliolate; the leaflets unequal in size, the middle one

the largest, ovate-oblong, shortly acuminate or sub-acute; the base slightly narrowed, oblique, not cordate, the edges quite entire; both surfaces glabrous, minutely reticulate when dry, the upper minutely punctate; length of leaflets 3-4.5 in., breadth 1.5-2.5 in.; petiole 1-1.5 in. long, stout; petiolules .15 in.; tendrils short, bifid. *Male peduncle* shorter than or equal to the leaves, stout, deeply sulcate, adpressed-pubescent, floriferous for half its length; bracts deltoid, pectinate, tawny glandular-tomentose. *Calyx-tube* narrowly infundibuliform, minutely pubescent; the teeth lanceolate, acuminate, entire, erectopatent. *Female flower* unknown. *Fruit* ovate, smooth, 8 in. long and 3 or 4 in. in diam. with a leathery rind, bright red with 10 yellow stripes when ripe; *seeds* obliquely oblong, compressed, smooth, .6 in. long and .4 in. broad.

PERAK; *Wray* 2460; *Scortechini*; *King's Collector* 4033. SINGAPORE; *Ridley* 2051, 4592, 6783; *Hullett* 247. DISTRIB. Celebes, Beccari.

3. GYMNOPTALUM, Arn.

Twining herbs, tendrils usually simple or 2-fid. *Leaves* petioled, 5-angular, nearly entire or deeply lobed. *Flowers* white (or yellow?), somewhat large; occasionally monœcious; male peduncles in fully developed plants 2 from each axil, the earlier 1-flowered, the later longer with racemes, either often suppressed; bracts on the racemes persistent, large, lanceolate, incised or small; females 1-flowered, usually in separate axils. *Male calyx-tube* long, contracted near the mouth, limb of 5 lanceolate segments; petals 5, not fimbriate on the margin; stamens 3; anthers included, connate, elongate, 1-2-celled, cells conduplicate; rudiments of the ovary 1 or 3, small, linear. *Female calyx* and corolla as in the male; ovary oblong; style long, stigmas 3, short linear; ovules horizontal, many; placentas 3, long, vertical. *Fruit* ovate-oblong, acute at both ends. *Seeds* many or few, ellipsoid, compressed, margined, nearly smooth. DISTRIB. Species 6; in India, China and Malaya.

Leaves not lobed 1. *G. integrifolium*.

Leaves lobed:—

Leaves 3-5-lobed half way down, reniform to triangular in general outline; lobes triangular acute, not lobulate

... .. 2. *G. Cochinchinensis*.

Leaves deeply 5-lobed, the lobes lobulate-sinuate,

blunt, their general outline orbicular 3. *G. quinqueloculare*.

1. GYMNOPTALUM INTEGRIFOLIUM, Kurz in Journ. As. Soc. Beng. XL, 58. Creeping, only a few feet long; *stem* scabrid, tendrils simple or bifid. *Leaves* reniform, obtuse; the margin undulate or denticulate, not lobed; upper surface very scabrid, the lower softly tomentose,

length 1·75–2 in., breadth ·8–2·25 in., petiole ·45–·65 in. *Flowers* monœcious, all solitary, axillary and bracteate, the *male* peduncle 1·5 in. long, the *female* only ·25 in. *Calyx-tube* in both sexes elongate, densely covered with long brown hairs; the teeth 5, lanceolate; *corolla* white, about 1·35 in. in diam., its lobes obovate, entire, pubescent, veined. *Fruit* about ·75 in. in diam., globular, smooth, orange-red. Kurz in *Flora* for 1871, p. 295; Clarke in *Hook. fil. Flor. Br. Ind.* II, 612. *Cucumis integri folius*, Roxb. *Flor. Ind.* III, 724; Wall. *Cat.* 6730. *Trichosanthes officinalis*, Wall. *Cat.* 6694. *T. integrifolia*, Kurz in *Journ. As. Soc. Beng.* XLVI, Pt. II, 99; Cogn. in *DC. Mon. Phan.* III, 386.

PERAK; Wray 2167; Ridley 3107.

Kurz named this *Gymnopetalium integrifolium* in the *Journal of the Asiatic Society of Bengal* which was issued in March 1871. His publication of it in *Flora* dates only from October of the same year.

2. GYMNOPETALUM COCHINCHINENSIS, Kurz in *Journ. As. Soc. Beng.* XLVI, Pt. II, 57. *Stems* slender, angled, slightly scabrid-hairy. *Leaves* reniform to triangular in outline, 5-angled or 3–5-lobed half way down; the lobes triangular, acute, the edges crenate-dentate and thickened, the base deeply and widely cordate, both surfaces more or less scabrid, length 2 to 4 in., breadth 2 to 3·5 in.; petiole scabrid-pubescent, 1–1·5 in. long; tendrils simple or bifid. *Male peduncle* longer than the leaves, the flowers racemose, or sometimes solitary; bracts large, incised-serrate, ·5–·75 in. long; calyx-tube sub-cylindric, villous, the mouth closed by deflexed hairs, the teeth erecto-patent; petals ovate-oblong, ·5 in. long, entire or sub-crenate. Peduncle of *female flower* shorter than the leaf-petiole, sparsely puberulous; *fruit* about 2 in. long. and ·75 in. in diam., somewhat scabrid, 10-ribbed, orange-red, the beak long; *seeds* about ·25 in. long. Kurz in *Flora* for 1871, p. 295; Clarke in *Hook. fil. Flor. Br. Ind.* II, 611; Cogn. in *DC. Mon. Phan.* III, 391. *Bryonia cochinchinensis*, Lour. *Flor. Cochinch.* 595; *DC. Prodr.* III, 305. *Momordica tubiflora*, Roxb. *Flor. Ind.* III, 711, (not of Wallich). *Tripodanthera cochinchinensis* Roem. *Synops.* II, 48. *Scotanthus tubiflorus*, Naud. in *Ann. Sc. Nat. Ser.* 4, XVI, 172, t. 3. *Trichosanthes cucumerina*, Wall. *Cat.* 6690 E. *T. ? Fatoa*, Ham. in Wall. *Cat.* 6695. *Bryonia grandis*, Wall. *Cat.* 6700 K. L. *Trichosanthes costata*, Bl. *Bijdr.* 933; *Ser. in DC. Prodr.* III, 314.

PAHANG; Ridley 2446. KEDAH; Curtis 2592. PERAK; King's *Collector* 10563. *DISTRIB.* British India, Malayan Archipelago, China.

3. GYMNOPETALUM QUINQUELOBUM, Miq. in *Flor. Ind. Bat.* I, Pt. I, 681. A slender annual; *stem* striate, with short pubescence or glabrous. *Leaves* orbicular in general outline, deeply 5-lobed; the lobes sinuately 2- or 3-lobulate, or oblong and subentire; both surfaces sparsely covered with thick whitish hairs with bulbous bases, length

1·5-2·25 in., breadth 1·75-3 in.; petiole ·75-1 in., sparsely pubescent. *Male flowers* usually solitary, rarely in racemes slightly longer than the leaves, shortly pilose; the bracts oblong, serrate, ·5 in. long. *Calyx-teeth* erect, entire or dentate; petals oblong, acute, puberulous outside. Peduncle of *female flower* ·5-1 in. long. *Fruit* brilliant scarlet when ripe, oblong-fusiform, acutely ribbed, shortly pubescent, 1·5-2 in. long; *seeds* blackish, rugulose, obscurely marginate, narrowed to the base, ·2 in. long and about ·1 in. broad. Clarke in Hook. fil. Flor. Brit. Ind. II, 611; Cogn. in DC. Mon. Phan. III, 392. *Scotanthus Porteanus*, Naud. in Ann. Sc. Nat. Ser. V, Vol. 5, 25. *Gymnopetalum heterophyllum*, Kurz in Trim. Journ. Bot. for 1875, p. 326.

ANDAMAN AND NICOBAR ISLANDS; Kurz.

4. LUFFA, Cav.

Climbers, large or small, pubescent or nearly glabrous; tendrils 2-5-fid. *Leaves* cordate, usually 5-angular or 5-lobed; petiole without glands at its apex. *Flowers* yellow or white, monœcious, males and females often from the same axil; females solitary or paniced, males on long or short racemes or clustered. MALE; calyx-tube turbinate, lobes 5, triangular or lanceolate; petals 5, obovate; stamens 3, rarely 5, filaments 3, free or connate; anthers exerted, free, one 1-celled, the others 2-celled; cells sigmoid, often on the margin of the broad connective. FEMALE; calyx-tube shortly produced above the ovary; lobes and corolla as in the male; ovary oblong, style cylindric, stigma 3-lobed; ovules very many, horizontal. *Fruit* large or small, oblong (not spherical), smooth or angular or spinous, ultimately fibrous, not succulent, 3-celled, usually circumscissile near the apex. *Seeds* many, oblong, compressed. **DISTRIB.** Species 6, in the warmer regions of the Old World and one in America.

LUFFA ÆGYPTIACA, Miller Gard. Dict. ed. VIII, ex Hook. fil. in Oliv. Flor. Trop. Afr. II, 530. *Stem* stout, many yards in length; the young branches glabrous, angled and very deeply sulcate; tendrils 2-3-fid. *Leaves* large, reniform or reniform-orbicular in general outline, palmately 5-lobed; the lobes acute, lobulate and denticulate; both surfaces scabrous or scaberulous, punctate, glabrous except the pubescent nerves on the lower surface; length 2·5-6 in., breadth 3-9 in., petiole 2-2·5 in., pubescent, eglandular. *Male peduncle* 6 in. long; the flowers 4-12, crowded near the summit, 1·5-2 in. in diam., their pedicels short, each with a small ovate viscid bract, or ebracteate; petals 5, yellow with green veins; stamens 5. *Female flower* solitary on a peduncle 1-3 in. long, usually from the same axil as the male inflorescence; fruit 5-12 in. long, sub-cylindric, with numerous bold ridges; *seeds* usually black,

narrowly winged, smooth or slightly tubercled. DC. Prodr. III, 303; Clarke in Hook. fil. Flor. Brit. Ind. II, 614. *Cucumis aegyptiacus*, Vcsl. in Alp. Pl. Aegypt. p. 199, t. 58, 59. *Momordica Luffa*, Linn. Spec. ed. 1, 1009. *L. pentandra*, Roxb. Flor. Ind. III, 712; W. & A. Prodr. 343; Wall. Cat. 6751; Wight Ic. t. 499. *L. racemosa*, Roxb. l. c. 715. *L. clavata*, Roxb. Hort. Beng. 104; Flor. Ind. III, 714. *L. acutangula*, W. & A. l. c., (not of Roxb.). *L. cylindrica*, Roem. Synops. II, 63; Naud. in Ann. Sc. Nat. Ser. 4, XII, p. 119; Kurz in Journ. As. Soc. 1877, Pt. II, 100; Cogn. in DC. Mon. Phan. III, 456. *L. Petola* and *L. Cattu-picinna*, Seringe in DC. l. c. *L. Parvala*, Wall. Cat. 6758. *L. Gosa*, *hederacea* and *Satpatia*, Wall. Cat. 6753, 6755, 6757. *Bryonia cheirophylla*, Wall. Cat. 6715 A.

PERAK; *King's Collector* 1020. DISTRIB. British India and in the Tropics generally; often cultivated.

The synonymy of this species occupies more than a page in Cogniaux's excellent Monograph of the *Cucurbitaceæ* in De Candolle's *Suites au Prodromus*, Vol. III. I have followed Messrs. Cogniaux and C. B. Clarke in reducing here Roxburgh's three species *L. pentandra*, *L. racemosa* and *L. clavata*, but I do so with considerable hesitation. Neither in flower nor leaf do Roxburgh's figures of his *L. clavata* and *L. pentandra* much resemble each other, whatever relation either of them may bear to *M. Aegyptiaca*, Miller. The material of the Indian species in the Calcutta Herbarium is very unsatisfactory, and I do not think the last word on them will be said until they have been carefully cultivated side by side, and studied as they grow.

5. BENINCASA, Savi.

A large climber, softly hairy, tendrils 2- or 3-fid, rarely simple. *Leaves* cordate, reniform-orbicular, more or less 5-lobed; petiole without glands. *Flowers* large, yellow, monœcious, all solitary, without bracts. MALE; calyx-tube campanulate; lobes 5, leaf-like, serrate; petals 5, nearly separate, obovate; stamens 3, inserted near the mouth of the tube; anthers exerted, free, one 1-celled, two 2-celled, cells sigmoid. FEMALE; calyx and corolla as in the male; ovary oblong, densely hairy; style thick, with 3 flexuose stigmas; ovules numerous, horizontal; placentas 3. *Fruit* large, fleshy, oblong, pubescent, indehiscent. *Seeds* many, oblong, compressed, margined.

BENINCASA HISPIDA, Cogn. in DC. Mon. Phan. III, 513. Annual. *Leaves* on long petioles, reniform-rotund, with 5-9 small lobes, all toothed, 4-6 in. long and about the same in breadth; petioles cylindric, longer than the leaves, tendrils usually 3-fid. *Male flowers* axillary, solitary, peduncled, yellow, 1.5 in. in diam.; teeth of the calyx obtusely pinnatifid or undulate. *Female flowers* like the male, axillary, solitary, peduncled; calyx as in the male. *Fruit* sub-cylindric, obtuse at the ends, smooth, hairy when young but glabrous and with a whitish

bloom when ripe, 12–18 in. long and from 8–10 in. in diam. *Seeds* white with tumid margins, .5 in. long and .15 in. broad. *Cucurbita hispida*, Thunb. Flor. Jap. (1784), p. 322; Bl. Bijdr. 931; Wall. Cat. 6723. *C. Pepo*, Lour. Flor. Coch.-Chin. p. 593; Roxb. Flor. Ind. III, 718 (not of Linn.). *Benincasa cerifera*, Savi in Bibl. Ital. IX, 159; DC. Prodr. III, 303; W. et Arn. Prodr. 344; Miq. Flor. Ind. Bat. I, Pt. I, 665; Clarke in Hook. fil. Flor. Br. Ind. II, 616. *Cucurbita villosa*, Bl. Bijdr. 931; DC. Prodr. III, 317. *C. farinosa*, Bl. Bijdr. 931. *Cucurbita alba*, Roxb. in E. Ind. Comp. Mus., tab. 457 (ex W. et Arn.). *Gymnopetalum septemlobum*, Miq. Flor. Ind. Bat. I, Pt. I, 679. *Lagenaria dasystemon*, Franch. et Sav. Enum. Pl. Jap. I, 173.

NICOBAR AND ANDAMAN ISLANDS; cultivated, *King's Collectors*. DISTRIBUTION.—Malayan Archipelago, Australasia, China, Philippines, British India; cultivated.

6. MOMORDICA, Linn.

Climbing by simple tendrils. *Leaves* cordate, petioled, undivided in the Indian species. *Flowers* yellow or white, monœcious or dioecious, females solitary, peduncled; males solitary or racemed, bracteate or not. MALE; calyx-tube short, campanulate with 2–3 basal oblong incurved scales (ex Hook. f.) lobes 5; *corolla* 5-partite nearly to the base; stamens 3; filaments short; anthers at length free, one 1-celled, one or two 2-celled, cells conduplicate or horse-shoe-shaped. FEMALE; calyx and corolla as in the male; ovary oblong; style long, stigmas 3; ovules very many; placentas 3, horizontal. *Fruit* oblong or spherical, rough or smooth, indehiscent or 3-valved, many- or few-seeded. *Seeds* obovate or complanate, smooth, corrugate or sculptured. DISTRIBUTION.—Species 25, chiefly in the warmer parts of Africa, several in Tropical Asia, a few in Tropical America.

Leaves entire :—

Male pedicels ebracteate	...	...	...	1. <i>M. Clarkeana</i> .
Male pedicels with a bract close to the flower	...	...	...	2. <i>M. subangulata</i> .
Leaves 3-lobed, the lobules entire	...	...	...	3. <i>M. Cochinchinensis</i> .
Leaves 5–7-lobed, the lobules sinuate-dentate or lobulate	...	...	...	4. <i>M. Charantia</i> .

1. MOMORDICA CLARKEANA, n. spec. King. *Stem* slender, 4-angled, glabrous, 20–30 feet long. *Leaves* thinly membranous, broadly ovate, never lobed, acute, the base deeply cordate or emarginate, both surfaces quite glabrous; length 3–5 in., breadth 3–4 in.; petiole 1.5–2 in., slender, eglandular. *Male flowers* .75 in. in diam., on filiform pedicels several form a leaf-axil, or in few-flowered lax racemes; calyx-lobes puberulous, broad, obtuse, their margins membranous and glabrous; *corolla* deeply divided into 5 broad blunt lobes, puberulous. *Female flower* unknown.

Fruit vermilion when ripe, sub-globular, apiculate when young, glabrous; without ridges or papillæ, 2-2.5 in. in diam.; *seeds* as in *M. Cochinchinensis*.

PERAK; *Scortechini* 1605; *King's Collector* 8340; *Wray* 3273.

This species is allied to *M. Cochinchinensis* and has seeds exactly alike those of that species. But the leaves of this are of thinner texture than those of *M. Cochinchinensis*, and they are not lobed; moreover the petiole in this is eglandular, and the fruit is quite free from ridges or papillæ of any kind. I have named it in honour of my friend Mr. C. B. Clarke who believes with me that it is a hitherto undescribed species.

2. *MOMORDICA SUBANGULATA*, Blume Bijdr. 928. *Stem* slender, glabrous, angled, sulcate, several feet long; tendrils single. *Leaves* broadly ovate, deeply cordate at the base, the apex acute, the edges with remote cartilaginous teeth; upper surface glabrous, the lower with sparse small adpressed hairs; length 1.75-2.25 in., breadth 1.25-1.65 in.; petiole 1 in. long, glabrous, eglandular. *Male peduncle* .5-1 in. long, pubescent; the bract close to the flower broader than long, its apex obtuse, its base cordate, minutely pubescent, the veins prominent; flower nearly 1 in. in diam.; calyx deep purple; its lobes oblong, obtuse, glandular, nearly .2 in. long; corolla yellow, partite to the base, the segments oblong. *Female flower* unknown; *fruit* ellipsoid, 2-3 in. long, obscurely ribbed, the ribs broken into joints. Ser. in DC. Prodr. III, 316; Roem. Syn. fasc. 2, p. 58; Miq. in Flor. Ind. Bat. I, Pt. I, 664; Kurz in Journ. As. Soc. Beng. XLVI, Pt. II, 102; Cogn. in DC. Mon. Phan. III, 443.

PERAK; *Scortechini* 399. *DISTRIB.* Java, Brit. India.

3. *MOMORDICA COCHIN-CHINENSIS*, Spreng. Syst. Veg. III, 14. A powerful climber ascending tall trees; *stem* angled, glabrous. *Leaves* in general outline sub-orbicular or broadly ovate, the base cordate or emarginate, usually 3-lobed to the middle or below it (sometimes 5-lobed), the margins with sparse umbilicate glands, both surfaces glabrous, length 4-7 in., breadth nearly the same; petiole 2-3 in. long, glandular at the middle and upper part; tendrils long, stout, simple. *Male peduncle* 2-6 in. long with an orbicular-reniform cucullate bract at its apex embracing the flower-bud; calyx-segments dark, coriaceous, hairy; corolla 1.75-3 in. across, white tinged with yellowish, some of the petals with black spots at the base, others with yellow glands. *Female peduncle* 1-2 in. long, (longer in fruit), with a small bract about the middle. *Fruit* ovate, pointed at the apex, fleshy, bright red and covered with conical points but not ribbed; 4-5 in. long; seeds numerous, blackish, ovate, compressed, sculptured, the margins undulate-sub-lobulate. Kurz in Journ. As. Soc. Beng. XLVI, Pt. 2, 102; Clarke in Hook. fil. Flor. Br. Ind. II, 618; Cogn. in DC. Mon. Phan. III, 444.

M. mixta, Roxb. Hort. Beng. 70; Flor. Ind. III, 709; Wight & Arn. Prodr. 349; Roem. Syn., fasc. 2, 59; Hook. in Bot. Mag. t. 5145; Miq. Flor. Ind. Bat. I, Pt. 1, 664; Naud. in Ann. Sc. Nat. Ser. 4, XII, 132. *M. dioica*, Wall. Cat. (not of Roxb.) 6750, A to F. *Muricia Cochinchinensis*, Lour. Flor. Coch.-Chin. 733; Ser. in DC. Prodr. III, 318.

PERAK; *Scortechini*, King's Collector, Wray; a common plant.

DISTRIB.—British India, Malaya, Philippines.

4. MOMORDICA CHARANTIA, Linn. Sp. Pl. ed. I, p. 1009. *Stem* slender, branching, striate, pubescent, sometimes tomentose towards the apex, 3-6 feet long. *Leaves* reniform-orbicular in general outline, 1-3 in. in diam., deeply divided into 5-7 lobes; the lobes sinuate-dentate or lobulate and mucronate, constricted at the base, glabrous or slightly pubescent; petiole 1-3 in.; the tendrils simple. *Male peduncle* slender, with a reniform or orbicular bract at or below the middle. *Male flower* .35-.75 in. in diam.; the calyx-lobes ovate, acute; *corolla* somewhat irregular, yellow, its segments obtuse or emarginate, anther cells much bent. *Female peduncle* 2-4 in. long, slender, bracteate near the base; ovary fusiform, muricate. *Fruit* 1-3 in. long, ovoid, tapering to both ends, many-ribbed and bearing numerous triangular tubercles. *Seeds* compressed, sometimes almost 3-toothed, the margins corrugated, the sides sculptured. Lour. Flor. Cochchin. II, p. 598; Bot. Mag. t. 2455; Ser. in DC. Prodr. III, 311; Roxb. Flor. Ind. III, 707; Wight and Arn. Prodr. 348; Torr. and Gray Flor. N. Amer. I, 543; Wight Ic. tab. 504; Wight Ill. t. 105 bis; Miq. Flor. Ind. Bat. I, Pt. I, 663; Cogn. in Mart. Flor. Bras., fasc. 78, p. 14; Clarke in Hook. fil. Flor. Br. Ind. II, 616. Cogn. in DC. Mon. Phan. III, 436. *M. muricata*, Willd. Spec. IV, 602; Roxb. Flor. Ind. III, 707; W. & A. Prodr. 348; Miq. Flor. Ind. Bat. I, Pt. I, 663. *M. humilis*, Wall. Cat. 6747. *M. anthelmintica*, Schum. et Thou. Flor. Guin. 423. *M. Roxburghiana*, Don Gen. Syst. Gard. III, 35. *M. macropetala*, Mart. in Hook. Journ. Bot. V, 504.

PERAK; *Scortechini*. DISTRIB. Malayan Archipelago, British India, China, Tropical Africa and America.

7. MELOTHRIA, Linn.

Climbing herbs; tendrils simple or 2-fid. *Leaves* petioled, deltoid, truncate or hastate, entire or deeply 3-lobed, little hairy, often punctate. *Flowers* small, white, usually monœcious, males and females often from the same axil; male pedicels long, clustered (rarely sub-solitary) in the axils, or clustered on long racemes resembling branches without leaves; female long-pedicelled. *Male*; calyx-tube short, teeth 5, small; corolla 5-partite; stamens 3, inserted in the middle of the calyx-tube; anthers free, one 1-celled, two 2-celled; cells free, straight, simple, more or less

lateral; connective prolonged, undivided, glabrous. *Female* calyx and corolla as in the male; ovary oblong, style long; stigmas 3, subglobose; ovules many, horizontal; placentas 3, vertical. *Fruit* indehiscent, globose, acute or fusiform, subrostrate. *Seeds* many, small, oblong, much compressed, obscurely margined, smooth or very nearly so. DISTRIBUTION. Species about 55, all tropical.

Fruit not beaked :—

Fruit globular, glabrous 1. *M. affinis*.

Fruit oblong, glabrous 2. *M. indica*.

Fruit beaked :—

Fruit fusiform, beaked, velvety 3. *M. marginata*.

1. MELOTHRIA AFFINIS, n. spec. King. Scandent; the stem slender, glabrous, 4-angled and deeply sulcate, not rooting at the nodes; the tendrils rather stout, bifid. *Leaves* ovate-cordate to triangular, often 3-5-lobed, the edges denticulate; upper surface densely scabrid-hispid, the hairs white; the lower paler and with hairs of the same colour but sparser and more slender; length 1·35-4·25 in., breadth 1·5-3·25 in., petiole ·5-1 in. *Male* and *female* flowers often from the same axil; the *males* in many-flowered umbels on pedicels twice as long as the leaf-petioles, pubescent below, glabrous above; pedicels about 20, slender, unequal, dilated at the apex, glabrous, ·25-·35 in. long. *Flowers* ·1 in. in diam., globose, pubescent, with 5 slender short diverging subulate teeth below the mouth. *Petals* not seen; *anthers* 3, straight, the connective not produced. Pedicel of the *fruit* shorter and stouter than the peduncle of the male umbel, glabrous. *Fruit* globose, glabrous, thin-walled, many-seeded, red when ripe, ·4-·5 in. in diam.; *seeds* obovoid, pitted, somewhat compressed, pale.

PERAK; *Scortechini* 495; *Wray* 860, 1404; *Curtis*; *King's Collector* 1069, 2539. BORNEO; BANGERMASSING; *Motley* 167.

Mr. C. B. Clarke, who was so good as to examine my specimens of this species and to compare them for me at Kew, assures me that the Perak specimens agree exactly with *Motley's* 167. Mr. Clarke considers the species as closely allied to *M. marginata*, Cogn. from which it differs by its globular glabrous fruit.

2. MELOTHRIA INDICA, Lour. Flor. Coch. China, 35. *Stem* slender, filiform, glabrous, 3-6 feet long, often rooting at the nodes, the tendrils simple. *Leaves* triangular-cordate, acute, entire or 3-lobed (sometimes deeply); the nerves somewhat hairy, otherwise glabrous, the lobes irregularly denticulate or lobulate; length 1·25-2 in. and breadth the same, petiole ·6-1 in. *Male pedicels* solitary or in racemes of 2 or 3 on peduncles 1 in. long; calyx-tube broadly campanulate, its teeth subulate, spreading; *corolla* white, puberulous, its segments ovate-oblong. *Stamens* with thick obconic filaments, glabrous or sparsely villose; *anthers* ovate-oblong, ciliate, the connective much produced. *Peduncle*

of female flower solitary, longer than the leaf-petiole. *Fruit* oblong, glabrous, white, .5–.75 in. long. *Seeds* ovate, attenuate at the base. Ser. in DC. Prodr. III, 313; Naud. in Ann. Sc. Nat., Ser. 4, XVI, 169 t. 2; Hance Suppl. Hongkong Flora, 104; Kurz in Journ. As. Soc. Beng. XLVI, Pt. II, 105; Clarke in Hook. fil. Flor. Br. Ind. II, 626. *Bryonia geminata*, Blume Bijdr. 924; Ser. in DC. Prodr. III, 305; Roem. Syn., fasc. II, 35; Miq. Flor. Ind. Bat. I, Pt. I, 659. *B. tenella*, Roxb. Flor. Ind. III, 725. *Aechmandra indica*, Arn. in Hook. Journ. Bot. III, 274; Wight in Ann. and Mag. Nat. Hist. VIII, 267; Miq. Flor. Ind. Bat. I, Pt. I, 658.

SELANGORE; *King's Collector* 360. DISTRIB. British India, Cochin-China, Philippines, Hongkong.

3. MELOTHRIA MARGINATA, Cogn. in DC. Mon. Phan. III, 593. *Stem* creeping, rooting at the nodes, angular, sulcate, glabrous; the tendrils slender, simple, puberulous. *Leaves* ovate-cordate or more or less 3-lobed, acute; the edges minutely and distantly denticulate; the upper surface coarsely and distinctly and the lower minutely and more closely strigose, the nerves on both pubescent; length 1–1.25 in., breadth 1–1.75 in.; petiole .75–1.5 in., tomentose. *Male flowers* umbellate on a filiform few-flowered peduncle shorter than the petiole, glabrous; the pedicels erect, .2–.3 in. long; the calyx broadly campanulate, pubescent, its teeth subulate. *Petals* villose, yellow; anthers glabrous, inappendiculate. *Female flower* solitary on a peduncle .5 in. long. *Fruit* narrowly cylindrical, beaked, tapering to the base, velvety, .75 in. long, its peduncle filiform; *seeds* 6–8, foveolate. *Bryonia marginata*, Blume Bijdr. 924; Ser. in DC. Prodr. III, 305; Roem. Syn., fasc. II, p. 36; Miq. Flor. Ind. Bat. I, Pt. II, 660. *B. epigæa*, Blume Bijdr. 924; Ser. in DC. Prodr. III, 306. *Aechmandra Blumeana*, Roem. Syn. fasc. II, p. 33; Miq. Flor. Ind. Bat. I, Pt. II, 657. *Melothria Rumphiana*, Scheff. Ann. Jard. Bot. Buitenz. I, 25. *Cerasiocarpum? Maingayi*, Clarke in Hook. fil. Flor. Br. Ind. III, 629.

MALACCA; *Maingay* (Kew Distrib.) 1268. PERAK; *King's Collector* 874. DISTRIB. Java and Sumatra.

VAR. *heterophylla*, Cogn. in DC. Mon. Phan. III, 594. *Leaves* quite entire, ovate-cordate or oblong-sub-hastate, scabrous above, almost smooth beneath but hairy on the nerves. *Bryonia heterophylla*, Blume Bijdr. 925; Wall. Cat. 6704; Roem. Syn., fasc. II, 35. *B. Blumei*, Ser. in DC. Prodr. III, 305; Miq. Flor. Ind. Bat. I, Pt. I, 659. *Cerasiocarpum? penangense*, Clarke in Hook. fil. Flor. Br. Ind. III, 629.

PENANG; *Wallich*; *Curtis* 1928. DISTRIB. Java.

NOTE.

There are in the Calcutta Herbarium specimens of several species of *Melothria*

which Mr. C. B. Clarke, (who elaborated the family of *Cucurbitaceæ* for Hooker's Flora of British India, and who kindly compared my Malayan material in the Kew Herbarium) considers as probably new. But, as these want either flowers or fruit, I am obliged to leave them undescribed. The chief amongst these are Perak, Wray 2228 and 3416; and Andamans, King's Collector 2200.

8. GYNOSTEMMA, Blume.

Climbing herbs, tendrils simple. *Leaves* pedate; leaflets 3-5, ovate-lanceolate, serrate, membranous. *Flowers* small, dicecious, in axillary diffuse panicles, greenish. *Male flower*; calyx short, with 5 small lobes; corolla rotate, 5-partite, with lanceolate segments; stamens 5, filaments connate below; anthers 2-celled, the cells straight and elongate. *Female flower*, calyx and corolla as in the male; ovary rotund, 2-3-celled; styles 2 or 3, united below, bifid at the apex; ovules 2 in each cell, pendulous. *Fruit* globose, umbonate, indehiscent, as large as a pea, 1-3-seeded. *Seeds* wingless, verrucose, sub-muricate. Species 4; all Indo-Malayan.

GYNOSTEMMA PEDATA, Blume Bijdr. 23. Slender, 10-20 feet long; young branches and leaves puberulous or glabrous, rarely pubescent. *Leaves* membranous, trifoliolate or pedate, the petioles 1-1.5 in. long; leaflets 3-7, ovate-oblong, lanceolate or oblanceolate, unequal, the middle the longest, their apices acute or sub-acute, the bases narrowed and sometimes oblique, the edges crenulate or crenate-dentate; length .75-2.5 in., breadth .4-1 in., the petiolules .1-2 in. *Panicles* longer than the leaves, 3-6 in. or even a foot long, slender, sparsely branched, more or less coarsely pubescent. *Calyx-segments* triangular, acute; segments of *corolla* 1-nerved, ciliate-dentate. *Fruit* .15 in. in diam. *Seeds* trigonous. Roem. Syn., fasc. II, p. 110; Miq. Flor. Ind. Bat. I, Pt. I, 683; Clarke in Hook. fil. Flor. Br. Ind. II, 633; Cogn. in DC. Mon. Phan. III, 913. *G. laxa*, Cogn. Mon. Phan. III, 914; *Zanonia laxa*, Wall. Cat. 3727; Pl. As. Rar. II, 29; Arn. in Hook. Journ. Bot. III, 272 (*in note*). *Zanonia cissoides*, Wall. Cat. 3726; Pl. As. Rar. II, 28. *L. Wightiana*, Arn. Pugill. 38; Nov. Act. Acad. Nat. Cur. 18, Pt. I, 356; Roem. Syn., fasc. II, 117. *Alsomitra laxa*, Roem. Syn., fasc. II, 118. *Pestolozzia laxa*, Thw. Enum. Pl. Zeyl. 124. *P. pedata*, Zoll. et Moritz. Syst. Verz. p. 31. *Alsomitra cissoides*, Roem. Syn., fasc. II, 118. *Enkylia trigyna*, Griff. Pl. Cantor. 27; Miq. Prol. Flor. Jap., pp. 15 and 142. *E. digyna*, Griff. Pl. Cantor. 27. *Zanonia pedata*, Miq. Flor. Ind. Bat. I, Pt. I, 683. *Gynostemma cissoides*, Franch. et Sav. Enum. Pl. Jap. I, 176. *Vitis atroviridis*, Wall. Cat. 6040; *Vitis trichophora*, Wall. Cat. 9032.

PERAK; King's Collector 2306. DISTRIB. Malayan Archipelago, British India and Tonkin.

This plant varies as to the number of its leaflets in its leaves and as to pubescence. The pedate forms with 5-7-puberulous leaflets have been by some authors (among whom is M. Cogniaux, the latest monographer of the *Cucurbitaceæ*) considered as belonging to a different species from the plants with trifoliolate glabrous shining leaves; and the latter has been named *G. laxa*. After carefully examining about a hundred specimens collected in different parts of British India and Malaya, I find so many that unite to some extent the characters relied upon as distinctive that I have been driven, with all respect to M. Cogniaux, to adopt Mr. Clarke's view that there is but a single species.

9. ZANONIA, Linn.

Climbing herbs; tendrils simple. *Leaves* long-petioled, simple, ovate or oblong. *Flowers* small, dicecious, in large compound pendulous racemes, males pedicelled, females subsessile. *Male*; sepals 3, oblong or orbicular, concave; corolla rotate, 5-partite, the segments subacute; stamens 5, free, inserted on a fleshy disc, filaments very short; anthers 1-celled, transversely oblong. *Female*; calyx and corolla as in the male; ovary sub-clavate, at first 3-celled; styles 3, spreading, 2-fid at the apex; ovules in each cell 2 or many, pendulous, attached in 2 series to a fleshy parietal placenta. *Capsule* large, elongate-cylindric, clavate, 3-valved at the truncate apex. *Seeds* large, oblong, pendulous, compressed, surrounded by a large membranous wing. **DISTRIB.** Species 3; British India, Malaya.

Leaves ovate-oblong; fruit 2·5 in. long ... 1. *Z. indica*.
 Leaves ovate-rotund; fruit 5-8 in. long ... 2. *Z. Clarkei*.

1. ZANONIA INDICA, Linn. Spec. Pl. ed. II, 1457. Slender, climbing to the extent of 30-50 feet, glabrous. *Leaves* coriaceous, ovate-oblong, acute; the base 3-nerved, rounded or somewhat emarginate; main nerves 6-8 pairs, curved, spreading, prominent beneath; length 3·5-6 in., breadth 2-3·5 in., petiole ·65-·8 in. *Fruit* cylindric-campanulate, glabrous, the apex truncate, 2·5 in. long; *seeds* flat, thin, 1·5-1·75 in. long; the nucleus oval, only ·6 in. long, the rest being wing. Blume Bijdr. 937; Ser. in DC. Prodr. III, 298; Roem. Syn. fasc. II, 117; Wight and Arn. Prodr. 340; Wight Ill. t. 103; Miq. Flor. Ind. Bat. I, Pt. I, 682; Thwaites' Enum. Pl. Zey. 124, 442; Clarke in Hook. fil. Flor. Br. Ind. II, 633; Trimen Flora Ceylon II, 261.

PERAK; *King's Collector* 7198, 7362.

2. ZANONIA CLARKEI, n. spec. King. Slender, 60-80 feet long, glabrous, the young branches deeply grooved. *Leaves* coriaceous, ovate-rotund, acute; the base broad, emarginate or slightly cordate, with 5-7 nerves radiating from the apex of the petiole (the lateral one on each side small); length 2·5-3·5 in., breadth 2·5-3 in., petiole ·75 in., tendrils bifid. *Flowers* unknown. *Fruit* ovoid-cylindric, smooth, 5-8 in. long,

and 3 in. in diam. *Seeds* flattened, about .1 in. thick, ovate, with 6 unequal deep narrow marginal lobes (those at the ends being the longest), the seed proper or nucleus papillose, 1 in. long and .75 in. broad, surrounded on all sides by a thin membranous wing nearly 1 in. wide.

PERAK; *King's Collector* 7230.

This fine species is known only from a single gathering of six specimens, none of which bears a flower. My friend Mr. C. B. Clarke, F.R.S., who was so kind as to compare for me at Kew the whole of my Malayan Cucurbits, notes on this as follows: "This is either a new *Zanonia* near *Z. indica*, Linn., or a new *Alsomitra* near *A. Capricornica*, F. Müll.—I think a *Zanonia*, whether the sepals turn out to be 5 or not. The 2-fid cirrhi may do for either genus. The spinose-margined seeds are not like those of *Zanonia*; but the ovoid, or sub-globose fruit is like nothing out of section *Macrozanonia*, Cogn. I call it *Zanonia*, n. spec."

10. ALSOMITRA, Bth. & Hk. f.

Large climbers; tendrils simple or 2-fid. *Leaves* with 3 oblong entire leaflets. *Flowers* small, dioecious, white, in compound panicles with filiform branches. *Male*; calyx rotate, 5-partite, segments oblong, acute; corolla rotate, 5-partite, segments obtuse; stamens 5, filaments short, near together at the base; anthers small, oblong, straight, 1-celled. *Female*; calyx and corolla as in the male; ovary elongate-clavate, 1-celled; styles 3-4, conical, with semi-lunate stigmas; ovules very many, pendulous; placentas 3, thick, vertical, parietal. *Capsule* large, elongate-clavate, truncate and 3-valved at the apex. *Seeds* very many, compressed, vertical, in six rows, much corrugated, incised or horned on the margin with a terminal membranous wing longer than the seed. **DISTRIB.** Species 9; British India, Malaya, North Australia, S. America.

ALSOMITRA CLAVIGERA, Roem. Syn. fasc. II, p. 118. A slender glabrous climber. *Leaflets* fleshy, the middle the largest, oblong or oblong-lanceolate, the apex obtuse, the base narrowed, the edges entire, subsessile, eglandular, length 1.5-3 in., breadth .65-1 in. *Panicles* slender, twice as long as the leaves, longer in fruit. *Capsule* smooth, 1.25-1.5 in. long and .4 in. broad. *Seeds* dark, cinereous, shortly muricate. Cogniaux in DC. Mon. Phan. III, 927; Hook. fil. in Bot. Mag. t. 6017; Clarke in Hook. fil. Flor. Br. Ind. II, 634. *Zanonia sarcophylla*, Wall. Cat. 3724; Pl. As. Rar. II, 28, t. 133.

KEDAH; *Curtis* 2504.

Ordered LVI. ARALIACEÆ.

Trees or shrubs, very rarely herbs, often scandent, sometimes prickly. *Leaves* alternate, the uppermost rarely sub-opposite, long-

petioled, large, simple or compound; stipules adnate to the petiole, sometimes inconspicuous or 0. *Flowers* regular, small, often polygamous, in umbels racemes or umbellate panicles; bracts and bracteoles small or conspicuous; pedicels continuous with the base of the calyx or jointed. *Calyx-tube* adnate to the ovary; limb truncate, obsolete or with small teeth. *Petals* 5, rarely 6-7 or many, valvate or sub-imbricate, expanding or calyptrate. *Stamens* as many as and alternate with the petals (very many in *Tupidanthus*), inserted round an epigynous disc. *Ovary* inferior, 2-celled, or cells as many as the stamens, or 1-celled; styles as many as the cells, distinct or united; ovules solitary and pendulous in each cell. *Fruit* coriaceous or drupaceous, usually small, one or more cells sometimes suppressed. *Seed* pendulous, albumen uniform or ruminant; embryo minute, radicle next the hilum. **DISTRIB.** Species 400, chiefly tropical and subtropical, a few in the cool temperate zones.

Petals imbricate (slightly); pedicels of flowers jointed:—

Styles 2-5, free; leaves compound 1. ARALIA.

Styles 3 or 4, free; leaves simple, entire, lobed or pinnatifid; ovary 1-celled 2. ARALIDIUM.

Petals valvate; stamens not exceeding 12:—

Albumen uniform, ovary 4-12-celled, pedicels continuous with the flower, leaves simple or digitately compound:—

Fruit boldly ridged, never more than '3 in. long; leaves usually compound 3. HEPTAPLEURUM.

Fruit succulent, ovoid-rotund, '5 in. in diam.; leaves simple, large, rotund-reniform, lobed 4. TREVESIA.

Fruit succulent, '3 in. in diam., obscurely ridged; leaves simple, entire (palmately lobed in young shoots) 5. DENDROPANAX.

Albumen ruminant:—

Ovary 1-celled:—

Ovary 1-ovulate, leaves compound 6. ARTHROPHYLLUM.

Ovary with 2 ovules; fruit 2-celled, 2-seeded, leaves simple 7. WARDENIA.

Ovary 2-celled, pedicels continuous:—

Style distinct; leaves pinnately decomposed 8. HETEROPANAX.

Styles combined; leaves digitate, palmate or angled 9. BRASSAIOPSIS.

Ovary 4- or 5-celled, pedicels jointed 10. HETEROPSIS.

Petals valvate; stamens 30-50 11. TUPIDANTHUS.

1. ARALIA, Linn.

Herbs, shrubs or small trees, glabrous, hairy or prickly. *Leaves* alternate or whorled, digitate, pinnate or compound-pinnate; leaflets

serrate or nearly entire; bracts and stipules not prominent. *Umbels* solitary or in racemes or panicles, rarely in compound umbels; pedicels usually jointed close under the flower. *Flowers* often polygamo-monœcious. *Calyx* with its margin truncate or 5-toothed. *Petals* 5, ovate, imbricate in bud. *Stamens* 5. *Ovary* 2-5-celled; styles 2-5, free or shortly connate at base. *Fruit* 4-5-celled, 4-5-angular, or subglobose, 2-3-celled. *Albumen* uniform. **DISTRIB.** Species about 50; extending from India and Malaya to Japan and North America.

Leaflets entire or minutely serrulate, densely ferrugineous-tomentose on the lower surface	...	...	...	1. <i>A. Thomsoni</i> .
Leaflets coarsely and somewhat unequally serrate, the lower surface with scattered flexuose white hairs	...	...	...	2. <i>A. armata</i> .
Leaflets obscurely undulate-serrate, quite glabrous on both surfaces, the lower sub-glaucous	...	...	...	3. <i>A. ferox</i> .

1. *ARALIA THOMSONI*, Seem. Rev. Hed. 91. A large prickly shrub, all parts more or less softly pubescent or tomentose. *Stem* slender, the prickles remote. *Leaves* large, 2-3-pinnate; leaflets thickly membranous, 5-9 in each ultimate pinnule, ovate-lanceolate, acuminate, the base rounded and somewhat oblique; the petiolules of all except the terminal very short (usually less than 1 in. long), that of the terminal leaflet 5 in. or upwards, the edges entire or minutely serrulate; upper surface sparsely strigose, the nerves and midrib pubescent; the lower softly tomentose; length 2.5-3.5 in., breadth 1-1.75 in. *Panicles* 15-20 in. long, with short sub-horizontal branches; the ultimate branches umbellate; the bracts narrowly lanceolate, .25 in long. *Fruit* .15 in. long, somewhat wrinkled, glabrous, the ridges broad. Clarke in Hook. fil. Flor. Br. Ind. II, 723.

PAHANG; *Ridley* 2450. PENANG; *King's Collector* 1574; *Curtis* 462. PERAK; *King's Collector* 7807, 8704, 10045.

2. *ARALIA ARMATA*, Seem. Rev. Hed. 91. A prickly shrub; stem slender, almost glabrous except the puberulous young parts. *Leaves* very large, 3-pinnate, the rachises puberulous; leaflets thinly membranous, 9-11 in each ultimate pinnule, ovate-lanceolate, acuminate, the edges coarsely and somewhat unequally serrate; the base rounded, slightly oblique or sub-cordate; sessile except the terminal one; petiolule of the terminal leaflet under 1 inch; length of leaflets 3-5 in., breadth 1.5-2 in.; upper surface with a few sparse adpressed hairs, otherwise glabrous; lower with scattered white flexuose hairs especially on the nerves and midrib. *Panicle* 15-18 in. long, pubescent in its ultimate 3-fid branches, the lower part glabrous, ultimate branchlets umbellate; the pedicels slender .3-.4 in. long, tomentose. *Fruit* nearly .2 in. long, glabrous; the ridges broad, flat. Kurz For. Flora Burma, I, 536;

Clarke in Hook. fil. Flor. Br. Ind. II, 723. *Panax armatum*, Wall. Cat. 4933; G. Don. Gen. Syst. III, 386.

KEDAH; *Curtis* 2526. DISTRIB. British India; in Burma, the Khasia Hills and on the lower slopes of the Eastern Himalaya.

3. *ARALIA FEROX*, Miq. Flor. Ind. Bat. I, Pt. I, 750. A lax spreading glabrous shrub, often scandent to 20 or 30 feet; the stems, branches, rachises of the leaves and inflorescence bearing numerous short recurved spines. *Leaves* 2-3-pinnate, the pinnæ 3 or 4 pairs; leaflets subcoriaceous, 3-5 in a pinna, the pairs opposite, ovate, acute, the bases rounded, the edges obscurely undulate-serrate; both surfaces glabrous, the upper shining when dry, the lower sub-glaucous; length 1-2 in., breadth .75-1 in.; petiolules unequal, the lateral .15-.3 in., the terminal .5-.65 in. long. *Panicle* terminal, 8-15 in. long and 6 in. across, with numerous slightly compressed horizontal branches, themselves branching and ultimately ending in numerous peduncled umbels of 10-15 long-pedicelled oblong flowers .1 in. long; the pedicels slender, .3-5 in. long. *Calyx-tube* campanulate, 10-ridged, the limb with 5 small triangular acute teeth. *Petals* ovate. *Fruit* ovate-globose, boldly 5-ridged, rather more than .1 in. long.

PERAK; *Scortechini* 142, 501; *King's Collector* 1037, 4434, 5089, 8438, 10568; *Wray* 2155.

2. *ARALIDIUM*, Miq.

Leaves large, simple, usually deeply lobed or pinnatifid, glabrous. *Flowers* male or hermaphrodite, in large compound panicles, minute. *Calyx-teeth* triangular, spreading, the tube campanulate. *Petals* 5, imbricate. *Stamens* 5. *Ovary* usually 3-celled, two of the cells soon aborting. *Styles* distinct, subulate. *Fruit* obliquely ovoid, drupaceous, 1 inch or more in length, 1-seeded; the seed solitary, rugose, pendulous, vertically sulcate; albumen very copious, coarsely ruminant, penetrated by outgrowing folds from the funicle; embryo small. DISTRIB; two species, both Malayan.

This is a remarkable genus of doubtful position. The large solitary seed, with a much developed funicle forming an expansion at the base of the coarsely ruminated albumen and sending processes into the latter, and the unisexual habit make it doubtful whether it should not be placed in *Cornaceæ* (to which Seemann referred it), rather than in *Araliaceæ*.

ARALIDIUM PINNATIFIDUM, Miq. Flor. Ind. Bat. I, 763, t. 13. A small tree without prickles, glabrous except the inflorescence. *Leaves* thinly coriaceous, irregularly lobed or coarsely pinnatifid, rarely entire and narrowly elliptic; length of the lobed or pinnatifid forms 10-18 in., breadth 7-10 in.; length of the entire leaves 4-10 in., breadth 2-4 in.; petiole stout, 1.5-5 in. long. *Panicles* many-branched, ferruginous-

puberulous, shorter than or as long as the leaves. *Petals* pubescent. *Fruit* narrowly ellipsoid, pointed at each end, glabrous, the pericarp thin, length 1.35 in., diam .6 in., damson-colored when ripe. *Miq. Flor. Ind. Bat. Suppl.* 340; *Clarke in Hook. fil. Flor. Br. Ind. II*, 726; *Hemsley in Hook. Ic. Plantar. t.* 1549.

PAHANG; *Ridley* 2439. SELANGOR; *Curtis* 2340. SINGAPORE; *Ridley*; *Hullett*, 485, 888; *King*. PAHANG; *Ridley* 2662. MALACCA; *Griffith* (Kew Distrib.) 2702; *Maingay* 676. PERAK; *Scortechini*; *Wray*; *King's Collector* (many numbers), a very common plant. *DISTRIB.* Sumatra, *Forbes* 2207.

The structure of the seed is well explained by Mr. Hemsley in his description and figure in *Hooker's Icones Plantarum*.

3. HEPTAPLIURUM, Gærtn.

Large shrubs or trees, glabrous or tomentose, without prickles. *Leaves* digitate, rarely compound-digitate or 1-foliolate; leaflets coriaceous, entire or remotely toothed or lobed, never closely serrate nor ciliate, those near the panicle usually entire; stipules often connate within the petiole and prominent. *Umbels* (rarely capitata) paniced or in compound racemes; bracts woolly, deciduous or persistent; pedicels not jointed under the flower; bracteoles few or 0, or rarely densely tufted. *Calyx-margin* toothed or truncate. *Petals* 5-6 or many, valvate. *Stamens* as many as the petals. *Ovary* cells as many as the petals, disc small or large; styles small, separate or combined in a short conical narrow cylindric column. *Fruit* subglobose, 5-6-angled. *Seeds* compressed, albumen uniform. *DISTRIB.* Species 55, in the tropics of the Old World.

Leaves simple 1. *H. avene*.

Leaves all trifoliolate:—

Panicle longer than the leaves, slender; its branches long, spreading, laxly-flowered 2. *H. luridum*.

Panicle shorter than the leaves; its branches short, densely-flowered 3. *H. triste*.

Leaves all digitately 5-9-foliolate:—

Panicle simple or 2-branched, sub-racemose, only about 3 in. long; the lateral umbels subsessile, lax, few-flowered 4. *H. sub-racemosum*.

Panicle divided from the base or near it into several erect narrow branches 6-12 inches long; the lateral branches very short and bearing dense heads of subsessile flowers:—

Ovary 8-celled, leaves glaucous and with loose woolly hairs beneath 5. *H. Cephalotes*.

Ovary 5-celled:—

Both surfaces of the leaves quite glabrous 6. *H. Scortechinii*.

Lower surface of leaves tomentose 7. *H. tomentosum*.

- Panicle with few narrow erect branches bearing shortly peduncled umbels of pedicellate flowers:—
- Ovary 12-celled; leaflets 5, membranous, 7-12 in. long ... 8. *H. Singalangense.*
- Ovary 9-celled; leaflets 7-9, very coriaceous, 3-5 in. long ... 9. *H. lati-foliolatum.*
- Ovary 5-celled:—
- Main nerves of leaflets only 2 or 3 pairs, the basal prominent; reticulations rather wide, not prominent; panicles very narrow, covered, up to the bases of the pedicels, with minute stellate hair ... 10. *H. subulatum.*
- Main nerves of leaflets 5 or 6 pairs, basal nerves prominent; panicles glabrous (rarely hairy) narrow in flower, spreading in fruit ... 11. *H. venulosum.*
- Panicle with spreading branches:—
- Branches of the panicle umbellate:—
- Ovary 5-celled; reticulations of leaves wide, distinct ... 12. *H. ellipticum.*
- Ovary 6-celled:—
- Common petiole 1-2·5 in. long; leaflets lanceolate or oblanceolate, caudate-acuminate, much narrowed to the base, 1·5-3·5 in. long; flower-buds globular, '1 in. in diam.; fruit '1 in. long ... 13. *H. scandens.*
- Common petiole 2-4 in. long; leaflets ovate-lanceolate, shortly caudate-acuminate, the bases rounded, 2-4 in. long; flower-buds oblong, about '2 in. long; fruit '25 in. long ... 14. *H. affine.*
- Common petiole 10-24 in. long; leaflets oblong-elliptic, shortly and abruptly acuminate, 4-12 in. long; flower-buds sub-globular, '1 in. in diam.; fruit elliptic, '25-3 in. long ... 15. *H. Hullettii.*
- Common petiole 5-10 in. long; leaflets oblong-elliptic or oblanceolate-oblong, acute, 5-10 in. long; flower-buds globular, '15 in. in diam.; fruit ovoid, '25 in. long ... 16. *H. Ridleyi.*
- Common petiole 2-2·25 in. long; leaflets lanceolate, acute, narrowed to the base, 1·5-2·5 in. long; flower-buds oblong, '2 in. long, fruit '3 in. long .. 17. *H. nervosum.*
- Branches of the panicle racemose ... 18. *H. Wrayi.*
- Lower leaves large, digitately decomposed:—
- Leaflets entire, narrowly oblong, acuminate, 2-3·5 in. long, panicle 8 in. long ... 19. *H. biternatum.*
- Leaflets usually entire, 2·5-7 in. long, panicle 10-15 in. long; fruit oblong ... 20. *H. heterophyllum.*
- Leaves bipinnate, leaflets coarsely toothed; fruits sub-globular ... 21. *H. Curtisii.*
1. **HEPTAPLEURUM AVENE**, Seem. Rev. Hed. 43. Scandent; young branches with striate rugulose glabrous bark, brown when dry. *Leaves*

simple, coriaceous, narrowly oblong, acute, narrowed to the base, the edges slightly recurved; both surfaces glabrous, dull when dry; main nerves about 12 pairs, faint, sub-horizontal; length 3·5–5·25 in., breadth ·9–1·2 in.; petiole ·75–1·25, thickened near the apex. *Panicles* single or 2 or 3, terminal, puberulous, half as long as the leaves, erect; the few branches rather close together, about ·25 or ·3 in. long, each bearing 3–5 pedicellate flowers; the buds ·15 in., ovoid, their pedicels ·2 in. long; bracts lanceolate, deciduous. *Calyx-rim* narrow; petals, stamens and stigmas 6. *Fruit* ellipsoid, as large as a pea, sulcate. *Sciadophyllum avene*, Herb. Korthals.

SINGAPORE; *Ridley* 5840, 6337. **DISTRIB.** Sumatra.

At once distinguished in the genus by its oblong simple leaves.

2. **HEPTAPLEURUM LURIDUM**, new species. An epiphytic shrub 2–3 feet long; branches with rugulose glabrous bark. *Leaves* trifoliolate, with a common petiole 1–1·75 in. long, glabrous, fleshy when fresh, vertically rugose when dry; leaflets very coriaceous, narrowly elliptic-oblong, slightly oblique, tapering gradually to each end; the edges entire, much recurved when dry; both surfaces quite glabrous, the nerves and veins very indistinct even when dry; length 2·5–4 in., breadth ·5–·75 in.; petiolules unequal, thick, the lateral ·15–·25 in. long, the terminal about ·4 in. *Panicle* terminal, longer than the leaves; its branches few, slender, long, spreading, glabrous; the ultimate branchlets 1–1·5 in. long, bearing umbels of 3–8 broadly ovoid glabrous flowers ·1 in. long; their pedicels at first only about ·1 in. long, but two or three times as long in fruit. *Calyx-tube* shortly campanulate; its mouth truncate, entire. *Petals* completely united into a calyptra. *Stamens* 6, erect, the filaments short. *Styles* united into a short conical column; the stigmas 6, small, occupying the corners of its truncate apex.

PERAK; *Scortechini* 1191; *King's Collector* 8304.

A very distinct small species easily recognised by its narrow very acuminate aenous leaflets borne on fleshy petioles, and by its slender spreading long-branched few-flowered panicles.

3. **HEPTAPLEURUM TRISTE**, new species. A tree; young branches as thick as a swan's-quill, glabrous, pale when dry. *Leaves* 3-foliolate, the common petiole 1·5–2 in. long; leaflets thickly coriaceous, glabrous, broadly elliptic, blunt or shortly apiculate, the base rounded; the edges entire, boldly recurved when dry; main nerves 10 to 12 pairs, close together, indistinct on both surfaces; length 2·25–3·25 in., breadth 1·5–2 in.; petiolules unequal, the lateral pair ·5 in. long, the middle one ·8 in. *Panicle* terminal, shorter than the leaves, glabrous, divided from the base into 2 or 3 spreading branches, ebracteate; the branchlets about ·5 in. long (longer in fruit), each ending in an umbel of 10–20 ovate

flowers, .15 in. long, their pedicels .1 in. long. *Calyx-tube* campanulate; the limb truncate, narrow. *Petals* 5, broadly elliptic, blunt, reflexed. *Fruit* narrowly oblong, pointed, deeply 5-ridged, glabrous, crowned by the short conical style-column, .2 in. long, glabrous.

PERAK; on Ulu Batang Padong, at an elevation of about 4900 feet; *Wray* 1509.

A species near *H. ellipticum* but readily distinguished from that in the Herbarium by its dull broad coriaceous leaflets, more widely campanulate calyx-tube, and larger fruit.

4. *HEPTAPLEURUM SUB-RACEMOSUM*, new species. A shrub 2-3 feet high; young branches with thick corky glabrous bark, pale when dry. *Leaves* trifoliolate or sometimes 5-foliolate, the common petiole 1.5-2.5 in. long, glabrous. *Leaflets* coriaceous, narrowly elliptic-lanceolate, caudate-acuminate, narrowed at the base, the edges entire and slightly revolute; both surfaces glabrous, distinctly and finely reticulate when dry; length 2.25-4 in., breadth .75-1.1 in.; petiolules unequal, .3-.4 in. long, that of the terminal leaflet .8-1.25 in. long, thickened at the apex. *Panicle* solitary, terminal, very narrow, sub-racemose, 2-branched, only about 3 inches long and about .65 in. across; the branchlets only .1-2 in. long, each ending in an umbel of 3-5 oblong, green flowers .15 in. long; rim of *calyx* very narrow. *Fruit* oblong, .2 in. long, glabrous, with 5 blunt ridges, pale green tipped with bluish, 5-celled.

PERAK; *King's Collector* 8283.

Readily recognised by its small caudate-acuminate narrow leaflets, much and prominently reticulated when dry; and by its short narrow racemoid panicles.

5. *HEPTAPLEURUM CEPHATOTES*, Clarke in *Flor. Br. Ind.* II, 731. A large tree. *Leaves* digitate, their petioles rather slender, 1.5-3.5 in. long, glaucous; leaflets about 7, oblong-elliptic, the apex abruptly and shortly acuminate, the base rounded, the edges entire and slightly recurved when dry; upper surface shining, glabrous; the lower dull, glaucous, and bearing when young some quickly deciduous loose woolly hairs. *Panicle* minutely tomentose, terminal, consisting of numerous sub-erect branches 6-12 inches long, bearing shortly peduncled globose ebracteolate dense capitula. *Fruit* oblong, ribbed, 8-celled, covered with stellate white tomentum and crowned by the broad cluster of short styles; disc large, spongy. *H. capitatum*, Seem. *Rev. Hed.* 15 (in part).

MALACCA; *Griffith* (Kew Distrib.) 2700. SINGAPORE; *Ridley* 3973, 6409. PENANG; *Curtis* 837. PERAK; *Wray* 1542; *Scortechini* 391.

6. *HEPTAPLEURUM SCORTECHINII*, new species. An epiphytic shrub, the young branches stout. *Leaves* digitate; the common petiole terete, glabrous, stout, 2.5-3.5 feet long; leaflets 8-10, very coriaceous, oblong

or oblong-elliptic, the apex blunt or shortly apiculate, the base rounded, the edges entire and recurved when dry; both surfaces quite glabrous, not reticulate; main nerves 6-9 pairs, slightly prominent on the lower surface; length 9-13 in., breadth 4-6 in.; petiolules unequal, 2.5-5 in. long. *Panicle* terminal, dividing into several narrow raceme-like branches, 10-20 inches long, covered with pale scurfy tomentum; the branchlets 40 or 50 in number and .35 to .75 in. long, each with a broadly ovate convolute woolly bract at its base, and at its apex a dense globular umbel of sub-globular flowers .1 in. in diam. and borne on pedicels .05 in. long. *Calyx* truncate, tapering to the base. *Petals* 6 or 7, narrowly lanceolate. *Stigmas* free, ovary 5-celled. *Fruit* unknown.

PERAK; *Scortechini* 2008.

Collected only by the late Father Scortechini, whose specimens unfortunately are scanty and rather fragmentary. A very distinct species, in general appearance resembling *H. Cephotos*, Clarke and *H. rigidum*, Seem. The leaflets of the latter have however twice as many main lateral nerves, although their length is not greater.

7. HEPTAPLEURUM TOMENTOSUM, Hassk. in *Cat. Hort. Bot. Bogor.* (1844), p. 165. A half-scandent shrub, 6-8 in. high; the young branches stout, deciduously stellate-pubescent, the older glabrous. *Leaves* digitate; the common petiole 9-12 in. long, densely covered with rusty stellate tomentum, the intra-petiolar stipules about .75 in. long. *Leaflets* 5-7, coriaceous, oblong-elliptic, caudate-acuminate, slightly narrowed to the base, the edges entire and slightly revolute; the upper surface boldly bullate and finely reticulate, quite glabrous, pale olivaceous when dry; the lower pale brown, more or less closely covered with pale brown stellate hairs; length 8-10 in., breadth 2.75-3.5 in.; petiolules unequal, 1.5-2.5 in. long, tomentose. *Panicles* usually two together, terminal, 4-5 in. long, racemose; the lateral branches about 12, short, .2-4 in. long, each bearing a sub-globular umbel of 8-10, ovoid, blunt, glabrous flowers .15 in. long; their pedicels .1 in. long, pubescent. *Calyx-tube* funnel-shaped, the rim narrow. *Petals* 5, white, glabrous, calyptrate. *Stamens* longer than the petals. *Styles* 5, conjoined, papilliform, their apices free. *Fruit* .2 in. long, narrowly oblong, 5-ridged, 5-celled. *Sciadophyllum tomentosum*, Blume *Bijdr.* 877; DC. *Prod.* IV, 260. *Paratropia tomentosa*, Miq. in *Bonplandia* for 1856, p. 138; *Flor. Ind. Bat.* I, Pt. I, 753; *Ann. Mus. Lugd. Bat.* I, 23.

PERAK; *Scortechini*, *Wray* 2202, 3152; *King's Collector* 2066, 2216, 2569, 7253, 8733. SELANGOR; *Curtis* 2341. *DISTRIB.* Sumatra; *Forbes*, 2611.

I have seen no authentically-named specimen of this from the Leiden Herbarium, but the Perak plant agrees so completely with Miquel's description that I have no doubt of the correctness of my identification.

8. *HEPTAPLEURUM SINGALANGENSE*, Seem. Rev. Hed. 42. Scandent, glabrous. *Leaves* digitate; common petiole 12–15 in. long, stout; leaflets 5, membranous, elliptic, shortly acuminate, the base slightly narrowed, the edges with a few irregular remote teeth or entire; both surfaces glabrous, faintly reticulate; main nerves 7 or 8 pairs, curved, spreading; length 7–12 in., breadth 3·25–5·25 in., petiolules 1·25–2·5 in., thickened at the base. *Panicle* 12–18 in. long, covered with deciduous rusty stellate pubescence, very narrow, (about 2 in. wide); the branches numerous, about 5 in. long, each ending in an umbel of 5–10 oblong obovoid pedicelled flowers 25 in. long, their pedicels 2–3 in. long. *Calyx-tube* shortly campanulate, minutely scaly; its limb narrow, truncate, undulate. *Petals* 9, fleshy, narrow, slightly unequal, connate by their edges. *Stamens* 9. *Stigmas* united into a notched fleshy ring, ovary 12-celled. *Fruit* unknown. *Paratropia Singalense*, Miq. in Ann. Mus. Lugd. Bat. I, 23. *Agalma redivivum*, Seem. Rev. Hed. 25.

PERAK; *Scortechini* 390; *Curtis* 3170.

The specimens which I have seen are few. In foliage they agree with the specimen in Kew named *Agalma redivivum*, which however Seemann describes as having 7–8-merous flowers. In other respects they agree with Seemann's description of that plant. They also agree with Miquel's full description of his *Paratropia Singalangense*, except as to the length of the petiole which Miquel gives as only 4–6 inches, a measurement so much out of proportion with those he gives for the petiolules, (1–2·5 in.) and leaflets, that I cannot help suspecting some clerical error.

9. *HEPTAPLEURUM LATIFOLIOLATUM*, new species. A bush with stout branches. *Leaves* digitate; the common petiole stout, glabrous, somewhat compressed, 7–11 in. long; leaflets thickly coriaceous, ovate-rotund, shortly acuminate or blunt, the base rounded; the edges entire, slightly recurved when dry; both surfaces glabrous, the upper shining, the lower dull and sub-glaucous; main lateral nerves 7 or 8 pairs, spreading, curving upwards, prominent on the lower surface, depressed on the upper when dry; length 3–5 in., breadth 1·75–3·5 in.; petiolules 8–1·5 in., rather stout. *Panicles* terminal, in pairs, 5–8 in. long, glabrous; the branches short, horizontal, each bearing at its apex an umbel of 10–15 pedicelled flowers; pedicels 3 in. long. *Fruit* broadly ovoid, deeply 9-ridged, 9-celled, glabrous, crowned by the 9 very short free styles, and 15 in. in diam., red when ripe.

PERAK; on Gunong Babu at an elevation of about 5000 feet; *Wray* 3927.

10. *HEPTAPLEURUM SUBULATUM*, Seem. Rev. Hed. 42. Scandent, glabrous. *Leaves* digitate; the common petiole 2–6 in. long, slender, glabrous, terete; leaflets coriaceous, oblong-elliptic or elliptic, shortly acuminate, tapering to the base; the edges entire, revolute when dry; both surfaces glabrous and reticulate but not prominently so, the upper

shining, the lower dull when dry; midrib prominent on the lower surface as also the 4 oblique, basal, and 2-3 pairs of sub-horizontal main nerves; length 2.5-7 in., breadth 1-3.5 in.; petiolules unequal, .2-2 in., swollen near the apex. *Panicle* terminal, stellately puberulous, shorter than the leaves while in flower, longer in fruit, bearing many very narrow racemoid branches each with an acuminate lanceolate bract 1 in. long at its base; branchlets very short, from .15 in. when in flower to .5 in. when in fruit, stellately puberulous, each bearing an umbel of 12-20 flowers; buds depressed, globular, glabrous, .05 in. in diam.; their pedicels .2 in. long, slender. *Fruit* rather broadly ovoid, bluntly 5-ridged, 5-celled, glabrous, .15 in. long. Clarke in Flor. Br. Ind. II, 730. *Paratropia subulata*, Miq. in Ann. Mus. Lugd. Bat. I, 22.

MALACCA; *Griffith* (Kew Distrib.) 2690; MAINGAY; 681, (Kew Distrib.) *Derry*. PAHANG; *Ridley* 1632, 5818. PERAK; *Scortechini*; *Wray* 872, 3090, 3639; *King's Collector* 773, 1102, 2343. DISTRIB. Sumatra.

This closely resembles *H. venulosum*, Seem., and is not always readily distinguishable from that species. The best marks of this appear to me to be the prominence of the basal nerves and the fewness of the other main nerves (only 2 or 3 pairs); and the longer narrower panicles which, up to the pedicels of the flowers, are covered with minute stellate hairs. The majority of the specimens of *H. venulosum*, Seem. have glabrous panicles, but those of var. *macrophylla* are hairy, and the leaves have many more lateral nerves.

11. HEPTAPLEURUM VENULOSUM, Seem. Rev. Hed. 44. Scandent; young branches rather slender, glabrous. *Leaves* digitate; common petiole slender, terete, glabrous, 4-6 in. long; leaflets thinly coriaceous, oblanceolate-elliptic to oblong-lanceolate, shortly acuminate, narrowed to the base, the edges entire; both surfaces shining, glabrous, conspicuously and minutely reticulate; length 3-7 in., breadth 1.25-2.75 in.; petiolules unequal, slender, varying from .5-1.5 in. long in the same leaf. *Panicle* varying in length but usually shorter than the leaves, terminal, glabrous or occasionally slightly pubescent, (stellate-pubescent in var. *macrophylla*), dividing into several narrow branches bearing short branchlets each terminating in an umbel of 10-15 depressed-globular flowers .1 in. in diam.; their pedicels unequal, slender, .15-.3 in. in length. *Fruit* ovoid, bluntly 5-ridged, 5-celled, glabrous, .15 in. long, yellow when ripe. Clarke in Hook. fil. Flor. Br. Ind. II, 729; Brand. For. Flor. 294; Kurz For. Flor. I, 538. *Paratropia venulosa*, W. & A. Prodr. 377; Wight Ill. t. 118. *Hedera venosa*, Wall. Cat. 4923. *H. terebinthacea*, Wall. Cat. 4920, (partly.). *Aralia digitata*, Roxb. Hort. Beng. 22; Flor. Ind. II, 107.

ANDAMAN ISLANDS; *King's Collectors*. MALACCA; *Derry*.

This species, so common from the base of the Eastern Himalaya southwards

through Assam to Burma, is replaced in the Malayan Peninsula by the closely allied species *H. ellipticum*, which differs from this as noted under that species. Mr. Clarke, in Flor. Br. India, however, reduces *H. ellipticum* to *H. venulosum*, a course in favour of which there is a good deal to be said.

12. HEPTAPLEURUM ELLIPTICUM, Seem. Rev. Hed. 43. Scandent; young branches with pale brown glabrous bark. *Leaves* digitate; the common petiole 4–6 in. long, glabrous; leaflets 5–7, coriaceous, more or less broadly elliptic, sometimes elliptic-rotund, apiculate, subapiculate or obtuse, the base rounded or sub-cuneate; the edges entire, revolute when dry; both surfaces glabrous and rather dull when dry; main nerves 4 or 5 pairs, the reticulations wide, inconspicuous; length 2.5–7 in., breadth 1.75–4 in.; petiolules unequal, .75–1.5 in., that of the middle leaflet 2 in. *Panicle* about as long as the leaves, terminal, glabrous, lax, open, the branches long, spreading and bearing few-flowered umbels on long slender peduncles; flowers globular-ovoid, .1 in. long or less, on slender pedicels .15–.2 in. long. *Fruit* oblong, yellowish, with 5 ridges and 5 cells. *Paratropia elliptica*, Miq. in Bonplandia 1856, p. 138; Flor. Ind. Bat. I, Pt. I, p. 756; in Ann. Mus. Lugd. Bat. I, 20; *Sciadophyllum ellipticum*, Blume Bijdr. 878; DC. Prodr. IV, 260.

SINGAPORE; *Ridley* 5839, 6399. MALACCA; *Derry* 1187, 1215. PENANG; *Curtis* 972. PERAK; *Scortechini*; *Wray* 2020, 2136; *King's Collector* 2541, 4733, 10375, 10534. ANDAMAN AND NICOBAR ISLANDS; *King's Collector*.

This resembles *H. venulosum*, Seem; but the reticulations on the leaves of this are wider and less distinct than in that; and the panicles of this have spreading, quite glabrous, lax branches.

13. HEPTAPLEURUM SCANDENS, Seem. Rev. Hed. 43. A slender creeper 3–5 in. long, the stem pale and corky. *Leaves* small, digitate; common petiole 1–2.5 in. long, slender; leaflets 3–5, thinly coriaceous, lanceolate, caudate-acuminate, tapering much to the base, the edges entire and somewhat recurved; both surfaces glabrous, the upper smooth and shining, the lower dull and reticulate; length 1.5–3.5 in., breadth .5–.8 in.; petiolules subequal, .2–.25 in. long. *Panicles* longer than the leaves, slender, 4–8 in. long; the branches spreading horizontally, simple, each ending in an umbel of flowers on a slender pedicel nearly .75 in. long; buds globular, .1 in. in diam. *Fruit* elliptic, boldly 5-ridged, 5-celled, .1 in. long. *Paratropia scandens*, Miq. in Bonplandia 1856, p. 138; Flor. Ind. Bat. I, Pt. I. 757. *P. brachybotrya*, Miq. Flor. Ind. Bat. I, Pt. I, 755. *Sciadophyllum scandens*, Blume Bijdr. 878.

PERAK; *Wray* 1844, 2401, 2880; *Curtis* 2687; *Scortechini* 218, 1352; *King's Collector* 4304. DISTRIB. Java, Sumatra.

A very slender glabrous species, at once distinguished by its small lanceolate, caudate-acuminate, digitate leaflets.

14. *HEPTAPLEURUM AFFINE*, new species. A shrub 6–8 feet high, semi-scandent; young branches as thick as a goose-quill, shining, glabrous; common petiole 2–4 in. long, slender, the stipule about .65 in., both glabrous; leaflets 5 or 6, thinly coriaceous, ovate-lanceolate to elliptic, acuminate, the base sometimes narrowed but always rounded, the edges entire; length 2.25–4 in., breadth 1.25–1.75 in.; petiolules somewhat unequal, .75–1.5 in. long. *Panicle* terminal, when young furfuraceously puberulous towards the base, ultimately quite glabrous everywhere, 2.5–5 in. long and almost as broad; the main branches 3 or 4, spreading and bearing, in pairs or whorls of 3, six to twelve ultimate ebracteate branches .5–.75 in. long, each terminating in an umbel of 7–10 pedicellate broadly ovate flowers nearly .2 in. long, the pedicels .2 in. long. *Fruit* broadly ovate, apiculate, boldly 6-ridged, 6-celled, glabrous, nearly .25 in. long.

PERAK; at elevations of from 3000 to 5000 feet. *Scortechini* 333, 486; *King's Collector* 3827; *Wray* 4121.

This in many respects resembles *H. ellipticum*, but has larger flowers and its fruit is on shorter pedicels.

15. *HEPTAPLEURUM HULLETTII*, new species. A small tree, 10–15 feet high; branches stout, rugulose, deciduously pubescent. *Leaves* large, digitate; the common petiole terete, glabrous, 10–24 in. long; leaflets 7–11, coriaceous, oblong or oblong-elliptic, occasionally somewhat broader in the upper than in the lower half, shortly and abruptly acuminate, slightly narrowed to the rounded base; both surfaces glabrous, not reticulate, the midrib prominent; main nerves 5–8 pairs, distant, slightly curved and ascending, prominent on the lower surface when dry, obsolete on the upper; length 4–12 in., breadth 1.5–3.25 in.; petiolules 1.25–3.5 in., slender, glabrous. *Panicles* 9–12 inches long, terminal, several together, long and narrow, with short horizontal slender branches from .5 to 1 in. long, bearing terminal umbels of 8–12 small 6-merous sub-globular flowers .1 in. in diam. *Fruit* elliptic, 6-ridged, 6-celled, crowned by the 6 short distinct styles, glabrous, pedicels .25–.3 in. long.

SINGAPORE; *Ridley* 447, 4591, 6012; *Wray* 2323; *King's Collector* 3048. JOHORE; *King* and *Hullett*.

A species resembling *H. dvaricata*, Miq.; but having leaflets with fewer nerves and no reticulations, much longer panicles and narrower fruit. It is allied also to *H. longifolium*, Seem., but the leaflets of that species have greatly more numerous main nerves, and the panicles are densely clothed with broad scale-like hairs and have longer lateral branchlets.

16. *HEPTAPLEURUM RIDLEYI*, new species. Scandent; young branches stout, glabrous. *Leaves* digitate; common petiole terete, glabrous, 5–10 in. long; leaflets 5, very coriaceous, oblong, oblong-elliptic or oblanceolate-oblong, acute, slightly narrowed at the base; the edges

entire, very slightly revolute when dry; both surfaces glabrous, the reticulations faint when dry; main nerves very slightly prominent on the lower surface, about 8 pairs, spreading, the intermediate nerves almost as conspicuous; length 4–6·5 in., breadth ·2–2·75 in.; petiolules unequal, ·75–2·25 in. *Panicle* terminal, glabrous, 5 or 6 in. long, with several spreading branches; the branchlets few, about ·5 in. long, each bearing an umbel of 10–20 globular flowers ·15 in. in diam. *Calyx-tube* short, widely campanulate, the limb narrowed and truncate. *Petals* 5, elliptic, glabrous. *Fruit* ovoid, somewhat succulent, smooth, faintly 6-ridged, ·25 in. long, 6-celled.

SINGAPORE; *Ridley* 6336 and perhaps also 1890a.

17. *HEPTAPLEURUM NERVOSUM*, new species. A small shrub; branches with glabrous bark pale brown when dry. *Leaves* digitate; the common petiole terete, 2–2·25 in. long; leaflets 6, very coriaceous, lanceolate, acute, the base narrowed; the edges entire, much recurved when dry; both surfaces glabrous, the upper shining, the lower dull; main nerves 7–10 pairs, straight, sub-horizontal, very prominent on the lower surface and deeply impressed on the upper when dry, length 1·5–2·5 in., breadth ·5–·9 in.; petiolules unequal, the middle two about ·75 in. long, the others about half as long. *Panicle* terminal, from 1·5–2 in. long, rusty-puberulous at first, afterwards glabrous, branches about 2, spreading, with short bracteoles at the base and above it, each ending in an umbel of 8–10 oblong pedicelled glabrous flowers ·2 in. long, their pedicels ·1–·15 in. long. *Calyx-tube* cylindrical-campanulate, the limb truncate and entire. *Petals* narrowly triangular. *Fruit* rotund-ovoid, boldly 6-ridged, 6-celled, glabrous, ·3 in. long.

PERAK, on Gunong Chabong; *Scortechini*.

A very distinct small species with rather large flowers and fruit for the genus, and prominently-nerved very coriaceous leaflets.

18. *HEPTAPLEURUM WRATI*, new species. A small tree; young branches as thick as a swan's quill, furfuraceous. *Leaves* digitate; common petiole 6–9 in. long, slender, glabrous; leaflets 7–9, thinly coriaceous, elliptic, abruptly shortly and sharply acuminate, the base rounded, the edges with shallow distant sharp serrations; upper surface glabrous, the lower glaucous and with scattered minute stellate hairy scales; main nerves 7 or 9 pairs, prominent beneath, length 3–5 in., breadth 1·75–2·25 in.; petiolules unequal, 1·5–2·5 in. long. *Panicle* terminal, longer than the leaves, furfuraceous stellate-pubescent, bearing a few rather distant, horizontal or deflexed many-flowered racemes. *Flowers* ·15 in. in diam., their pedicels ·2 in. long. *Calyx-tube* funnel-shaped, its mouth with 5 short triangular spreading teeth. *Petals* 5, elliptic-oblong, glabrous, reflexed. *Fruit* globular, prominently 5-ridged,

crowned by the long confluent column of styles, glabrous, 5-celled, .15 in. in diam.

PERAK; on Gunong Brumber Pahang, at an elevation of about 7000 feet, *Wray* 1585.

A very distinct species, at once distinguishable by its racemose panicles, and leaflets glaucous on the lower surface and with serrate edges.

19. HEPTAPLEURUM BITERNATUM, Clarke in Hook. fil. Flor. Br. Ind. II, 735. A shrub several feet high; the young shoots and the under surfaces of the leaves deciduously stellate-pubescent. *Leaves* digitately decomposed or twice pinnate, with ternate leaflets at each node of the rachis; leaflets coriaceous, narrowly-oblong, acuminate, entire, the base slightly narrowed and rounded; length 2-3.5 in., breadth .5-.75 in., petiolules .1 in. long or less, that of the terminal leaflet .4 in.; both surfaces minutely reticulate and shining, the upper glabrous, the lower with deciduous stellate pubescence. *Panicle* 8 in. long, but only about 1.5 in. across; the branches little-divided, stellate-hairy; bracts deciduous, pedicels .2 in. long.

MALACCA; *Maingay* (Kew Distrib.) 684.

Known only by Maingay's fragmentary specimens.

20. HEPTAPLEURUM HETEROPHYLLUM, Seem. Rev. Hed. 40. A bush or small tree 8-12 feet high. *Lower leaves* large, ternately decomposed, 24 in. across; common petiole 12-24 in. long; the upper leaves smaller and only twice digitate; the leaflets in all 3 to 5 on each petiolule, thinly coriaceous, variable in shape, oblong-lanceolate to elliptic or broadly ovate, shortly acuminate, narrowed or rounded at the base; the edges entire, rarely with 1 or 2 teeth near the apex; both surfaces minutely reticulate and glabrous, the lower minutely dotted; length 2.5-7 or even 9 in., breadth 1-2.25 in.; petiolules of the lower leaflets .1-.25 in., that of the terminal twice as long. *Panicles* with deciduous pale stellate pubescence, solitary or several together, 10-15 in. long, and only 1.5-2 in. across; the branches horizontal, slender, each ending in an umbel of flowers on slender pedicels, the flowers bearing fertile pistils smaller than those with fertile stamens. *Fruit* narrowly oblong, boldly 5-ribbed, glabrous, 5-celled, nearly .25 in. long, claret-coloured when ripe. Clarke in Hook. fil. Flor. Br. Ind. II, 731. *Hedera heterophylla*, Wall. Cat. 4919; G. Don. Gen. Syst. III, 394. *Paratropia heterophylla*, Presl Epimel. Bot. 250; Miq. Flor. Ind. Bat. I, Pt. I, 761.

PENANG; *Wallich*, *Curtis* 241, 2301 and possibly 1950. PERAK; *Scortechini* 145, 664; *King's Collector* 718, 2688, 8640, 8769.

21. HEPTAPLEURUM CURTISII, new species. A large shrub. *Lower leaves* bipinnate, the upper trifoliolate; common petioles of both about 8 in. long; leaflets thinly coriaceous, oblong-elliptic, sometimes slightly

obovate, the apex shortly acuminate, the edges entire in the lower half but with a few unequal scanty coarse sharp teeth in the upper half; the base slightly narrowed, sometimes oblique; both surfaces quite glabrous, shining and finely reticulate when dry; length 3–6 in., breadth 1·5–2·5 in.; petiolules unequal, the lateral ·1 in. long or absent, the terminal ·35–·8 in. *Panicle* terminal, shorter than the leaf-petioles, with several rusty stellate-tomentose bracts ·75 in. long at its base, 2-branched; the branches narrow, sparsely covered with scurfy pubescence; the lateral branchlets about ·75 in. long, slender, each bearing at its apex a crowded umbel of from 10–20 oblong flowers on pedicels ·15–·3 in. long. *Fruit* oblong, boldly 5-ribbed, crowned by the conical disc bearing 5 small rounded stigmas at its corners, 5-celled.

PENANG; at Pulo Boetong, 1950.

I have seen only two specimens (and they are both of the same gathering) of this very distinct species.

4. TREVESIA, Vis.

Shrubs or small trees, prickly or unarmed, glabrous or stellate-hairy. *Leaves* palmifid or palmisect; petioles often united by a wing at their base; stipules united within the petiole, or obsolete. *Flowers* polygamous, large for the Order; umbels paniced; pedicels not jointed under the flower; bracts small or 0. *Calyx-margin* entire or toothed. *Petals* 8–12, valvate, somewhat thick, often cohering as a cap in the fertile flowers. *Stamens* equal in number to the petals. *Ovary* with as many cells as the petals; styles connate into a short column. *Fruit* ovoid, large for the Order. *Seeds* compressed; albumen uniform. **DISTRIB.** Species about 10; natives of Eastern India, Malaya and Polynesia.

TREVESIA PALMATA, Vis. in Mem. Acad. Torino, Ser. 2, IV, 262, *with fig.* A small single-stemmed tree 10–25 feet high; young shoots ferruginous-pubescent and very prickly. *Leaves* coriaceous, large (12–24 in. in diam.), rotund in general outline, deeply palmatifid; or, in young shoots, palmatisect, widely cordate at the base, the lobes acuminate, their edges serrate or sometimes lobulate; glabrous when adult or with a few small rufous stellate hairs on the lower surface; the lobules contracted in the middle to a pseudo-petiolule (in var. *cheirantha*); petiole often prickly, 6 to 20 in. long. *Panicles* 12–30 in. long, the branches spreading, when young clothed with reddish-brown tomentum; bracts oblong, 1 in. long, usually deciduous; pedicels 1–1·5 in. long. *Flower-buds* ·12 in. in diam. *Fruit* ovoid-rotund, the ribs not prominent, crowned by the stout style, fleshy, ·5 in. in diam. *Seem.* Rev. Hed 77; *Kurz For. Flora Burma*, I, 539; *Clarke in Flor. Br. Ind.* II, 732; *Bœrlage in Ann.*

Jard. Bot. Buitenzorg VI, 108. *Gastonia palmata*, Roxb. Hort. Beng. 33; Flor. Ind. II, 407; Lindl. in Bot. Reg. t. 894. *Gilbertia palmata*, DC. Prodr. IV, 256. *Hedera ferruginea* and *H. palmata*, Wall. Cat. 4909 and 4910 (partly). *Brassaiopsis confluens*, Seem. Rev. Hed. 18 (as to the leaves). *Aralia dubia*, Spreng. Syst. Veg. IV, 2, p. 125.

PERAK; *Scortechini*; *King's Collector* 4435, 6715.

VAR. *cheirantha*, Clarke in Flor. Br. Ind. II, 732; laminæ of the lobes cut away in the middle so as to expose the midrib and form a pseudo-petiolule. *Hedera? cheirantha*, Jack in Wall. Cat. 4925; Wall. Cat. 4910 in part.

PERAK; *Wray* 2322; *King's Collector* 2308; *Scortechini* 344.

5. DENDROPANAX, Decne and Planch.

Unarmed glabrous trees or shrubs. *Leaves* simple, entire, (palmately 3-5-lobed on young shoots). *Umbels* solitary or in small panicles; bracts small or none; pedicels not jointed under the flower. Limb of the calyx entire or 5-toothed. *Petals* 5, free, valvate, rather thick. *Stamens* 5. *Styles* united into a column at the base, free at the apex. *Fruit* globose or ellipsoid, succulent, distinctly or obscurely 5-ribbed. *Seeds* compressed; albumen uniform. **DISTRIB.** about 12 species mostly tropical American; one Japanese; one Indo-Chinese.

DENDROPANAX MAINGAYI, new species. A shrub; young branches with corky bark, pale-brown when dry, all parts except the umbels glabrous. *Leaves* alternate or sub-opposite, thinly coriaceous, oblong-ovate, oblong or lanceolate, acute; the base rounded, sometimes slightly narrowed; the edges entire and slightly recurved when dry; both surfaces glabrous, dull, the midrib prominent on the lower and sending off near its base two bold curving nerves running at some distance from the margin to the apex and, above the origin of these, 7-8 pairs of faint horizontal nerves; length 2-3.25 in., breadth 1-1.75 in., petioles varying from .25-1.5 in. in length. *Umbel* simple, terminal, its pedicel .35-.5 in. long; flowers 8-12, oblong, pedicelled, .2 in. long, their pedicels .25-.4 in. long. *Calyx* cylindric-campanulate, puberulous, its mouth with 5 sharp triangular teeth. *Petals* broadly lanceolate, acute, quite free. *Fruit* globular, succulent, glabrous, .3 in. in diam. *D. parviflorum*, Clarke in Hook. fil. Flor. Br. Ind. (not of *Bentham*).

MALACCA; *Maingay* (Kew Distrib.) 682; *Griffith* 2685-1. PERAK; *Scortechini* 308.

This *Dendropanax*, found in Malacca and Perak, does not agree with specimens of *D. parviflorum*, Benth., collected in Hongkong. It appears to me to be a distinct species hitherto un-named.

6. ARTHROPHYLLUM, Blume.

Shrubs or small trees, unarmed. *Leaves* glabrous or sub-glabrous, the lower large and compoundly pinnate, the uppermost opposite and simple, the intermediate 3-foliolate; leaflets easily separable from the rachis; stipules forming a ligule within the petiole. *Inflorescence* a terminal compound umbel, the terminal umbellules peduncled; bracts very small; pedicel not jointed under the flower. *Calyx-teeth* 5, small. *Petals* 5, valvate. *Stamens* 5. *Ovary* 1-celled, 1-ovuled; style short, simple. *Fruit* (in the Indian species) ovoid, not angular. *Seed* sub-globose; albumen ruminant. **DISTRIB.** Species 3, Malayan.

The 1-celled ovary is anomalous in this Order, and this genus was excluded from *Araliaciæ* by Seemann.

- | | | | |
|---------------------------------------------------|-----|-----|------------------------------|
| Lower leaves pinnately decomposed | ... | ... | 1. <i>A. diversifolium</i> . |
| Lower leaves simply pinnate, or at most bipinnate | ... | ... | 2. <i>A. pinnatum</i> . |

1. ARTHROPHYLLUM DIVERSIFOLIUM, Blume Bijdr. 879. A shrub or small tree, all parts except the umbels glabrous. Lower leaves large, pinnately decomposed, with pairs of opposite leaflets at the main divisions, the upper leaves smaller and simply pinnate, and the uppermost of all trifoliolate or simple; leaflets coriaceous, oblong or elliptic, acute, narrowed at the base, entire; length 1.5–3 in., breadth 1.25–2.25 in.; petiolules .25–.45 in., slender. *Inflorescence* a compound umbel; the peduncles of the ultimate umbels unequal, covered with warm brown deciduous stellate tomentum; lengthening in fruit to .5–1.5 in.; pedicels .25 in. long; *fruit* ovoid-globose, not ridged, crowned by the conical disc, glabrous. Clarke in Hook. fil. Flor. Br. Ind. II, 734; Miq. Flor. Ind. Bat. I, Pt. I, 767. *A. javanicum*, Blume Bijdr. 879; DC. Prodr. IV, 266; Kurz For. Flor. I, 540. *A. ellipticum*, Blume and DC. l. c. *A. Blumeanum*, Zoll. & Mor. Verz. 41; Miq. l. c. 1, 768. *A. ovalifolium*, Jungh. & De Vriese in Miq. l. c. t. 14. *Panax polycarpum*, Wall. Cat. 4930. *P. Jackianum*; Wall. Cat. 4931. *Hedera Jackiana*, G. Don Gen. Syst. III, 394. *H. ? ovata*, Wall. Cat. 4911. *Eupteron*, sp. nov. Kurz Andam. Rep. Suppl. B 9.

MALACCA; *Griffith* (Kew Distrib. 2675). SINGAPORE; *Anderson* 48, 185; *Hullett* 351, 393; *Ridley*, 5838. PENANG; *Curtis* 781. PERAK *Wray* 2012, 3063; *King's Collector* and *Scortechini*, many numbers. ANDAMAN ISLANDS; *Kurz*.

2. ARTHROPHYLLUM PINNATUM, Clarke in Hook. fil. Flor. Br. Ind. II, 734. A bush; all parts glabrous. *Leaves* pinnate, rarely bipinnate or simple; the pinnate ones 12–18 in. long and with 5–17 leaflets; leaflets varying in size, coriaceous, lanceolate, caudate-acuminate, tapering to the base; the edges entire, glabrous; length 1.25–4 in., breadth .4–1 in., petiolule absent or only .1 in. in length. *Umbels* with few

umbellules, their peduncles 1·5–2 in. long; pedicels glabrous or with rusty stellate deciduous pubescence; fruit sub-globose, shining, ·15 in. in diam. *Panax pinnatum*, Lamk. Dict. II, 715; DC. Prodr. IV, 254; Wall. Cat. 9057. *P. secunda*, Schultz Syst. VI, 215. *Nothopanax? pinnatum*, Miq. Flor. Ind. Bat. I, Pt. I, 766.

PENANG; *Wallich*, *Maingay* (Kew Distrib.) 679. MALACCA; *Main-gay* 677; *Griffith* (Kew Distrib.) 2676; *Ridley* 3224. PERAK; *Wray* 330, 1475; *Scortechini* 352.

7. WARDENIA, new genus.

A miniature tree with prickly stem, otherwise unarmed. *Leaves* coriaceous, simple, on long terete petioles expanded at the base into a short sheath with 2 minute stipules on its inner surface. *Inflorescence* a terminal shortly-branched compound umbel. *Flowers* hermaphrodite. *Calyx-tube* narrowly campanulate, its limb with 5, small, spreading teeth. *Petals* 5, calyptrate, their edges slightly infolded, valvate below, slightly imbricate near the apex; the midribs prominent on the inner surface. *Stamens* 5, alternate with the petals; the filaments short, straight; the *anthers* versatile; the cells linear, quite separate from each other, each united by its middle to the tip of the filament. *Disc* large, fleshy, convex, covering the whole of the apex of the ovary, slightly 5-lobed. *Styles* united to form a short thick column without any distinct stigmatic enlargement; ovary 1-celled, with 2 parallel pendulous ovules. *Fruit* 2-celled, by the formation of a dissepiment not present in the ovary, 2-seeded; *seeds* compressed. A single species.

This genus is allied to *Arthrophyllum*; but its ovaries, although one-celled, have two pendulous ovules. The fruit, however, is two-celled, by the subsequent formation of a dissepiment, and is 2-seeded. The leaves moreover are all simple. The seeds of the few specimens which I have seen are quite young and the nature of the albumen cannot be made out. I have named the genus in honour of my friend Brigade-Surgeon Lt.-Colonel C. J. H. Warden, a distinguished pharmacologist and one of the authors of the *Pharmacographia Indica*.

WARDENIA SIMPLEX, King. A shrub 6–8 in. high, deciduously rufous-pubescent towards the apex, prickly near the base. *Leaves* simple, elliptic, tapering gradually to the shortly acuminate apex, not narrowed to the slightly cordate base; both surfaces bearing minute scattered rusty stellate hairs; length 8–15 in., breadth 3·5–7 in., petiole 5–10 in. *Flower* buds ·1 in. in diam., conical; pedicels ·6–·9 in. long, slender, rusty-pubescent, the umbels 10–20-flowered. *Calyx* slightly rusty-pubescent. *Petals* glabrous. *Fruit* elliptic-globose, sub-glabrous, ·2 in. long, crowned by the calyx and by the slender conic stylar column.

PERAK; near Ulu Kerling, *King's Collector* in flower during March only once collected.

8. HETEROPANAX, Seem.

A small unarmed tree. *Leaves* glabrous or nearly so, very large, pinnately decomposed, stipules not prominent. *Panicles* large, the branches bearing umbels, stellate-hairy; bracts of umbels small, ovate, obtuse, persistent; pedicels not jointed to the flowers. *Flowers* polygamous, the female flowers most numerous in the terminal umbel. *Calyx-limb* minutely toothed. *Petals* 5, valvate. *Stamens* 5, filaments filiform, anthers ovate. *Disk* nearly flat; ovary 2-celled; styles 2, slender, free from the base, spreading, the stigmas sub-terminal. *Fruit* laterally compressed, coriaceous, almost didymous, 2-seeded. *Seeds* compressed, albumen ruminant. Species 1 or 2; Indo-Chinese.

HETEROPANAX FRAGRANS, Seem. Rev. Hed. 73. A tree 40–60 feet high; all parts glabrous. *Leaves* large, the lower often 3 feet across, pinnately decomposed, the pinnae with a pair of opposite leaflets at their forks; leaflets ovate or ovate-oblong, acute or acuminate; the base slightly oblique, not narrowed; variable in size (2·5–5 in. long, and 1·5–2·5 in. broad); petiolules of lateral leaflets ·1–·2 in. long, that of the terminal one ·8–1 in. *Panicles* terminal, longer than the leaves; *flowers* small, whitish-tomentose, in small condensed umbels, their pedicels under ·25 in. long; *fruit* compressed, sub-reniform, sub-glabrous, slightly glaucous, ·35 in. across. Brandis For. Flora 249 Kurz For. Flora Burma, I, 541; Clarke in Hook. fil. Flor. Br. Ind. II, 734. *Panax fragrans*, Roxb. Hort. Beng. 21; Flor. Ind. II, 76; Wall. Cat. 4929; DC. Prodr. IV, 254 (*excl. syn. of Don*).

ANDAMAN ISLANDS; *King's Collector*. **DISTRIB.** Brit. India, Java, China.

9. BRASSAIOPSIS, Decne. & Planch.

Large shrubs or trees, glabrous or tomentose, armed or not. *Leaves* digitate or palmate or angled; stipules connate within the petiole, not prominent. *Umbels* in large compound panicles, young parts at least stellately tomentose; bracts not large, often persistent; pedicels rising from a dense cluster of persistent bracteoles, not jointed under the often polygamous flowers. *Calyx* 5-toothed. *Petals* 5, valvate. *Stamens* 5. *Ovary* 2-celled; styles 2, united, long or short. *Fruit* broadly globose or turbinate, 2- or (by abortion) 1-seeded. *Seed* not compressed; albumen ruminant. **DISTRIB.** Species 11; Northern Brit. India to Java.

BRASSAIOPSIS PALMATA, Kurz in Journ. As. Soc. Beng. XXXIX

(1870) Pt. II, 77. A small sparingly prickly tree with simple stem slightly branched near the top; young shoots covered with tawny or rusty scurfy tomentum. *Leaves* crowded at the ends of the stem and branches, large, 9–15 in. across, coriaceous, rotund in general outline, cordate at the base, palmately lobed about half or more than half way down; the lobes 5–9, oblong, or sometimes sinuate towards the base, acuminate, serrate; upper surface glabrous, lower sub-glabrous; the petiole 10–20 in. long, without prickles, scurfy-tomentose when young, ultimately glabrous. *Inflorescence* rusty-tomentose, terminal, paniced, the ultimate branches bearing many-flowered bracteolate umbels; flowers 1.5 in. across, their pedicels .5–.7 in. long; rim of calyx narrow, irregularly toothed. *Fruit* broadly elliptic or turbinate, terete, .3 in. long, as large as a pea, crowned by the slender column of connate styles; cocci 1 or 2, with chartaceous pericarp, 1-seeded. Kurz For. Flor. Burma I, 537; Clarke in Hook. fil. Flor. Br. Ind. II, 735. *Panax palmatum*, Roxb. Hort. Beng. 21; Flor. Ind. II, 74. *Hedera polycantha*, Wall. Pl. As. Rar. II, t. 190; Cat. 4907 B.

This species is closely allied to *B. Hainla*, Seem., from which it differs chiefly in having leaves with deeper narrower more serrate lobes, and also in having rusty instead of pale tomentum on the young shoots and inflorescence. The two are in my opinion rather too closely allied to be kept distinct as species. In his distribution, Wallich issued both under the name *Hedera polycantha* and the number 4907.

PERAK; *Scortechini* 17, 146; *Ridley* 3018; *King's Collector* 2598. **DISTRIB.** Brit. India, along the base of the Himalaya; Assam and Burma.

VAR. *andamanica*, lobes of leaves obovate-oblong, the edges almost entire; inflorescence a narrow panicle nearly as long as the leaves. *Araliopsis andamanica*, Kurz in Andaman Report, App. B, 9.

ANDAMAN ISLANDS; *Kurz*, *King's Collectors*.

10. HEDEROPSIS, C. B. Clarke.

A glabrous unarmed tree. *Leaves* 1–3-foliolate; leaflets lanceolate, denticulate or nearly entire; base of petiole much dilated; stipules inconspicuous. *Umbels* paniced; bracts and bracteoles deciduous; pedicels jointed close under the flowers. *Calyx* margined, somewhat prominently 5-toothed. *Petals* 5, valvate. *Stamens* 5. *Ovary* 5-celled; styles connate. *Fruit* berried, large, sub-globose, crowned by the stout persistent style. *Seeds* 5–4; albumen ruminated.

HEDEROPSIS MAINGAYI, Clarke in Hook. fil. Flor. Br. India, II, 739. Leaflets of the compound leaves membranous, ovate-lanceolate, acuminate, narrowed at the base, nerves faint, length 3–5 in., breadth 1.5–2

in., petiolules 1-2 in. Simple leaves as long as 8.5 in. and about 4 in. broad; petiole 1-2 inches. *Inflorescence* a panicle of umbels with puberulous peduncles 1 in. or more long. *Calyx-tube* sub-globular, puberulous. *Petals* ovate-lanceolate, spreading, .15 in. long. *Fruit* (unripe) more than .5 in. long, including the conical disc and persistent style.

MALACCA; *Maingay* (Kew Distrib.) 683.

This plant has not been collected since Maingay's time, and it is known only from his fragmentary specimens.

11. TUPIDANTHUS, H. f. & T.

A large glabrous shrub, at first erect but afterwards a lofty climber. *Leaves* digitate; leaflets glabrous, leathery, entire; stipules connate within the petiole. *Inflorescence* a compound umbel or small panicle; pedicels thick, not jointed under the flowers. *Calyx-margin* obsolete. *Petals* closely connate, falling off in a cap. *Stamens* very many, in two or several series. *Ovarian* cells and stigmas very numerous; the latter sessile, radiating, crowded but not connate. *Fruit* globose, depressed, succulent.

TUPIDANTHUS CALYPTRATUS, Hook. fil. and Thoms. in Bot. Mag. t. 4908. *Leaflets* 7-9, oblong or oblong-obovate, acute or blunt, 4-7 in. long, and 1.75-3.5 in. broad, the petiolules 1-2 in.; the common petiole 6-15 in. *Inflorescence* umbellate, 3-4-branched; the branches stout, short and with large coriaceous bracts at their bases; the ultimate umbels with 3-7 pedicellate flowers nearly 1 in. across; calyx-tube glabrous, thickly coriaceous. *Stamens* 50-70, crowded. *Fruit* sub-globose, succulent, 1.25-1.5 in. in diam. when ripe. Seem. Rev. Hed. 6; Clarke in Hook. fil. Flor.Br. Ind. II, 740.

PERAK; on Gunong Ulu Sungei, elevat. 4500 feet; *Wray* 1594. DISTRIB. Burma; Khasia Hills and probably Java.

Mr. Wray's specimens were collected at an elevation much higher than this species ever ascends to in British India. They have smaller leaves with blunt leaflets, but are otherwise indistinguishable from the British Indian plant.